S. HRG. 109–827, PT. 4

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2007

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

SECOND SESSION

ON

S. 2766

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2007 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 4
AIRLAND

MARCH 1, 28; JULY 25, 2006

Printed for the use of the Committee on Armed Services

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CONTENTS

CHRONOLOGICAL LIST OF WITNESSES

Army Transformation and the Future Combat Systems Acquisition Strategy

MARCH 1, 2006

	Page
Cody, GEN Richard A., USA, Vice Chief of Staff, United States Army	6
Bolton, Hon. Claude M., Jr., Assistant Secretary of the Army for Acquisition, Logistics, and Technology	18
Francis, Paul L., Director, Acquisition and Sourcing Management, Government Accountability Office	21
Graham, David R., Deputy Director, Strategy Forces and Resources Division, Institute for Defense Analyses	31

Air Force and Navy Tactical Aviation Programs

MARCH 28, 2006

Sullivan, Michael J., Director, Acquisition and Sourcing Management Team, United States Government Accountability Office	77
Marron, Donald B., Acting Director, Congressional Budget Office	92
Bolkcom, Christopher, Specialist in National Defense, Congressional Research Service	98
Hoffman, Lt. Gen. Donald J., USAF, Military Deputy, Office of the Assistant Secretary of the Air Force for Acquisition	103
Kilcline, RADM Thomas J., Jr., USN, Director, Air Warfare Division, United States Navy	130
Enewold, RADM Steven L., USN, Program Executive Officer, Joint Strike Fighter Program	134

F–22A Multiyear Procurement Proposal

JULY 25, 2006

Wynne, Hon. Michael E., Secretary of the Air Force	407
Walker, Hon. David M., Comptroller General of the United States	411
Finley, Hon. James I., Deputy Under Secretary of Defense for Acquisition and Technology	417
Newman, David B., Principal Analyst in Defense, Congressional Budget Office	478
Nelson, J. Richard, Research Staff Member, Operational Evaluation Division, Institute for Defense Analyses	482
Bolkcom, Christopher, Specialist in National Defense, Congressional Research Service	485
Brian, Danielle, Executive Director, Project on Government Oversight	494

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2007

WEDNESDAY, MARCH 1, 2006

U.S. SENATE,
SUBCOMMITTEE ON AIRLAND,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

ARMY TRANSFORMATION AND THE FUTURE COMBAT SYSTEMS ACQUISITION STRATEGY

The subcommittee met, pursuant to notice, at 2:41 p.m. in room SR–232A, Russell Senate Office Building, Senator John McCain (chairman of the subcommittee) presiding.

Committee members present: Senators McCain, Sessions, and Lieberman.

Majority staff members present: Ambrose R. Hock, professional staff member; Gregory T. Kiley, professional staff member; and Elaine A. McCusker, professional staff member.

Minority staff member present: Daniel J. Cox, Jr., professional staff member.

Committee members' assistants present: Christopher J. Paul, assistant to Senator McCain; John A. Bonsell, assistant to Senator Inhofe; Arch Galloway II, assistant to Senator Sessions; Frederick M. Downey, assistant to Senator Lieberman; Elizabeth King, assistant to Senator Reed; and William K. Sutey, assistant to Senator Bill Nelson.

OPENING STATEMENT OF SENATOR JOHN MCCAIN, CHAIRMAN

Senator MCCAIN. Good afternoon. The Airland Subcommittee meets today to receive testimony on Army Transformation and the Future Combat Systems (FCS). The hearing will be conducted in two panels. The first panel will testify on the budgetary aspects of Army transformation, and will specifically discuss Army force structure, Army aviation, and modularity in the communications program, complementary to the FCS.

We welcome Secretary Bolton and General Cody, and we extend our profound respect to those who serve—and our thoughts and prayers are with their families—who are serving with great distinction in our Armed Forces—in the Army, in particular.

The 2007 Army budget request of $110.4 billion is a 12.7-percent increase over fiscal year 2006, authorized in appropriated levels of $99.3 billion. This increase is reflected primarily in the procure-

ment account. 2007 reflects the first year the Army has budgeted for modularity in its base budget, instead of supplemental appropriations. Not included in the fiscal year 2006 almost $70 billion are of supplemental appropriations. Of the $70 billion for the Army in the supplemental, $15.2 billion in the procurement account funds modularity, force protection and recapitalization, equipment, and combat losses. This committee has jurisdiction over all of these areas, but, by funding these areas through the supplemental budget, has little oversight. This is a concern to me and other members of the committee.

Yesterday, we learned from the press that the Army leaders sliced nearly 3 billion from their latest wartime supplemental spending request, under last-minute orders from the White House, foregoing money needed to upgrade a hard-worn fleet of heavy tanks and armored vehicles. The report goes on to say the budget-cutting decision is expected to shut down production lines, at least temporarily, on the Abrams tank and the Bradley fighting vehicle, resulting in long modernization delays for the aging platforms, and perhaps thousands of layoffs around the country.

The Army's Abrams tank and Bradley fighting vehicle programs have been funded through supplemental budgets for their last several years. In some cases, the programs have been funded through earmarks to the base and supplemental budget requests, and I have opposed those emergency supplemental earmarks.

After last year's Airland Subcommittee hearing on Army Transformation and the FCS, Secretary Harvey met with me and agreed to convert the FCS other transaction authority contract to a more traditional Federal Acquisition Regulation (FAR) Part 15 contract. I congratulate the Army on that decision, and we look forward to receiving an update on the progress of the FCS contract conversion.

FCS remains a particular concern, particularly the use of a lead systems integrator (LSI). That's why the FCS LSI is a topic of the second panel. Secretary Bolton, thank you for sitting on the second panel. You'll be joined by Paul Francis, Director of Acquisition and Sourcing Management, Government Accountability Office (GAO), and Dr. David Graham, Deputy Director, Strategy Forces and Resource Divisions, Institute for Defense Analyses (IDA).

According to the report, IDA Review of FCS Management, Army documentation noted that one of the critical reasons to select the Boeing/Science Applications International Corporation (SAIC) as the LSI was because it would have an integrating role, not a producing one in developing FCS, opening up potential opportunities for non-LSI companies in FCS development.

Additionally, the IDA report states that the LSI is intended to act as a neutral party in assessing program tradeoffs and in offering advice. Thus, in theory, the LSI should not have a financial stake in developing and building the individual elements of the system; rather, it should recruit and oversee the best of industry.

In the case of FCS, Boeing has a large financial stake in the future of the program; thus, creating an inherent tension in Boeing's roles and responsibilities. The IDA review examined Boeing's formal ethics program in depth, looked briefly into the ethics programs and the other companies involved in FCS, and considered Government workforce ethics issues, as well. The report made sev-

eral recommendations regarding improvement to the ethics program and we look forward to hearing how the Army has addressed these recommendations.

I thank everyone for being here today. I look forward to your testimony and I want to thank Senator Lieberman for his leadership on this subcommittee and for continuing the bipartisanship this subcommittee has enjoyed over the past 6 years.

Senator Lieberman.

STATEMENT OF SENATOR JOSEPH I. LIEBERMAN

Senator LIEBERMAN. Thanks, Mr. Chairman. It is always a pleasure to work with you in support of our Nation's military.

I want to welcome Assistant Secretary Bolton, General Cody, Mr. Francis, and Dr. Graham. Thank all of you for not only being here, but really, more fundamentally, for your continued military and governmental service to our country. We recognize the important jobs you undertake to ensure that our Army maintains its superiority worldwide.

The President's budget request for the Army is 12 percent higher than last year's. That is good news—very good news. Some of that increase is a result of including the cost of the Army Modularity Program (AMP) in the base budget rather than in the emergency supplemental request. That, too, is good news. However, I'm concerned about other potential shortfalls in modularity and reset. It appears that the administration's fiscal year 2006 supplemental budget request covers only about $10.4 billion of the Army's estimated fiscal year 2006 $13.5 billion requirement for reset, repair, recapitalization, and replacement of equipment of units redeploying from Iraq and Afghanistan. Also, the Army's estimate of an additional $20 billion requirement for reset in fiscal years 2007 to 2011 assumes that units will begin withdrawing in the summer of 2006 from Iraq, and complete that withdrawal within 2 years. Should that assumption prove wrong, the program cost of reset will certainly require an increase. At this moment, it's hard to say, though we hope it does not prove wrong, whether it will or not.

I remain concerned about the organization, force structure, and size of the Army. At this moment in time, the U.S. Army is comprised of truly the best and brightest soldiers in its history. The Army's service men and women are committed to their mission, exhibit courage beyond any normal expectations, and demonstrate impressive technological capabilities.

The quality of our soldiers is not my concern. My concern is whether there are enough of them. Common sense dictates that we must question the Quadrennial Defense Review's (QDR) recommendation that the Army decrease its size at this point in time. Right now, there are about 500,000 Active solders in the Army, which is down from 800,000 at the end of the Cold War. Even though everyone acknowledges that we are now engaged in a long war against Islamist terrorism, the QDR suggests that this number should decrease to 482,000 by fiscal year 2011 which I think any of us will say, by 2011, we'll still be in this long war, unfortunately. I know of no instance in our Nation's history in which we cut our Army during wartime and I'd like to ask about that.

In order to improve its deployability, the Army has proposed an increase in the number of combat brigades. As part of its modularity plan, the Army will reorganize from 33 brigades to 42 brigades. But each of these new brigades contains only two maneuver battalions, instead of the longstanding standard of three. Under this plan, the Army will have more brigades, but fewer maneuver battalions and maneuver companies and I'd like to ask some questions about that.

Finally, at this hearing I would welcome an update on the FCS. Last year, this committee was able to protect the FCS from potentially damaging legislation. But should supplemental budget request levels remain high, that program will undoubtedly come under increased funding pressure and we need to hear from you and work with you to protect that part of the Army's future.

Mr. Chairman, I'd ask that my full statement be included in the record. I look forward to the testimony of the witnesses.

Senator MCCAIN. Without objection.

PREPARED STATEMENT BY SENATOR JOSEPH I. LIEBERMAN

Good afternoon and thank you all for attending. This hearing is an opportunity to continue the discussions about the Army's future plans, which we began at the full Senate Armed Services Committee hearing on February 14. Assistant Secretary Bolton, General Cody, Mr. Francis, and Dr. Graham, I want to thank you for coming here today to testify on these issues. I appreciate your continued military and, Government service, and recognize the important jobs you undertake to ensure that our Army maintains its superiority worldwide.

The President's budget request for the Army is 12 percent higher than last year's. That is good news. Some of that increase is a result of including the cost of the Army modularity program in the base budget rather than in the emergency supplemental requests. I hope this hearing addresses any known shortfalls in resources for modularity and reset. It appears that the administration's fiscal year 2006 supplemental budget request covers only about $10.4 billion of the Army's estimated fiscal year 2006 $13.5 billion requirement for reset—the repair, recapitalization, and replacement of equipment for units redeploying from Iraq and Afghanistan. Also, the Army's estimate of an additional $20 billion requirement for reset in fiscal years 2007–2011 assumes that units will begin withdrawing from Iraq in the summer of 2006 and complete that withdrawal within 2 years.

I remain concerned about the organization, force structure, and size of the Army. At this moment in time, the United States Army is comprised of the best and brightest soldiers in its history. The Army's service men and women are committed to their mission, exhibit courage beyond expectation, and demonstrate impressive technological capabilities. The quality of our soldiers is not the problem. The problem is that there are not enough of them.

Common sense dictates that we must question the Quadrennial Defense Review's (QDR) recommendation that the Army decrease its size at this point in time. Right now, there are about 500,000 Active soldiers in the Army, which is down from 800,000 at the end of the Cold War. Even though we are engaged in a "long war," the QDR suggests that this number should decrease to 482,400 by fiscal year 2011. I know of no instance in our Nation's history in which we cut our Army during wartime.

At the very moment when our Nation's strategic challenges are expanding in scope to include irregular, catastrophic, and asymmetric threats, it is simply not sensible that the Army reduce its end strength to the level it was after the fall of the Soviet Union and before September 11. In fact, with an increase of 12 percent in the Army's budget for next year, it is hard to understand why a portion of these additional funds were not targeted towards expanding our ground forces.

In order to improve its deployability, the Army has proposed an increase in the number of combat brigades. As part of its modularity plan, the Army will reorganize from 33 brigades to 42 brigades. But each of these new brigades contains only two maneuver battalions instead of the longstanding standard of three battalions. Under this plan, the Army will have more brigades, but fewer maneuver battalions and maneuver companies. I know that technology can multiply the effectiveness of our soldiers, but that improvement only goes so far. It is difficult to understand how

smaller brigades engaged in irregular warfare will have the capability of covering the same territory as the previous components or providing commanders with the same tactical flexibility. Furthermore, with more brigades, there is a need for additional headquarters and overhead. Reputable outside voices have raised concerns about the Army's decisions. It is very important that we examine whether this reconfiguration is the best way to organize the Army's scarce resources.

Engaging in combat with the enemy is only one of the tasks our soldiers must perform today. They must also control populations, repel insurgencies, perform humanitarian work, and defeat terrorists. With these added responsibilities, it seems sensible to conclude that we need more boots on the ground. In this respect, this budget and the QDR point us in the wrong direction.

The transformation of our Army is not only a matter of reorganization. More robust education and training will play a vital role as the Army prepares for the complex strategic threats outlined in the QDR. Our soldiers need sophisticated training that will prepare them to think critically in the battlefield now, and even more importantly, in the future. A substantial investment in linguistics and cultural awareness is a good starting point. But the Army must make an ambitious pedagogical commitment that extends beyond these goals. That requires more time than ever before, and an Army training and educational base that is better than ever. We can't do that if our institutional Army is stripped of the numbers and quality of informed personnel it needs and if our soldiers are too busy to train and learn. Operational efficiency is not enough; the Army must produce soldiers who can think analytically.

An important component of military transformation involves an investment in research and forward-thinking scientific innovations. But technology is not the whole picture. We also need to think about investing in human capital. To a large extent, the irregular threats we face in the future will be won on the ground. Our soldiers will be making difficult tactical decisions that can change a potentially fatal encounter to a strategic success. To train our soldiers adequately for these future challenges, the Army must invest in education. We cannot do that if we do not have enough soldiers in the Army to support our troops in combat. If the Army reduces its size, it becomes much harder to focus on important non-combat functions, such as education, which will enable the Army to meet its future strategic goals.

At this hearing, I also welcome an update on Future Combat Systems (FCS). Last year this committee was able to protect FCS from potentially damaging legislation. But should supplemental budget request levels remain high, that program will undoubtedly come under increased funding pressure.

I look forward to learning more about the progress the Army has made on FCS and its capabilities. It is my understanding that FCS relies on several dozen technologies, all of which contribute to the creation of a battle network. I am interested in learning more about the technologies that are essential for the development of FCS, and the risks associated with them. FCS is at a stage of development in which the Army should be able to provide this committee with a precise definition of the program. I hope that during this hearing, we will hear such a description.

I look forward to hearing the testimony today, and I hope the discussion addresses both the Army's need for technological innovation and the structural requirements needed to wage the "long war" on terrorism.

Senator MCCAIN. We welcome Secretary Bolton and General Cody. As always, your full statement will be made part of the record, and we recognize and thank you for coming.

Mr. BOLTON. Mr. Chairman, Senator Lieberman, thank you very much for this opportunity. In the interest of time, I'll save my remarks——

Senator MCCAIN. I think you need to pull the microphone a little closer, Mr. Secretary. Thank you.

Mr. BOLTON. Thank you for this opportunity, and I'll save my remarks for the second panel. Thank you for your support and your guidance. I'll turn it over to General Cody, our Vice Chief.

Senator MCCAIN. Thank you.

General Cody.

STATEMENT OF GEN RICHARD A. CODY, USA, VICE CHIEF OF STAFF, UNITED STATES ARMY

General CODY. Mr. Chairman, Senator Lieberman, Senator Sessions, thanks for the opportunity to speak to you today about our Army, our Army Transformation, and the Army Modular Force (AMF).

A great deal has changed since I testified before you last year. I have carefully read your letter inviting me here, and I'm eager to answer your questions.

That said, I'm going to keep my opening remarks rather brief, and focus on answering your questions.

As many of the issues we will discuss today are complex, I have brought a few charts to assist in answering your questions. With your permission, Mr. Chairman, I would like to be able to show these at the appropriate time, things like organizational charts, to get to the complexity of the issues, so that I can better answer your questions. I've also provided some packets with these slides.

On behalf of our Army's 600,000 soldiers that are on Active-Duty today around the world, more than 110,000 of them now serving in harm's way in Afghanistan and Iraq. I want to thank you for your support in providing our soldiers the mission-essential equipment and resources they need to prosecute this long war on terrorism.

Our Army is at war, and it's also an Army in motion. We continue to transform, modernize, reset, and realign our global force posture while engaged around the world. We're aggressively evolving from a division-dependent force that was postured to deter and to wage war against traditional 20th-century adversaries to a now more modular brigade-centric force designed to meet the challenges of both today's and tomorrow's asymmetric threats. Restructuring our brigade combat teams under Army modularity addresses the irregular warfare and counterinsurgency operations that we are now facing in Iraq and Afghanistan, as well as the full range of military operations we anticipate to be confronted within the future.

Our modular brigade combat teams are more lethal, mobile, survivable, adaptable, sustainable, and ready for joint and expeditionary operations for the full range of military operations. Our Army modular brigades that we now have in combat with the 101st Airborne Division and with the 4th Infantry Division are the most versatile units we have ever fielded. In addition to their strategic and operational deployability, they remain flexible and fully capable of irregular warfare and the entire spectrum of military operations, to include both civil support and homeland defense missions. They will do this through the state-of-the-art command and control, as well as technology inserts.

As we are building the modular brigades for our Active Army National Guard and Army Reserve components, our Army is moving ahead aggressively with the FCS program, our first major modernization program in more than 30 years that, simply put, is the most effective way for us to modernize our Army for future threats.

Funding for the FCS program is critical to providing our soldiers the means to dominate the future fight. The FCS is not only a program of the future in which we will spin out mature technologies to our entire Army structure, we are today spiraling FCS-like tech-

nologies into our formation and cascading them across the force to increase the capabilities of, and provide greater protection for, our soldiers.

2007 will be a pivotal year for the Army. Each of our Army's major initiatives, the Active component and Reserve component rebalance, Army modularity, the Integrated Global Positioning and Basing Strategy, Base Realignment and Closure (BRAC), operations in Iraq and Afghanistan, the temporary growth of 30,000 in the Active Force, and the reset and modernization of our equipment, all of those will be fully underway and fully integrated in fiscal year 2007.

With your support, we're executing a fully integrated plan to best serve the Nation to deal with the challenges we face today, and will continue to confront tomorrow, as well as sustain this All-Volunteer Force. I assure you that our soldiers, the centerpiece of all that we do, continue to serve magnificently.

I just returned from Kuwait and Iraq. Our soldiers know we are waging a long war, and they believe in their mission, the Soldier's Creed, and the Warrior Ethos. Their voluntary service is proof of their pride in each other and their confidence in their leadership and their unwavering patriotism. They are a solid green line in defense of this Nation forward.

Our soldiers understand our Army values, and personify this Nation's highest ideals. Our Nation must remain equally committed to them by providing the resources they need to succeed in their mission. With your continued support, I know we will succeed.

Thank you, again, Mr. Chairman. I look forward to your questions.

[The prepared statement of General Cody follows:]

PREPARED STATEMENT BY GEN RICHARD A. CODY, USA

Mr. Chairman, Senator Lieberman, and distinguished members of the committee, thank you for this opportunity to speak to you today about Army Transformation and the Army Modular Force. On behalf of our Secretary, Dr. Francis Harvey, our Chief of Staff, General Pete Schoomaker, and the approximately 600,000 soldiers on Active-Duty around the world—more than 110,000 of them serving in harm's way in Afghanistan and Iraq—let me offer a sincere "thank you" for your committed investment in our men and women in uniform. Our soldiers appreciate the support of this committee, and your tireless work to provide them the mission-essential resources to prosecute and win the war on terrorism.

Our Army is an Army in motion. We continue to transform, to modernize, and to realign our global force posture to meet current demands and future challenges. The Army plan is driving change at an unprecedented pace. We are aggressively evolving from a division-dependent force postured to deter and to wage war against traditional adversaries, to a modular brigade-centric force designed to meet the challenges of tomorrow's asymmetric enemy. With your support, we have resourced and are executing a fully integrated plan to best serve the Nation, to deal with the challenges we face today and will confront tomorrow, and to sustain our volunteer soldiers in this time of war. To execute The Army plan, we are depending upon continued Congressional assistance in several key areas: Expediting those wartime acquisitions essential to equipping and protecting our soldiers; maintaining investment in emerging technologies to complete conversion to the Army Modular Force and execute the Future Combat System (FCS) strategy; and sustaining the support of the American people whom we serve.

To sustain the current mission posture for future commitments, and maintain risk at acceptable levels, the Army needs full funding of our request in the 2007 President's budget and supplemental funding. This supplemental funding is required for combat and contingency operations, and reset and replacement of equipment through at least 2 years beyond the conclusion of major operations. Prior to September 11, many of our units, especially within our Reserve components, were inad-

equately equipped due to years of insufficient modernization investment. To meet the needs of the combatant commanders for the global war on terrorism, we had to pool personnel, vehicles, and equipment from across the force to make some units whole before they deployed.

Thanks to this committee and the administration, we have received unprecedented support to correct previous procurement deficits and broaden our operational capabilities to meet the complex challenges of the 21st century security environment. In addition, we are increasing the quality and the effectiveness of our principal fighting units, the Brigade Combat Teams (BCTs), by creating a rotational pool of 70 fully-manned, equipped, and trained modular BCTs: 42 in the Active component and 28 in the Army National Guard. We will support these BCTs with more than 200 Active and Reserve support brigades, organized not just for the operational fight, but to provide essential capabilities to support civil authorities in homeland defense missions, including consequence management and disaster relief.

To manage the rotation of these forces for the long war, the Army has developed a new force generation model to ensure units are at the desired state of readiness before they are scheduled to deploy. Our goal is to generate a continuous output of fully manned, equipped, and trained forces adequate to sustain one operational deployment in 3 years for the Active component, and one operational deployment in 6 years for the Reserve component. This model allows the Army to increase predictability for soldiers, families, and employers, improve availability of forces for combatant commanders, generate a continuous supply of 18–19 BCTs and the required support brigades, and surge up to an additional 15–19 BCTs in response to crises.

To support global operations while transforming, we are resetting our force quickly and efficiently and providing for the well-being of our soldiers and their families. To take advantage of our current momentum, we are restoring our returning units to the required readiness levels, while simultaneously converting them to the new modular design and executing our re-stationing plan for an optimal footprint and in accordance with base realignment and closure (BRAC) and integrated global presence and basing strategy (IGPBS) decisions. We have already reset more than 20 major units. Many of these units have already returned to theaters of war in their new configurations. We are rebalancing capabilities within our three components to assure timely access to the right types of units and soldiers. We have determined the types of units and skills that are in greatest demand in today's security environment—including infantry, engineer, military police, military intelligence, Special Forces, chemical, civil affairs, and psychological operations—and have identified over 100,000 positions to rebalance. We have accomplished more than half of this rebalancing and project completion by 2011. To achieve heightened readiness for missions at both at home and abroad, the Army's senior leadership is committed to fully manning, equipping, and training Reserve component forces. This will enable them to both serve as an operational force for the Nation and a ready force for State missions.

Equally important, the Army is moving forward on the FCS, our first major modernization program in more than 30 years, that simply put, is the most effective way to modernize the Army for the future. Funding for the FCS program is critical to provide our soldiers the means to dominate the future fight. "Spin outs" of FCS advanced capabilities will increase the combat power, versatility, and survivability of our current formations. The first "spin out," on track for delivery beginning in 2008, will introduce unattended ground sensors, non-line-of-sight launch systems, the intelligent munitions system, and the first generation network to the force. These capabilities will enhance soldiers' understanding of their situation in dynamic, battlefield conditions. The second and third "spin outs," on track for delivery beginning in 2010 and 2012 respectively, will introduce new types of unmanned aircraft systems and unmanned ground vehicles for our soldiers. These technologies will enable soldiers to employ greater numbers of sensors to see and find their enemies first. The fourth "spin out," on track for delivery beginning in 2014, will complete the Network. When BCTs are fielded with the full complement of FCS systems, these units will be able to generate significantly more capability. These new capabilities will directly benefit all U.S. ground forces, including the Marine Corps and Special Operations Forces from all Services.

Even as we move forward with FCS and our many transformation initiatives, the American soldier remains the centerpiece of all that we do. The American military experience of the 20th century tells us that our soldiers' effectiveness depends upon a national commitment to recruit, train, and support them consistent with their service and sacrifices. This commitment must be underwritten by consistent investment in our recruiting and retention initiatives, in their equipment and infrastructure, and in our leader development programs. Meeting these goals for our Active

and Reserve soldiers sustains the quality and effectiveness of our All-Volunteer Force.

2007 will be a pivotal year for your Army. All of the Army's initiatives—Active component/Reserve component rebalance, Army modularity, IGPBS, BRAC, Reset/Modernization, +30,000 end strength, business transformation and Operations Iraqi Freedom and Enduring Freedom—will be fully underway, thoroughly integrated, and moving forward. The resources and commitment of this committee will be essential to interweave and accelerate each of these components to ensure the completion of our total Army transformation. Just as important will be the support to our families, communities, and the American people—truly, our extended Army family.

I assure you that our soldiers continue to serve magnificently as we enter the fourth year of the war on terrorism. Soldiers know we are waging a long war, and they believe in their mission, the Soldier's Creed, and the Warrior Ethos. Our soldiers, 150 of whom I had the honor to re-enlist in Iraq 2 weeks ago, continue to stay in uniform at unprecedented rates. Their voluntary service is proof of their pride in each other and their leaders, and of their unwavering patriotism. Like the American soldiers of generations past, today's warriors are distinguishing themselves with tremendous acts of courage and valor in places like Baghdad, Samarra, An Najaf, Fallujah, Tal Afar, Mosul, and Khandahar. Our soldiers understand the Army's values and personify our Nation's highest ideals, demonstrated most poignantly by their willingness to sacrifice all so that others may live in peace and freedom. Our Nation must remain equally committed to them by providing the resources they need to succeed in their mission. With your continued support, I know we will succeed.

Senator MCCAIN. Thank you, General.

I guess the first thing I'd like to talk about with you are the Guard and Reserve plans. I think you know very well, the Governors are in town, unfortunately for you, in time for this hearing. They feel very strongly that they are not receiving either the funding or the size. The Army, last year, said that there would be 43 Active component combat brigades and 34 Army National Guard combat brigades that would ensure the Army could maintain the 17-brigade force deployed with Active component brigades, having 2 years between rotations, and the Army Guard combat brigades having 5 years between rotations. For this request, the Army has modified its plan to increase the number of combat brigades in the Active and Reserve component. The Army will increase the Active component force structure to 42 combat brigades, and increase the Army National Guard Force structure to 28 combat brigades. This action represents a reduction of one Active component brigade and six Army National Guard brigades from previous plans. Is that accurate?

General CODY. It's accurate, Mr. Chairman, that we have changed our plan as we went through the QDR, as well as we continued to study the combat service support structure, the homeland security/homeland defense requirements, and the growth of the Special Operation Forces in the Army. If you remember, 2 years ago our plan was to build 43 to 48 Active component brigades and 22 to 34 Army National Guard brigades. That was our intent as we looked at the plan. It was driven based upon a steady-state commitment of over 20 brigade combat teams in this long war.

Coming out of the QDR, the analysis that was done was that the steady-state requirement for this long war would be 16 to 18 brigade combat teams. As we continued to flesh out Army modularity, we had a shortfall and an imbalance in our combat service support. We also were equipment-challenged on the heavy-force side, especially in the Army National Guard, with the 10 heavy brigades, as well as the 19 heavy brigades in the Active Force, the Abrams and

Bradley, and it did not appear that we would be able to fully equip all 10 of the heavy brigades in the Army National Guard.

When we took all that together and went back through our force study analysis—we went through several iterations of this—what we decided to do was only grow to 42 Active brigades, and that would accommodate the growth in Special Operations Forces (SOF), on the Active side, rebalance and only build up to 28 fully-resourced, in terms of front-line equipment, in the National Guard, as well as fully-manned, and take those other brigades that we would have built as brigade combat teams, basically two infantry brigades and four heavy brigades, and restructure them into things that we needed to back up the shortage in combat service support on the Active side, but also be able to support homeland security/homeland defense.

So, the total number of brigades in the Army National Guard will remain at 106. The makeup of the brigades will be different; 28 will be combat brigades, and then 78 will be combat support/combat service support, which gives us a better balance for the total Army, as well as giving the Governors and the Department of Homeland Security a better balance of transportation, military police, engineers, and other transportation-type units. The end strength will stay the same for the Guard. These are just the different formations that they'll have.

Senator MCCAIN. The current end strength of the Guard will stay the same. The authorized end strength for the Guard is 350,000, rather than the present manning level of 333,000. The Guard claims that they can recruit to 350,000. So, what we're actually doing is saying we are not going to increase the size of the Guard any more than what they're presently manned at, not what they're authorized. Is that accurate?

General CODY. I would not say that you're inaccurate, Mr. Chairman. Let me say how I see it, and then I'll see if I've answered your question.

Senator MCCAIN. Also, do you think that the Guard is accurate in saying they could recruit up to 350,000?

General CODY. I think the National Guard—and I've talked to the adjutant generals (TAGs), and I've talked to the Governors, and I've certainly had many meetings with General Blum and General Vaughn—I think they'll be successful in bringing the Guard strength back up to 350,000 in the next year and a half. Remember how we got here.

Senator MCCAIN. But if we only fund them at 333,000——

General CODY. We will fund them at whatever level they have. We will reprogram our dollars to fund at whatever end strength they come in at. This year, they're funded at——

Senator MCCAIN. That's funny, then why did we——

General CODY. Sir, we——

Senator MCCAIN.—coming forward with a budget that puts them at 333,000? Go ahead, I'm sorry. Where do you get the money? If we're budgeting only for 333,000, if they can recruit up to 350,000, where do we get the money?

General CODY. We'll have to reprogram the dollars. If they come in lower than 350,000—they're budgeted for 350,000, in 2006. In 2007 the program decision memorandum-3 (PDM–3) put it at their

current strength. The Secretary of Defense, the Secretary of the Army, and the President said, if they can make 350,000, we will reprogram to pay and fully fund not just the military pay, but the operational dollars of whatever their end strength comes in at.

Senator MCCAIN. General, it doesn't compute, to me, if we have confidence that the Guard could recruit up to a certain level, that we would only come forward with a request for a lower level, and then say we're going to reprogram. But let me just discuss it. I don't want to take—there's a lot of questions that both my colleagues have. But we all know that the Guard is doing things that they've never done before. Even in World War II, they were just fully mobilized and became part of the regular Army. Now they're doing things that they've never done before, and they're doing it admirably. You'll be the first, I'm sure; you've testified to that many times. Therefore, we place great reliance on our TAGs and our Guard leaders when they tell us what they need and what they think they can do. They're not very happy right now. They're communicating with us, so, first of all, let me recommend that you, or the Chief of Staff of the Army, or the Secretary of Defense, somebody get all these guys in Washington and try to get some meeting of minds.

General CODY. Yes, sir.

Senator MCCAIN. Because we're conflicted by the administration proposal versus what our TAGs are telling us. So, it would be helpful to us in our process if there was more agreement.

I know there's always a certain amount of tension, but this is a unique situation, given what the Guard is being asked to do. So, that's a problem for us, and I think you can help solve it.

But I guess the logical question if we're going to reprogram the money, if they can reach an end strength of 350,000, do we have any ideas of what we're going to reprogram?

General CODY. No, sir. But we have been reprogramming, and I know you don't want to hear this, but we have been reprogramming since I've been here, resourcing this war. You all have been very helpful to us in reprogramming.

Senator MCCAIN. Okay. I just want to mention one other thing. We, in the authorizing side—and I mentioned this to the Secretary of Defense in a full committee hearing—know that it costs additional money to fund a war in Iraq. We're tired of "emergency supplementals," and I would hope that we could adopt a policy like the Sense of the Senate Resolution we passed last year calling for regular funding for the war to be included in budgetary requests. We're going to get more active in that effort. We think we deserve the oversight—not "deserve," we feel oversight is our responsibility. When you're this many years in the war, "emergency" really doesn't fit the meaning of the word anymore.

Senator Lieberman.

Senator LIEBERMAN. Thanks, Mr. Chairman.

Senator MCCAIN. I'm sure that's above your paygrade, too.

General CODY. It is, sir. [Laughter.]

Senator LIEBERMAN. Although you're welcome to reach for it. [Laughter.]

Thanks very much, Mr. Chairman.

Let me take up a few of the questions that I raised in my opening statement. The first is on reset. This is the whole challenge of repairing, replacing, and recapitalizing equipment coming back from Iraq and Afghanistan. The Army reset requirement, as I read it, for fiscal year 2006, is $13.5 billion, but the supplemental request only is $10.4 billion for that purpose. I guess the first question I want to ask is whether those are correct figures that I have. Second, if they are, how the Army will address that unfunded requirement of a pretty urgent need.

General CODY. You are correct in the figures, $13.477 billion is what we've put in. I know what came out in the title IX supplemental, but I don't know the figure yet coming out of the base supplemental. But I'm sure it's not going to be $13.7 billion. It would be something short of that.

Most of this is in our depot accounts and our depot outlays, and we will reprogram other dollars to keep our depots—that we're very proud of, and you've all helped us very much—to keep our depots running at the 25 to 27 million direct-labor hours that has basically kept his Army running.

Senator LIEBERMAN. From where will you reprogram?

General CODY. Probably some of these are operational dollars that we can do. Some will be procurement dollars, because with some of this, there are three levels of reset. Senator, I know that you know them very well, but, just for the record, there's replacement, and recap, at the national level and then there is the first-level reset at the unit level. Most of what we're doing now is national level and replacement. We've lost almost two battalions worth of tanks.

Senator LIEBERMAN. Yup.

General CODY. We've lost quite a few Stryker vehicles and we've lost 106 helicopters in this fight. So those are procurement dollars. Then there's also the recap that I think we're going to discuss later. We're not resetting the five different types of tanks we have right now. When we pull them back in, we're not resetting them back to their old standard, we're resetting them to the modernized standard of the Abrams Integrated Management (AIM) tank and the M1A3 system enhancement program (SEP) tank.

Senator LIEBERMAN. Right.

General CODY. So there are procurement dollars associated with that, above and beyond just the maintenance reset. It is very complex, but we'll have to reprogram. We will keep our depots running at full throttle as we go through this.

Senator LIEBERMAN. The need here is real and urgent. Am I right to say that?

General CODY. It is.

Senator LIEBERMAN. I mean, we've lost equipment. The stuff that we haven't lost, thank goodness, has taken some real wear and tear in the fight.

General CODY. We think it's anywhere from 5 to 6 years worth of wear and tear on our track fleet and our tactical fleet, and probably 5 to 6 years of life on our airframes.

Senator LIEBERMAN. Okay. I'm sure we'll want to stay close to you on this and make sure that you don't feel the pressure to reprogram to support the urgent need for reset in a way that makes

it hard for the Army to operate in other areas. So, we're going to keep in touch on that.

Let me ask you about the numbers that continue to perplex me about the size of the Active Army, because I had to go around on this with Secretary Harvey at the full committee level, and he ended up saying—and I guess it was short term—that, because of moving numbers of personnel out of the institutional Army, there might actually be an increase in the Active Army. But, long term, it's pretty clear it's going down and it's not so long, it's 4 or 5 years from now that the aim is to go down to 482,000. As I said, I don't know of any time when we've been at war—and this war is going to be long—when we've done that so, I wanted to ask you to reflect a little bit on that, and then I'll ask you a specific question. Do you have enough personnel? It's as direct as that.

General CODY. I think we all know the answer today, that it's taken over 600,000 soldiers, Active, Guard, and Reserve, on Active-Duty status, to prosecute this global war on terror.

Senator LIEBERMAN. Right.

General CODY. That's with a base of a 482.400 Active Force and a 300,000 National Guard Force, and about a 200,000 United States Army Reserve. We have the authority today, with emergency funding, to grow the Army by 30,000.

Senator LIEBERMAN. Right.

General CODY. We're continuing to do that. That'll bring us up, and that will help us. Army modularity in synchronization with rotations of brigades in and out of Iraq, and in and out of Afghanistan. I think I testified last year that each time we do those rotations, it's larger than the Normandy invasion of World War II. We've done it now four times. So with that churn, we have to increase the Active Force, because we're transforming the force with different skill sets for these new brigade combat teams. We have growth in military intelligence by 9,000, because irregular war and counterinsurgency operations require more of that.

So, we're growing the Army as fast as we can. I fully understand what the Secretary of the Army has testified to. He has given me the plan to execute, and that is to take our operational force, which started out with the 482,000 end strength. Inside the operational force was about 310,000 soldiers and the rest of it was in the training accounts and the institutional Army.

When we took the Army from 780,000, down to its present strength, we also cut the institutional force, we cut other things. So, what the Secretary has tasked us to do is to build this Army into the AMF, under the directive of the Chief of Staff, who started Army modularity. As we do that, we will rebalance the Active, Guard, and Reserve properly, but take the operational force and grow it to 355,000 inside of that 482,000. What he testified, I believe, to you, Senator, was that he was going to take more out of the institutional Army and also decrease the Army's transient trainee, holdee, and student account to a certain level. How successful we are in 2007, 2008, and 2009 in being able to do that will determine the end strength of the Army. My personal opinion is, it's going to be north of 482,400.

Senator LIEBERMAN. I appreciate your honesty in saying that. It alleviates my concern. So, hang in there, and keep fighting for what you need, because you're the people we ask——

General CODY. Yes.

Senator LIEBERMAN.—to carry out these missions. You do it brilliantly, but we owe it to you to give you enough personnel to do it right.

General CODY. What we don't know—and the Secretary has said this is our plan, and this is why it's complex—these new brigades we've built are enabling us to restructure our combat service support in a different way, because now we only have three chassis, versus the 13 different types of brigade combat teams we had. We still don't know is what the—because we're still half into modularity, but still fighting a war—combat service support full structure is really going to look like. We've guessed at it. We've modeled it. We're now executing some of it. But we think there are about 25,000 in there that we're unsure of. That's why I think, in the next 2 or 3 years, we'll be able to understand better how we can get to that 355,000 operational Army that the Secretary and Chief have asked us to do, and whether we can get the savings and reroll the spaces out of the institutional Army.

Senator LIEBERMAN. A final quick question before the time is up. Last year, we were told that the optimal plan was to build 77 combat brigades. So, I wanted to ask why you decided to increase the number of noncombat brigades. Why didn't you decide to increase the number of noncombat brigades and still maintain last year's plan to build the 77 combat brigades? Of course, I worry that you're under pressure because of the reduced number of Active Army personnel.

General CODY. Two things. First, because of the irregular warfare, we have a growth in the SOF on the Active side of about 7,700, and all of us agree that we need to do that, we need to grow our SOF, Civil Affairs, and Psychological Operations (PSYOPs) because we're really stretching the Reserve structure. I think 5 percent of Civil Affairs and PSYOPS was in the Active Force, the other 95 percent was in the Reserve Force. We're bringing that up to about a 15 to 85 rebalance. So, we had to subsume that underneath our end strength figure. That's one reason why we came back to only 42 brigades on the Active side, because what we want to do is not have 43 flags, and have them not fully-manned and fully-equipped. So, whatever flags we have, we're going to have fully-manned and fully-equipped, which, by the way, wasn't the way it was when we started this war.

On the National Guard side, it came down to, again, this rebalancing between the Active component and the Reserve component and we were challenged, quite frankly, to be able to provide all the equipment on the heavy brigade side. We were looking at options with 10 heavy brigades, which was part of the plan, of some of those brigades not being fully equipped. Then, as we went through our analysis of how much combat support we needed for homeland security, lessons learned from Hurricane Katrina, as well as what would be more useful to the Active component in this long war for rotation base for combat service support, we said we had enough

heavy brigades in both structures. What we needed to do was restructure the combat service support.

Senator LIEBERMAN. Okay, my time is up. Thanks, General. Thanks, Secretary. I have a bunch of other questions, which I'd like to submit to you and ask your answers in writing.

Thanks, Mr. Chairman.

General CODY. Yes, sir. Thank you, Senator.

Senator MCCAIN. Senator Sessions.

Senator SESSIONS. Thank you, Mr. Chairman. You so ably lead this committee, and no one's better experienced or prepared to lead it, and you have a good partner in Senator Lieberman.

Senator MCCAIN. Thank you.

Senator LIEBERMAN. Thank you.

Senator SESSIONS. General Cody, I understand that the budget that's come out has required the Army to reduce, by as much as $3 billion, their reset capability and that this has real problems for us as we go forward. It strikes me that one of the lessons we learned from the first Gulf War is there's no way we can avoid the expense of resetting equipment that's been driven hard in harsh environments like the desert area. You say that, in fact, as we proceed, it looks like we might be even in a point where refurbishment lines would be broken and then have to be reconstituted, at greater cost.

I understand you to say that that's not so, and you won't allow that to happen, but isn't it a concern for us? For example, the Anniston Army Depot, which does the M1A2 tank reset, looks like it would take a $588 million hit, and that this could break the line there. Why would we want to fund that through grabbing money from some other sources? Why wouldn't we continue with the plan that you've started out, to put that in the supplemental, since so much of the damage is a result of use in hostile environments, and pay for that in that way?

General CODY. Thank you, Senator, for that question. Your figures are accurate. They reflect what I see. Let me give you a backout strategic look first.

As I've testified, we're not going to reset our tanks back to the five different configurations. We're going to modernize, as we reset these tanks, to the SEP and the AIM tank, the same with the Bradley, ODS, and the A3. Those help us as we start cascading the FCS technologies. So, the monies you're talking about right now, that we did not get in the fiscal year 2006 supplemental, reflect about a $1.1 billion shortfall for the Abrams line, and about a $1.5 billion shortfall on the Bradley line.

Now, when we submitted that, the Office of the Secretary of Defense (OSD), through my comptroller, came back and said, "We're not going to get that much money. This is how much we'll be short." But they are going to put it in the 2007 title IX bridge supplemental that's supposed to come out in July 2006. If the money comes out in July or August 2006, the five tanks that come off the AIM and SEP line will not be broken. So, we don't see a slip.

All this money that we're putting in for 2006 and 2007 is to give us five brigade combat teams of tanks and Bradleys; three of them for the National Guard, by the way. So, if the title IX money is put into the title IX money for 2007, we will not see a slip in either

the Bradley line or the tank line. If that supplemental is slipped and comes in late, then you will see a break, and then we will be faced with reprogramming.

Senator SESSIONS. So, you'll be focusing then, and dependent upon, the next supplemental.

General CODY. The timing of it.

Senator SESSIONS. You would agree—and I think all of us have seen it, time and again—but the most efficient, cost-effective way to maintain any kind of major resource production or reset is to keep it on as steady a pace as possible to avoid the ups and downs that require overtime and more people to be hired, and then down periods in which you have to lay people off or carry people that you wouldn't otherwise have to.

General CODY. We have gotten better, Senator, over the last 3 years since I've been running this. We were flowing money to our depots 2 months at a time. We've gotten much better, through the help of this committee and from Congress, so it's been more predictable.

My hope is—and hope is not a method—that what I've been told, that that first tranche of the title IX in 2007 is $50 billion, and this money that was not in the 2006 would be pushed to that, it will come on time, and we'll be okay. What we don't need, though, is, in this base 2006, to push this money back in at the expense of something else, because we have a whole lot of other requirements that will just cause us now to unravel. We think as long as that title IX in 2007 comes in on time, we'll be okay, and the production line will stay at the capacity that we have.

Senator SESSIONS. Secretary Bolton, is that consistent with your understanding? What are your thoughts about that apparent shortfall?

Mr. BOLTON. Senator Sessions, absolutely. My part of this is to look at the depots, and see what they require—what they're output's going to be, and then look for the sources, if they aren't forthcoming. I think General Cody has hit it right on the head on the supplemental. We talked about that over the last few days. We talked about it again this morning and that's why we're urging that we get on with the timing of this. The timing is absolutely critical. If we don't get it in the June/July timeframe, we're going to have to break the lines. Then, as you've already pointed out, once you break the line, it's not a matter of "the money comes, and then the folks come right back." Some of those folks are not coming back, and now you have to go out and replace them and, more importantly, the experience that went out the door.

So, we're pushing very hard this morning—we're looking at it. My job now is to take a real hard look at Anniston, what's the drop-dead date to keep the pressure on the front office and also on the financial part of this, to get the money and make sure that someone's not pigeonholing the requirement.

Senator SESSIONS. The pig-in-the-poke idea makes me a little nervous.

Mr. BOLTON. Yes, sir.

Senator SESSIONS. But, beside that point, now let me ask General Cody briefly about the extended range of multipurpose unmanned aerial vehicles (UAVs) to be available for the Army at the

tactical level. How are we doing on that? I know there's a competing interest out there. Is it critical, in your opinion, for the soldiers and their personal safety and ability to be effective combat warriors? If so, how are we doing to make sure we have that capability available at the brigade level and below?

General CODY. Yes. Senator, the extended range multipurpose UAV, now called the Warrior, is an official program. We will buy 132 of them. They'll comprise 11 companies, at the tactical level. It'll be able to provide moving target indicators (MTIs), synthetic aperture radar, as well as electro-optic infrared (EOIR) sensors. I've looked at the sensors. They're much better than we have on the Apache right now. I mean, it's really promising. It'll have a heavy fuel engine, a loiter time of plus-20-some-odd hours. We're moving forward. I anticipate that we'll have four block zero here at the end of 2006 or early 2007. We'll do testing and integration. Right now, it's fully-funded and on track, and we are working with the United States Air Force, as well as the other Services, in the Joint UAV Center of Excellence to work the bigger issue, and that is a common ground station for all UAVs, so that as we employ them we have the horizontal integration on the joint battlefield. So, I'm very, very pleased with the progress, the support we've had from Congress, but, more importantly, the support we've had from the Joint Staff. The Warrior UAV will be out in the Army here as fast as we can get it.

Senator SESSIONS. That's good news. Jointness is clearly the right way to go, because so much of that technology is going to be beneficial and critical for all the Services. If we can do more, cheaper and better, there would be, I think, some possibility here for UAVs.

Thank you, Mr. Chairman.

Senator MCCAIN. Thank you very much.

General, I hope you'll carry the message back that you need to talk to our Guard people and try and get everybody on the same page here. Okay?

General CODY. Mr. Chairman, if I could just say, I've met with all the TAGs. I've talked to the Governors. Change is hard. By the way, there are a lot of Active-Duty people not happy with some of the changes we make. We rebalanced our air defense artillery, we've rebalanced Army aviation and taken core aviation and pushed it down, we've restructured the artillery, we're getting ready to move Fort Knox, the armor school, down to the infantry school and make it the maneuver center. So, we're going to continue to engage with the National Guard, as we also change them.

I believe that the Secretary of the Army and the Chief of Staff of the Army's vision of converting fully manned, fully equipped Army National Guard brigades to make them an operational force versus a strategic force because of the world we live in today is the right way to go. I think, over time, this is going to be a much better force. The National Guard has served superbly. We've asked a lot of them. What we're trying to do now is get them out of their old equipment, get them in the right formations, and get them the opportunity to be trained up and be as they are today, an equal partner on the battlefield with us. I think it's going to be a good thing, when it's all said and done.

But I do have some more work to do with the TAGs and the Governors, and I recognize that.

Senator MCCAIN. Thank you very much, General.

Secretary, I think you're staying for the next panel.

Mr. BOLTON. Yes, sir, I am.

Senator MCCAIN. So, we'd ask Mr. Paul Francis, who's the Director of Acquisition and Sourcing Management of the GAO, and Dr. David Graham, the Deputy Director of Strategy Forces and Resources Division, IDA, to come forward.

Now, Secretary Bolton, do you have an opening comment?

Mr. BOLTON. Yes, Mr. Chairman, I do.

Senator MCCAIN. All right, please proceed.

Mr. BOLTON. Thank you.

STATEMENT OF HON. CLAUDE M. BOLTON, JR., ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS, AND TECHNOLOGY

Mr. BOLTON. Good afternoon, Mr. Chairman, Senator Lieberman, and distinguished members of this subcommittee. Thank you for the opportunity to appear before you to discuss the FCS acquisition strategy. I respectfully request that my written statement be made part of the record of this hearing.

Senator MCCAIN. Without objection.

Mr. BOLTON. Thank you, sir.

In addition, on behalf of the Army leadership, members of the acquisition and logistics workforce, and our soldiers who serve with distinction throughout the world, I express my deep appreciation for the wisdom and guidance that you have provided. Your steadfast support for this critically important program has contributed significantly to our success.

The FCS is the Army's primary modernization program. It is also the materiel centerpiece of our future modular force. FCS includes 18 systems, the network, and the soldier—18 plus 1 plus 1. A significant contribution of FCS is that it will place advanced technologies in the hands of our soldiers in what we call spin-outs, increasing capabilities and providing greater protection to the current modular and fighting forces beginning in 2008.

Mr. Chairman, 2006 is a critical year for the FCS. We have two major field experiments scheduled, one in April, another one in the fall, the Defense Acquisition Board (DAB) in-progress review, which takes place in early May, and the interim preliminary design review, in August. All in all, there are more than 50 reviews scheduled this year.

An important factor in program success is our lead systems integrator (LSI) management approach. The Army is on schedule to fully definitize the letter contract awarded to the Boeing Company, in September 2005, to continue the FCS system development and demonstration program.

From my position, we are meeting the FCS challenge. My bigger challenge is ensuring that we have the right people and experience and expertise not only for the FCS, but for all the Army programs. During the next 3 to 5 years, nearly one-half of the Army's acquisition and logistics workforce will be retirement-eligible. Recruiting,

retooling, and reshaping the workforce are vital to meeting the future challenges.

That said, we are addressing these challenges with education, the establishment of the Army's life-cycle management commands, business transformation initiatives, and what I have termed the "big A, little a" acquisition process. That process begins when a soldier says, "I want," and it ends when the soldier says, "I got."

I included a chart that further explains my thinking on this, with my written statement.

That concludes my opening remarks, Mr. Chairman. Again, I thank you and the members of this committee for your continuing wisdom and guidance and support. I look forward to your questions.

[The prepared statement of Mr. Bolton follows:]

PREPARED STATEMENT BY HON. CLAUDE M. BOLTON, JR.

Chairman McCain, Senator Lieberman, and distinguished members of the Senate Armed Services Committee, I would like to express my appreciation at this opportunity to appear before you to discuss the status of converting the Future Combat System (FCS) Brigade Combat Team (BCT) program's other transaction agreement (OTA) to a Federal Acquisition Regulation (FAR) Part 15 contract, its structure, its lead systems integrator (LSI) approach, the proposed incentive fee structure, the risks and challenges facing the program, and the progress being made to address these risks.

The FCS BCT program is the principal modernization program for the Army and it is the materiel centerpiece of the Army's future modular force. It is an evolutionary acquisition program consisting of 18 systems, the network, and the soldier (18+1+1). The FCS BCT is a networked family of integrated manned and unmanned systems providing mobile-networked command and control capabilities; autonomous robotic systems; precision direct and indirect fires; organic sensor platforms; and adverse-weather reconnaissance, surveillance, targeting, and acquisition. In addition, the FCS BCT program will develop and position spin outs of FCS BCT capabilities for procurement and fielding to current modular and fighting forces.

Since the 2004 restructure announcement, the FCS BCT program continues to keep pace with its performance objectives and baseline. The FCS BCT program completed a Department of Defense (DOD) program review in June 2005 and successfully completed its System of Systems Functional Review in August 2005. The program's revised acquisition program baseline was approved in November 2005. Fort Bliss/White Sands Missile Range (WSMR) complex is the selected location for the evaluation BCT (EBCT). The program continues to move forward in completing all of the platform-based system functional reviews and transitioning into design and prototypical development activities. Further, the program is leaning forward in preparation for its Defense Acquisition Board (DAB) in-progress review scheduled for May 2006. The Non-Line of Sight Cannon (NLOS–C) continues to move ahead as the lead development vehicle for manned ground vehicles. The Army submitted a report to Congress and is moving forward to comply with congressional direction by building eight prototype cannon systems with delivery starting in calendar year 2008.

2006 is a critical execution year for the program. It has over 52 major reviews. It has extensive software and hardware deliveries and major field experiments in April 2006 and joint expeditionary force exercise JEFX–06, and Experiment 1.1 in the fall 2006. In addition, the program will have its interim preliminary design review (IPDR) in August 2006. The FCS BCT network is proceeding ahead as planned. For over 18 months, the FCS BCT program has acknowledged the risks, integration challenges, and synchronization issues associated with transport layer for Joint Tactical Radio System (JTRS) and Warfighter Information Network-Tactical. The FCS BCT program has worked and continues to work closely with the restructuring activities of both key transport layer programs to make sure these enablers support the integration master schedule of the FCS BCT program. The FCS BCT program has detailed risk mitigation plans in place to include the use of surrogates and pre-engineering development models (pre-EDMs) to ensure form, fit interchangeability, and to preserve the integration phased approach for maturing the integrated FCS platforms and common network. The Army is focusing hard to get it right on developing a common and integrated battle command network. In addition, it is impor-

tant to note that the program has received its first seven JTRS cluster 1 pre-EDM radios for integration and experimentation support and use.

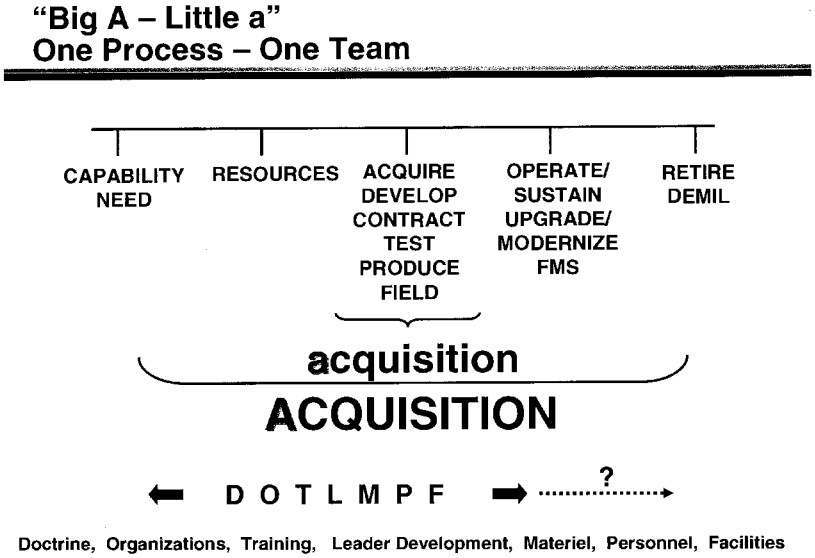
In terms of critical technologies, 18 of the 49 critical technologies are rated with a technical readiness level (TRL) of 6. One is rated 8. The program is on schedule to have more than 23 rated TRL 6 by December 2006 and it is on schedule to mature the rest by the Preliminary Design Review (PDR) in August 2008. Risk associated with the maturation of technologies was one of the contributing factors in the Army's decision to restructure the FCS BCT program and extend it by 4 years. The current program plan significantly reduces the degree of concurrency and risk through both the spin out plan and the increased development time between milestones B and C. The program's maturity approach is consistent with DOD acquisition policy. It is important to note that the DOD policy requires the use of alternative technology that is mature and can meet the user's needs when the technology is not mature enough. The FCS BCT program remains at the heart of the Army's strategy to mitigate risk using the current to future force construct. At the same time, the Army is accelerating selected technologies to reduce operational risk by improving the current modular force's survivability, intelligence, surveillance, and reconnaissance, and joint interdependence.

The FCS BCT program is a complex undertaking. The Army continues to use a LSI management approach for the FCS BCT program. To manage the complexity involved, a better approach was needed than having the Government operate as the "integrator." Having over 19 independent prime contracts (one team partners) would only inhibit interoperability and integration. Today's weapon system programs with complex networking features require new, integrated, and single-step or common design processes that integrate horizontally across the board. Commonality in design of systems and subsystems is a new design imperative for complex programs. The keys to success are maximizing the use of a one-step design process for large scale horizontal integration and having one contract, one management baseline, and integrated program management and execution.

In September 2005, the Army awarded a letter contract (referred to as an Undefinitized Contractual Action) on a sole-source basis to the Boeing Company for continuation of the FCS BCT system development and demonstration (SDD) program, which initially began under an OTA signed May 2003. The FCS BCT SDD contract was negotiated using FAR Part 15 procedures and is fully compliant with the uniform contract format and all FAR required clauses. The use of the letter contract was essential in order to preserve the program's schedule and prevent disruption. As required, the contract must be fully definitized within 180 days. Currently, the Army is on schedule to fully definitize by the end of March 2006. I am aware of the recent Government Accountability Office report 06–66, DOD Has Paid Billions in Award and Incentive Fees Regardless of Acquisition Outcomes, and its concerns that there is little evidence that such incentives improve contractor performance and outcomes. I know that the Department is working on policy guidance changes. From my position, I believe the proposed fee structure arrangement for the FCS BCT SDD contract strikes the right balance between contract risks and motivation of contractor performance. The fee structure is different than typical contracts of this magnitude, it has concrete and measurable performance aimed at critical path performance activities.

While I believe we are meeting the FCS challenge, my bigger challenge is ensuring we have the right people and expertise for the FCS and indeed all Army programs. Over the next 3 to 5 years, nearly half of the Army's acquisition workforce will be retirement eligible. Recruiting, retooling, and reshaping the workforce are vital if we are to continue meeting the challenges of the Army programs. We are addressing that challenge with education, establishment of the Life Cycle Management Command's, "Big A, Little a" (see attached) and Army Business Transformation initiatives. People have made our Army the world's best. It is therefore imperative that we appropriately focus on the people aspect of our program developments as we go forward into the future.

The Army is fully committed to the FCS BCT program and to ensure that the program delivers what is expected and required of this program. We appreciate your wisdom, guidance, and strong support as we work to ensure that the FCS BCT program accomplishes its goal in support of the Army modular force initiative.



Senator MCCAIN. Thank you very much.

Mr. Francis, welcome.

STATEMENT OF PAUL L. FRANCIS, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. FRANCIS. Thank you, Mr. Chairman.

Mr. Chairman, Senator Lieberman, I'm pleased to be here this afternoon to talk about the FCS. FCS will be the centerpiece in the Army's plan to transform to a lighter, more agile, and capable force.

I'll summarize my remarks here, and ask that my full statement be submitted for the record.

The context for the FCS investment is important. Fiscal imbalances faced by the Government will continue to constrain discretionary funding. One of the single largest investments that the Government makes is in new weapons. Over the last 5 years, the Department of Defense (DOD) has doubled its planned investments in new weapons from about $700 billion in 2001 to nearly $1.4 trillion in 2006. At the same time, development cost growth on new weapons maintains its historical level of about 30 to 40 percent. This is the lens through which we should look at new major investments, such as FCS, because more money may not be an option for the future. Rather, the key to getting better outcomes is to make individual programs more executable.

My summary will cover two issues: first, the risk FCS faces, in terms of a good business case; and, second, the business arrangements for the program—namely, the contract and the LSI.

There are a number of compelling aspects of the FCS program, and it's hard to argue with the program's goals. However, elements of a sound business case—namely, firm requirements, mature tech-

nologies, a knowledge-based acquisition strategy, a realistic cost estimate, and sufficient funding, are not yet demonstrably present. Specifically, it'll be several years before requirements are firmed up for individual systems.

Technologies are progressing slower than predicted. Using the Army's standards, about 90 percent of the FCS technologies were to be mature today; the actual number is around 30 percent. Requirements in technology dominate the acquisition strategy, and are going to push demonstration out to later in the program. The cost estimate is limited by the low level of knowledge available today. Even if accurate, the Army will need a substantial increase in budget levels to accommodate FCS production.

The Army has made several changes to improve its approach to acquiring FCS. It has lengthened the schedule by 4 years, provided for spinning out technologies to the current forces, provided for more testing and an experimental unit, made cost estimates more realistic, and improved the contract provisions. Nevertheless, the program remains a long way from having the level of knowledge it should have had before it started product development. FCS has all the markers for risk that would be difficult to accept for any single system, much less a complex multisystem effort.

These challenges are even more daunting in the case of FCS, not only because of their multiplicity, but because FCS represents a new concept of operations that is predicated on technological breakthroughs. Thus, technical problems which accompany immaturity not only pose traditional risks to cost, schedule, and performance, they pose risks to the new fighting concepts envisioned by the Army. We do not yet know if FCS is technically doable.

As we consider the future of FCS, we must anticipate facts of life, like technologies not working out, tighter budgets, and changes in performance. It's important, therefore, that the business arrangements made for FCS, primarily the development contract and the LSI, preserve the Government's ability to adjust course as dictated by facts of life.

The Army is currently negotiating a new FAR-based contract that provides more protection against conflict of interest, and a better fee structure for the Government. In my opinion, though, the risk and the scope of the program will dictate progress and cost, not the contract. The contract is not an insurance policy, and the Government still bears the burden of risk.

As the details of the Army's new contract are worked out and its relationship with the LSI evolves, it'll be important to ensure that the basis for making additional funding commitments is transparent. Accordingly, markers for gauging knowledge must be clear, incentives must be aligned with demonstrating knowledge, and alternative courses of action must be kept viable. Most importantly, the knowledge must be put to use. DOD must keep itself in a position to change course as the program progresses.

There are several opportunities to revisit the FCS business case. One is in May 2006, when the Defense Acquisition Board reviews the program. However, the new contract will be signed by then, so it could limit the board's range of actions. A key juncture will fall in 2008, when the preliminary design review is held. At that point, there should be sufficient demonstrated knowledge for FCS to

make an informed go or no-go decision; in effect, the real commitment to product development.

Mr. Chairman and Mr. Lieberman, this concludes my remarks, and I'd be glad to answer any questions.

[The prepared statement of Mr. Francis follows:]

PREPARED STATEMENT BY PAUL L. FRANCIS

Mr. Chairman and members of the subcommittee: I am pleased to be here today to discuss the Department of the Army's Future Combat System (FCS), a networked family of weapons and other systems. FCS is in the forefront of efforts to help the Army transform itself into a lighter, more agile, and more capable combat force by using a new concept of operations, new technologies, and a new information network that links whole brigades together. This is a tremendous undertaking that will involve a total investment cost on the order of $200 billion.

The context within which the FCS investment is being made is important. Fiscal imbalances faced by the Federal Government will continue to constrain discretionary spending. One of the single largest investments the Government makes is the development and production of new weapon systems. Over the last 5 years, the Department of Defense (DOD) has doubled its planned investments in new weapon systems from about $700 billion in 2001 to nearly $1.4 trillion in 2006. At the same time, research and development cost growth on new weapons maintains its historical level of about 30 to 40 percent. This is the lens that must be used to look at major new investments, such as FCS, because more money may not be an option for the future. Rather, the key to getting better outcomes is to make individual programs more executable.

Today, I would like to discuss (1) the business case that is necessary for the FCS to be successful and (2) the related business arrangements for carrying out the FCS program.

SUMMARY

The critical role played by U.S. ground combat forces is underscored today in Operation Iraqi Freedom. That the Army should ensure its forces are well equipped with the capabilities they will need in the coming years is unquestioned. Moreover, the top-level goals the Army has set for its future force seem inarguable: to be as lethal and survivable as the current force, but significantly more sustainable and mobile. However, the Army's approach to meeting these needs—embodied in the FCS and its complementary systems—does raise questions.

On the one hand, the FCS is the result of the Army leadership's taking a hard look at how it wants its forces to fight in the future. Army leadership has had the courage to break with tradition on FCS; it would have likely been much easier to win support for successor vehicles to the Abrams and Bradley. On the other hand, FCS does not present a good business case for an acquisition program. It is necessary that a major new investment like FCS have a compelling, well-thought out concept, but this alone is not sufficient. FCS began the product development prematurely in 2003, and today is a long way from having the level of knowledge it should have had before committing the high level of resources associated with a new product development effort. The elements of a sound business case—firm requirements, mature technologies, a knowledge-based acquisition strategy, a realistic cost estimate and sufficient funding—are not yet present. FCS has all the markers for risks that would be difficult to accept for any single system. They are even more daunting in the case of FCS not only because of their multiplicity but because FCS represents a new concept of operations that is predicated on technological breakthroughs. Thus, technical problems, which accompany immaturity, not only pose traditional risks to cost, schedule, and performance; they pose risks to the new fighting concepts envisioned by the Army.

We are still early in the long journey that FCS entails. Many decisions lie ahead that will involve trade-offs the Government will make. Facts of life, like technologies not working out, reductions in available funds, and changes in performance parameters, must be anticipated. It is important, therefore, that the business arrangements made for FCS, primarily the development contract and the lead system integrator approach, preserve the Government's ability to adjust course as dictated by facts and circumstances. At this point, the $8 billion to be spent on the program through the end of fiscal year 2006 is a small portion of the $200 billion total. DOD needs to guard against letting the buildup in investment from limiting its decision making flexibility as essential knowledge regarding FCS becomes available. As the details of the Army's new FCS contract are worked out and its relationship with

the lead system integrator evolves, it will be important to ensure that the basis for making additional funding commitments is transparent. Accordingly, markers for gauging knowledge must be clear, incentives must be aligned with demonstrating such knowledge, and provisions must be made for the Army to change course if the program progresses differently than planned.

BACKGROUND

The FCS concept is part of a pervasive change to what the Army refers to as the Future Force. The Army is reorganizing its current forces into modular brigade combat teams, meaning troops can be deployed on different rotational cycles as a single team or as a cluster of teams. The Future Force is designed to transform the Army into a more rapidly deployable and responsive force and to enable the Army to move away from the large division-centric structure of the past. Each brigade combat team is expected to be highly survivable and the most lethal brigade-sized unit the Army has ever fielded. The Army expects FCS-equipped brigade combat teams to provide significant warfighting capabilities to DOD's overall joint military operations. The Army is implementing its transformation plans at a time when current U.S. ground forces are playing a critical role in the ongoing conflicts in Iraq and Afghanistan.

The FCS family of weapons includes 18 manned and unmanned ground vehicles, air vehicles, sensors, and munitions that will be linked by an information network. These vehicles, weapons, and equipment will comprise the majority of the equipment needed for a brigade combat team. The Army plans to buy 15 brigades worth of FCS equipment by 2025.

Elements of a Business Case

We have frequently reported on the importance of using a solid, executable business case before committing resources to a new product development. In its simplest form, this is evidence that (1) the warfighter's needs are valid and can best be met with the chosen concept, and (2) the chosen concept can be developed and produced within existing resources—that is, proven technologies, design knowledge, adequate funding, and adequate time to deliver the product when needed.

At the heart of a business case is a knowledge-based approach to product development that demonstrates high levels of knowledge before significant commitments are made. In essence, knowledge supplants risk over time. This building of knowledge can be described as three levels or knowledge points that should be attained over the course of a program:

- First, at program start, the customer's needs should match the developer's available resources—mature technologies, time, and funding. An indication of this match is the demonstrated maturity of the technologies needed to meet customer needs.
- Second, about midway through development, the product's design should be stable and demonstrate that it is capable of meeting performance requirements. The critical design review is that point of time because it generally signifies when the program is ready to start building production-representative prototypes.
- Third, by the time of the production decision, the product must be shown to be producible within cost, schedule, and quality targets and have demonstrated its reliability and the design must demonstrate that it performs as needed through realistic system level testing.

The three knowledge points are related, in that a delay in attaining one delays the points that follow. Thus, if the technologies needed to meet requirements are not mature, design and production maturity will be delayed.

OBJECTIVES, SCOPE, AND METHODOLOGY

To develop the information on the Future Combat System program's progress toward meeting established goals, the contribution of critical technologies and complementary systems, and the estimates of cost and affordability, we interviewed officials of the Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics); the Army G–8; the Office of the Under Secretary of Defense (Comptroller); the Secretary of Defense's Cost Analysis Improvement Group; the Director of Operational Test and Evaluation; the Assistant Secretary of the Army (Acquisition, Logistics, and Technology); the Army's Training and Doctrine Command; Surface Deployment and Distribution Command; the Program Manager for the Future Combat System (Brigade Combat Team); the Future Combat System Lead Systems Integrator; and other contractors. We reviewed, among other documents, the Future Combat System's Operational Requirements Document, the Acquisition Strategy Re-

port, the Baseline Cost Report, the Critical Technology Assessment and Technology Risk Mitigation Plans, and the Integrated Master Schedule. We attended and/or reviewed the results of the FCS System of Systems Functional Review, In-Process Reviews, Board of Directors Reviews, and multiple system demonstrations. In our assessment of the FCS, we used the knowledge-based acquisition practices drawn from our large body of past work as well as DOD's acquisition policy and the experiences of other programs. We conducted the above in response to the National Defense Authorization Act for Fiscal Year 2006, which requires GAO to annually report on the product development phase of the FCS acquisition. We performed our review from June 2005 to March 2006 in accordance with generally accepted auditing standards.

IMPROVED BUSINESS CASE IS NEEDED FOR THE FCS'S SUCCESS

An improved business case for the FCS program is essential to help ensure that the program is successful in the long run. The FCS is unusual in that it is developing 18 systems and a network under a single program office and lead system integrator in the same amount of time that it would take to develop a single system. It also started development with less knowledge than called for by best practices and DOD policy.

While Progress Has Been Made, Requirements Still Remain Uncertain

The Army has made significant progress defining FCS's system of systems requirements, particularly when taking into account the daunting number of them involved—nearly 11,500 at this level. Yet system-level requirements are not yet stabilized and will continue to change, postponing the needed match between requirements and resources. Now, the Army and its contractors are working to complete the definition of system level requirements, and the challenge is in determining if those requirements are technically feasible and affordable. Army officials say it is almost certain that some FCS system-level requirements will have to be modified, reduced, or eliminated; the only uncertainty is by how much. We have previously reported that unstable requirements can lead to cost, schedule, and performance shortfalls. Once the Army gains a better understanding of the technical feasibility and affordability of the system-level requirements, trade-offs between the developer and the warfighter will have to be made, and the ripple effect of such trade-offs on key program goals will have to be reassessed. Army officials have told us that it will be 2008 before the program reaches the point which it should have reached before it started in May 2003 in terms of stable requirements.

FCS Success Hinges on Numerous Undemonstrated Technologies and Complementary Programs

Development of concrete program requirements depends in large part on stable, fully mature technologies. Yet, according to the latest independent assessment,[1] the Army has not fully matured any of the technologies critical to FCS's success. Some of FCS's critical technologies may not reach a high level of maturity until the final major phase of acquisition, the start of production. The Army considers a lower level of demonstration as acceptable maturity, but even against this standard, only about one-third of the technologies are mature. We have reported that going forward into product development without demonstrating mature technologies increases the risk of cost growth and schedule delays throughout the life of the program. The Army is also facing challenges with several of the complementary programs considered essential for meeting FCS's requirements. Some are experiencing technology difficulties, and some have not been fully funded. These difficulties underscore the gap between requirements and available resources that must be closed if the FCS business case is to be executable.

Technology readiness levels (TRL) are measures pioneered by the National Aeronautics and Space Administration and adopted by DOD to determine whether technologies were sufficiently mature to be incorporated into a weapon system. Our prior work has found TRLs to be a valuable decisionmaking tool because they can presage the likely consequences of incorporating a technology at a given level of maturity into a product development. The maturity levels range from paper studies (level 1), to prototypes tested in a realistic environment (level 7), to an actual system proven in mission operations (level 9). Successful DOD programs have shown that critical technologies should be mature to at least a TRL 7 before the start of product development.

In the case of the FCS program, the latest independent technology assessment shows that none of the critical technologies are at TRL 7, and only 18 of the 49 tech-

[1] Technology Readiness Assessment Update, Office of the Deputy Assistant Secretary of the Army for Research and Technology, April 2005.

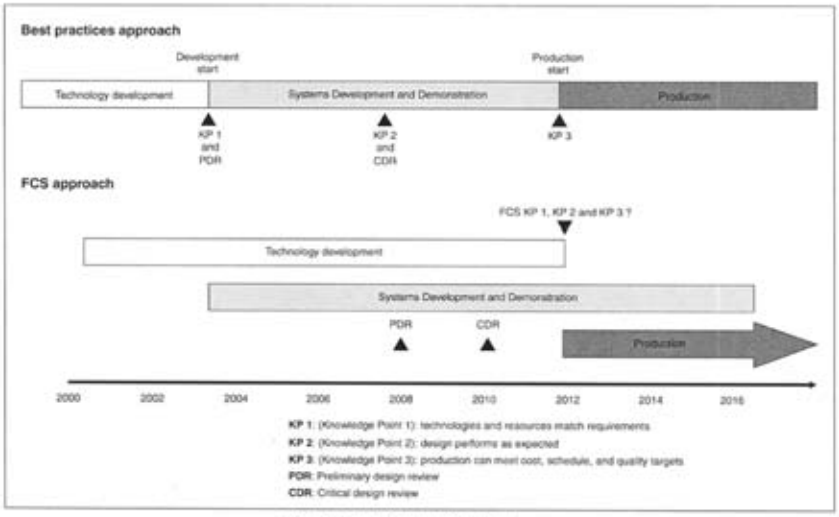
nologies currently rated have demonstrated TRL 6, defined as prototype demonstration in a relevant environment. None of the critical technologies may reach TRL 7 until the production decision in fiscal year 2012, according to Army officials.[2] Projected dates for FCS technologies to reach TRL 6 have slipped significantly since the start of the program. In the 2003 technology assessment, 87 percent of FCS's critical technologies were projected to be mature to a TRL 6 by 2005. When the program was looked at again in April 2005, 31 percent of the technologies were expected to mature to a TRL 6 by 2005, and all technologies are not expected to be mature to that level until 2009.

FCS Acquisition Strategy Will Demonstrate Design Maturity After Production Begins

The knowledge deficits for requirements and technologies have created enormous challenges for devising an acquisition strategy that can demonstrate the maturity of design and production processes. Several efforts within the FCS program are facing significant problems that may eventually involve reductions in promised capabilities and may lead to cost overruns and schedule delays. Even if requirements setting and technology maturity proceed without incident, FCS design and production maturity will still not be demonstrated until after the production decision is made. Production is the most expensive phase in which to resolve design or other problems.

The Army's acquisition strategy for FCS does not reflect a knowledge-based approach. Figure 1 shows how the Army's strategy for acquiring FCS involves concurrent development, design reviews that occur late, and other issues that are out of alignment with the knowledge-based approach outlined in DOD policy.

Figure 1: Differences between Best Practices' Acquisition Approach and FCS Approach



Source: Army (data); GAO (analysis and presentation).

Ideally, the preliminary design review occurs at or near the start of product development. Doing so can help reveal key technical and engineering challenges and can help determine if a mismatch exists between what the customer wants and what the product developer can deliver. An early preliminary design review is intended to help stabilize cost, schedule, and performance expectations. The critical design review ideally occurs midway into the product development phase. The critical design review should confirm that the system design is stable enough to build production-representative prototypes for testing.

The FCS acquisition schedule indicates several key issues:

[2] When the program started seven of 32 technologies were rated at TRL 6 and one was at TRL 7.

• The program did not have the basic knowledge needed for program start in 2003. While the preliminary design review normally occurs at or near the start of product development, the Army has scheduled it in fiscal year 2008, about 5 years after the start of product development.
• Instead of the sequential development of knowledge, major elements of the program are being conducted concurrently.
• The critical design review is scheduled in fiscal year 2010, just 2 years after the scheduled preliminary review and the planned start of detailed design. The timing of the design reviews is indicative of how late knowledge will be attained in the program, assuming all goes according to plan.
• The critical design review is also scheduled just 2 years before the initial FCS low-rate production decision in fiscal year 2012, leaving little time for product demonstration and correction of any issues that are identified at that time.

The FCS program is thus susceptible to late-cycle churn, which refers to the additional—and unanticipated—time, money, and effort that must be invested to overcome problems discovered late through testing.

FCS's Higher Costs May Result in Funding Challenge

The total cost for the FCS program, now estimated at $160.7 billion (then year dollars), has climbed 76 percent from the Army's first estimate. Because uncertainties remain regarding FCS's requirements and the Army faces significant challenges in technology and design maturity, we believe the Army's latest cost estimate still lacks a firm knowledge base. Furthermore, this latest estimate does not include complementary programs that are essential for FCS to perform as intended, or all of the necessary funding for FCS spin-outs. The Army has taken some steps to help manage the growing cost of FCS, including establishing cost ceilings or targets for development and production; however, program officials told us that setting cost limits may result in accepting lower capabilities. As FCS's higher costs are recognized, it remains unclear whether the Army will have the ability to fully fund the planned annual procurement costs for the FCS current program of record. FCS affordability depends on the accuracy of the cost estimate, the overall level of development and procurement funding available to the Army, and the level of competing demands.

At the start of product development, FCS program officials estimated that the program would require about $20 billion in then-year dollars for research, development, testing, and evaluation and about $72 billion to procure the FCS systems to equip 15 brigade combat teams. At that time, program officials could only derive the cost estimate on the basis of what they knew then—requirements were still undefined and technologies were immature. The total FCS program is now expected to cost $160.7 billion in then-year dollars, a 76-percent increase. Table 1 summarizes the growth of the FCS cost estimate.

TABLE 1: COMPARISON OF ORIGINAL COST ESTIMATE AND CURRENT COST ESTIMATE FOR FCS PROGRAM

[In billions of then-year dollars]

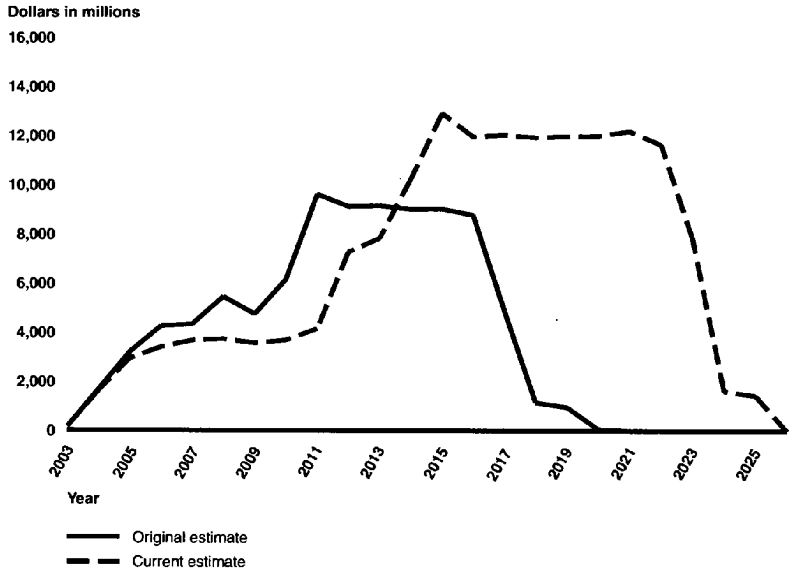
	Original estimate	Revised estimate (as of 1/2006)	Percentage increase
Research, development, testing, and evaluation	$19.6	$30.5	56
Procurement	$71.8	$130.2	81
Total	$91.4	$160.7	76

Source: Army (data); GAO (analysis and presentation).

According to the Army, the current cost estimate is more realistic, better informed, and based on a more reasonable schedule. It accounts for the restructure of the FCS program and its increased scope, the 4-year extension to the product development schedule, the reintroduction of four systems that had been previously deferred, and the addition of a spin-out concept whereby mature FCS capabilities would be provided, as they become available, to current Army forces. It also reflects a rate of production reduced from an average of 2 brigade combat teams per year to an average of 1.5 brigades per year. Instead of completing all 15 brigades by 2020, the Army would complete production in 2025. This cost estimate has also benefited from progress made in defining system of systems requirements.

Figure 2 compares the funding profiles for the original program and for the latest restructured program.

Figure 2: Comparison of Original Cost Estimate and Current Cost Estimate for FCS Program between Fiscal Years 2003 and 2026 (in millions of then-year dollars)



Source: U.S. Army.

The current funding profile is lower than the original through fiscal year 2013, but is substantially higher than the original after fiscal year 2013. It still calls for making substantial investments before key knowledge has been demonstrated. Stretching out FCS development by 4 years freed up about $9 billion in funding through fiscal year 2011 for allocation to other Army initiatives. Originally, FCS annual funding was not to exceed $10 billion in any 1 year. Now, the cost estimate is expected to exceed $10 billion in each of 9 years. While it is a more accurate reflection of program costs than the original estimate, the latest estimate is still based on a low level of knowledge about whether FCS will work as intended. The cost estimate has not been independently validated, as called for by DOD's acquisition policy. The Cost Analysis Improvement Group will not release its updated independent estimate until spring 2006, after the planned Defense Acquisition Board review of the FCS program.

The latest cost estimate does not include all the costs that will be needed to field FCS capabilities. For instance,

- Costs for the 52 essential complementary programs are separate, and some of those costs could be substantial. For example, the costs of the Joint Tactical Radio System Clusters 1 and 5 programs were expected to be about $32.6 billion (then-year dollars).[3]
- Some complementary programs, such as the Mid-Range Munition and Javelin Block II, are currently not funded for their full development. These and other unfunded programs would have to compete for already tight funding.
- Procurement of the spin-outs from the FCS program to current Army forces is not yet entirely funded. Procuring the FCS items expected to be spun out to current forces is expected to cost about $19 billion, and the needed installation kits may add $4 billion. Adding these items brings the total required FCS investment to the $200 billion range.

[3] The ongoing operational assessment of the Joint Tactical Radio System functionality could result in a program restructure, which would have an impact on the program's costs.

Through fiscal year 2006, the Army will have budgeted over $8 billion for FCS development. Through fiscal year 2008, when the preliminary design review is held, the amount budgeted for FCS will total over $15 billion. By the time the critical design review is held in 2010, about $22 billion will have been budgeted. By the time of the production decision in 2012, about $27 billion will have been budgeted.

The affordability of the FCS program depends on several key assumptions. First, the program must proceed without exceeding its currently projected costs. Second, the Army's annual procurement budget—not including funds specifically allocated for the modularity initiative—is expected to grow from between $11 billion to $12 billion in fiscal year 2006 to at least $20 billion by fiscal year 2011. The large annual procurement costs for FCS are expected to begin in fiscal year 2012, which is beyond the current Future Years Defense Plan period (fiscal years 2006–2011). FCS procurement will represent about 60–70 percent of Army procurement from fiscal years 2014 to 2022. This situation is typically called a funding bow wave.[4] As it prepares the next Defense Plan, the Army will face the challenge of allocating sufficient funding to meet the increasing needs for FCS procurement in fiscal years 2012 and 2013. If all the needed funding cannot be identified, the Army will have to consider reducing the FCS procurement rate or delaying or reducing items to be spun out to current Army forces. However, reducing the FCS procurement rate would increase the FCS unit costs and extend the time needed to deploy FCS-equipped brigade combat teams.

FCS BUSINESS ARRANGEMENTS

Given the risks facing the FCS program, the business arrangements made for carrying out the program will be critical to protecting the Government's interests. To manage the program, the Army is using a lead system integrator (LSI), Boeing. As LSI, Boeing carries greater responsibilities than a traditional prime contractor. The Army is in the process of finalizing a new Federal Acquisition Regulation (FAR)-based contract in response to concerns that the previous Other Transaction Agreement was not the best match for a program of FCS's size and risks. This contract will establish the expectations, scope, deliverables, and incentives that will drive the development of the FCS.

Program Management with A Lead System Integrator

From the outset of the FCS program, the Army has employed a management approach that centers on the LSI. The Army did not believe it had the resources or flexibility to field a program as complex as FCS under the aggressive timeline established by the then-Army Chief of Staff. Although there is no complete consensus on the definition of LSI, generally, it is a prime contractor with increased responsibilities. These responsibilities may include greater involvement in requirements development, design and source selection of major system and subsystem subcontractors. The Government has used the LSI approach on other programs that require system-of-systems integration. The FCS program started as a joint Defense Advanced Research Projects Agency and Army program in 2000. In 2002, the Army competitively selected Boeing as the LSI for the concept technology demonstration phase of FCS. The Army's intent is to maintain the LSI for the remainder of FCS development.

Boeing and the Army established a relationship to work in what has become known as a "one-team" management style with several first tier subcontractors to develop, manage, and execute all aspects of the FCS program. For example, Boeing's role as LSI extends beyond that of a traditional prime contractor and includes some elements of a partner to the Government in ensuring the design, development, and prototype implementation of the FCS network and family of systems. In this role, Boeing is responsible for (1) engineering a system of systems solution, (2) competitive selection of industry sources for development of the individual systems and subsystems, and (3) integrating and testing these systems to satisfy the requirements of the system of systems specifications. Boeing is also responsible for the actual development of two critical elements of the FCS information network—the System of Systems Common Operating Environment and the Warfighter-Machine Interface.

The Army participates in program decisions such as make/buy and competitive selection decisions, and it may disapprove any action taken under these processes. The decision structure of the program is made up of several layers of Integrated Product Teams. These teams are co-chaired by Army and LSI representatives. Government personnel participate in each of the integrated product teams. This collaborative structure is intended to force decision making to the lowest level in the program.

[4] The term bow wave is used to describe a requirement for more funds just beyond the years covered in the Future Years Defense Plan that are subject to funding constraints.

Decisions can be elevated to the program manager level, and ultimately the Army has final decision authority. The teams also include representation of the Army user community, whose extensive presence in the program is unprecedented.

The advantages of using an LSI approach on a program like FCS include the ability of the contractor to know, understand, and integrate functions across the various FCS platforms. Thus, the LSI has the ability to facilitate movement of requirements and make trade-offs across platforms. This contrasts with past practices of focusing on each platform individually. However, the extent of contractor responsibility in so many aspects of the FCS program management process, including responsibility for making numerous cost and technical tradeoffs and for conducting at least some of the subcontractor source selections, is also a potential risk. As an example, many of the subcontractor source selections are for major weapon systems that, in other circumstances, would have been conducted by an Army evaluation team, an Army Contracting Officer and a senior-level Army source selection authority. These decisions, including procurement decisions for major weapons systems, are now being made by the LSI with Army involvement. This level of responsibility, as with other LSI responsibilities in the program management process, requires careful Government oversight to ensure that the Army's interests are adequately protected now and in the future.

Thus far, the Army has been very involved in the management of the program and in overseeing the LSI. It is important that as the program proceeds, the Army continue to be vigilant about maintaining control of the program and that organizational conflicts of interest are avoided, such as can arise when the LSI is also a supplier. As discussed in the next section, the Army intends the new contract to provide additional protection against potential conflicts.

Contracting Arrangements

The Army and Boeing entered into a contractual instrument called an Other Transaction Agreement (OTA). The purpose of the OTA was to encourage innovation and to use its wide latitude in tailoring business, organizational, and technical relationships to achieve the program goals. The original OTA was modified in May 2003 and fully finalized in December 2003 for the Systems Development and Demonstration phase of the FCS program. The latest major modification to the OTA, to implement the 2004 program restructuring, was finalized in March 2005.

Questions have been raised about the appropriateness of the Army's use of an OTA for a program as large and risky as FCS. The Airland Subcommittee held a hearing in March 2005 which addressed this among other issues. In particular, concern has been raised about the protection of the Government's interests under the OTA arrangement and the Army's choice to not include standard FAR clauses in the OTA. In April 2005, the OTA was modified by the Army to incorporate the procurement integrity, Truth in Negotiations, and Cost Accounting Standards clauses.

In April 2005, the Secretary of the Army decided that the Army should convert the OTA to a FAR-based contract. A request for proposals was issued by the Army on August 15, 2005. An interim letter contract was issued on September 23, 2005. The Systems Development and Demonstration work through September 2005 will be accounted for under the OTA and all future work under the FAR-based contract. Boeing/SAIC and all of the FCS subcontractors were to submit a new certifiable proposal for the remainder of Systems Development and Demonstration and that will be the subject of negotiations with the Army. The Army expects the content of the program—its statement of work—will remain the same and they do not expect the cost, schedule, and performance of the overall Systems Development and Demonstration effort to change materially. The target date for completion of the finalized FAR contract is March 28, 2006. In the coming months, we will be taking a close look at the new contract as part of our continuing work on FCS that is now mandated by the National Defense Authorization Act for Fiscal Year 2006.

The FAR-based contract is expected to include standard FAR clauses, including the Truth in Negotiations and Cost Accounting Standards clauses. The letter contract includes Organizational Conflict of Interest clauses whereby Boeing and SAIC can not compete for additional FCS subcontracts. Also, other current subcontractors can compete for work only if they do not prepare the request for proposals or participate in the source selection process.

The last major revision of the OTA in March 2005 had a total value of approximately $21 billion. Through September 2005 the Army and LSI estimate that about $3.3 billion will be chargeable to the OTA. The FAR based contract will cover all activity after September 2005 and is expected to have a value of about $17.4 billion. Both the OTA and the FAR-based contract will be cost plus fixed fee contracts with additional incentive fees. According to the Army, the fee arrangement is designed to address the unique relationship between the Army and the LSI and to acknowl-

edge their "shared destiny" by providing strategic incentives for the LSI to prove out technologies, integrate systems, and move the program forward to production, at an affordable cost and on schedule. In the OTA, the annual fixed fee was set at 10 percent of estimated cost and the incentive fee available was 5 percent.

The Army plans to change the fee structure for the FCS program in the new contract. The request for proposals for the new contract proposed a 7-percent fixed fee and an 8-percent incentive fee. The OTA established 10 distinct events where LSI performance will be evaluated against predetermined performance, cost, and schedule criteria. (Those events are expected to be retained in the FAR contract.) One event has already occurred—the System of Systems Functional Requirements Review was held in August 2005. The next event is called the Capabilities Maturity Review and it is expected to occur in June or July 2006. As the details are worked out, it is important that the new contract encourage meaningful demonstrations of knowledge and to preserve the Government's ability to act on knowledge should the program progress differently than planned.

Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions that you or members of the subcommittee may have.

Contacts and Staff Acknowledgements

For future questions about this statement, please contact me at (202) 512–4841. Individuals making key contributions to this statement include Robert L. Ackley, Lily J. Chin, Noah B. Bleicher, Marcus C. Ferguson, William R. Graveline, Guisseli Reyes, Michael J. Hesse, John P. Swain, Robert S. Swierczek, and Carrie R. Wilson.

Senator MCCAIN. Thank you very much.

Dr. Graham, welcome.

STATEMENT OF DAVID R. GRAHAM, DEPUTY DIRECTOR, STRATEGY FORCES AND RESOURCES DIVISION, INSTITUTE FOR DEFENSE ANALYSES

Dr. GRAHAM. Thank you. It's an honor to be here.

Let me begin by saying that I think this committee is on to a very important set of issues. FCS is one example of an emerging class of programs that involve a lot of integration across platforms, involve multiple Services, corporations, and corporate interests. So, coming to grips with how the Department is going to manage those programs is a very important challenge before the Department, and the Government as a whole.

Other examples, if you look at the joint tactical radio system, theater air and missile defense, command, control, communications, computers, intelligence, surveillance, and reconnaisance systems, there's a whole range of challenges ahead of us that present the same kind of problems that we're talking about with FCS today.

Our study was completed in 2004. It provides a snapshot of what we saw in the program at that time. By way of context, I have to say that we were asked by the Army to look at the challenges that we saw for them to execute the FCS program as it went forward. So, our recommendations were aimed specifically at the execution of that program. We gave the Army 18 recommendations, some of which are important in the context of today's discussions.

Because of our approach to this, we were again advising the Army on the things that we saw needed to be done to execute the program. So, we weren't doing a broader public policy review of a lot of these issues; and that, in some cases, has led us to make recommendations that are specific to the program, but not be germane to the broader issues.

Now, I've been asked to comment on two things today. One is the LSI, the second is the ethics issues relating to FCS.

The bottom line with respect to the LSI is consistent with what Mr. Francis just said. You have a program here where there are a lot of very important decisions that remain to be made. The Army requires the ability to stand back from the competitive interests of the participants in the program and make judgments about what is in the best interest of the Army. We concluded there's a lot at stake for all of the companies that are involved in this program, so there is a need for the Army to have its own capability to judge where they are at any point in time, and what makes the most sense going forward. That was the focus of our recommendations to the Army at that time. We said they needed to identify the kinds of decisions that would need to be made, and create a process within the Army, the corporate Army, for getting those decisions made, and then provide that guidance back to the contractors. They needed, as Mr. Francis said, an effective risk assessment and management process. They needed their own internal mechanisms for assessing the status of the program, and options. Finally, they needed an independent test capability. So, we were focused on strengthening the Army's ability to provide its own perspective and views on the program.

With respect to ethics, we were asked to see if there was anything that was going to come back and bite the Army due to the business setup that they had. We looked very carefully at Boeing and what they had done, in response to the issues with the other programs and a little bit at the other contractors.

Basically, what we found was that Boeing, by the time we looked at the program, had undergone three or four pretty in-depth independent reviews—Senator Rudman was involved in that, among others—and had put together a lot of formal structures, to guarantee the integrity of the program. So, what we found was that, in terms of the formal structures, they had done a lot. Boeing had really bent over backwards to make the case, so they could win back the confidence of their customer.

We did not do an in-depth field survey of how these new programs had been implemented. So one of the things we told the Army was that they should adopt a policy of "trust, but verify," in order to understand how the contractors were implementing these programs. Boeing had already agreed with the Air Force to institute a set of external oversight activities. We recommended that the Army piggyback on those. Boeing had also set up a number of—they created a new independent vice president and so forth. So we thought the Army should continue to monitor those things.

In addition, as part of the Rudman review, Boeing agreed to set up a pretty stringent screening process for new employees coming onboard if they had Government background. Our recommendation there was that they ought to look retrospectively at the people who came into the corporation before those provisions were set in place.

So, that concludes the recommendations that we have made to Boeing or to the Army on that program.

[The prepared statement of Dr. Graham follows:]

PREPARED STATEMENT BY DAVID R. GRAHAM

IDA findings on the use of the Lead System Integrator program structure for the Army's FCS program.[1]

I was the study director for the Institute for Defense Analyses's (IDA) 2004 review of Future Combat System (FCS) program management. IDA performed this review at the request of then-Acting Secretary of the Army, Les Brownlee, and the Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics).

The IDA report provides a snapshot of the program in mid-2004, and it describes 18 substantial actions we identified as necessary to manage the program effectively. Our recommendations included actions to address risks associated with the topics of interest for this hearing: the Army's employment of a Lead System Integrator (LSI) and the ethical programs associated with FCS. I have submitted an extract from our report for the record.

THE ARMY'S EMPLOYMENT OF AN LSI FOR FCS

Let me begin with three observations on the rationale for employing an LSI for managing FCS:

- The Army established a LSI for the FCS program in order to capitalize on industry expertise in structuring, integrating, and managing complex development programs.
- The Boeing-SAIC team was selected to act as the LSI because of its experience in technical management and program integration. Boeing has considerable experience in integrating other large complex programs, including the NASA International Space Station since 1997, and the Missile Defense Agency (MDA) Ground-Based Mid-Course Defense (GMD) program since 1998.
- In DOD's view, an LSI is legally equivalent to employing a prime contractor that is focused primarily on system engineering, system integration, system planning, and control of the family of systems production.[2]

Our overall findings were that the LSI concept has worked satisfactorily in other contexts, and we discovered nothing to indicate such an approach cannot work for the FCS program.

At the same time, we found that the Army's use of an LSI for FCS involves some significant management challenges.

- The underlying challenge is that the successful execution of the FCS program requires ongoing strong, independent Army involvement to address design and development issues that are fundamental to the Army's future. At the time of our review, the operational requirements document and key performance parameters were being revised in parallel with FCS program development. There were also major technical risks that would require downstream adjustments in program plans and expectations.
- The Army had the formal processes in place for overseeing and engaging on these issues with the FCS program. But, we saw potential weaknesses in the execution of the FCS management structure.[3] The FCS employs the "one-team," which inter-mixes Government and industry experts in integrated product teams (IPTs) co-chaired by Government and LSI officials, and relies heavily on Boeing's management information system for information and analyses. This creates inherent tensions in the roles of Army participants—teammate vs. customer representative, and in the roles of industry representatives—teammate vs. representative of corporate management and stockholders.
    - From the contractor's perspectives, there are tens of billions of dollars at stake in upcoming decisions regarding the composition of FCS units to be

[1] This statement is based on the IDA study report for this task. David R. Graham, Amy A. Alrich, Richard P. Diehl, Forrest R. Frank, Anthony C. Hermes, Robert C. Holcomb, Dennis O. Madl, Michael S. Nash, J. Richard Nelson, Gene Porter, David A. Sparrow, and Michael D. Spies, IDA Review of FCS Management, (Alexandria, Virginia, Institute for Defense Analyses, IDA P–3929), August 2004.

[2] Acting Under Secretary of Defense (Acquisition, Technology, and Logistics) letter report on DOD's use of Lead Systems Integrators, 31 March 2004. DOD indicates that an LSI is legally equivalent to a prime contractor.

[3] The Army's formal framework includes the UA Board of Directors to support FCS execution, assist in building interfaces between FCS and other Army acquisition activities, and to protect the Army's corporate interests in the FCS program. In 2003, the Army established the TRADOC Futures Center. The Futures Center provides an Army focal point for defining FCS capability needs and for arbitrating those major requirements decisions that have broad Army implications.

fielded, as well as the capabilities that will be assigned to each element of FCS.

• Boeing LSI personnel also face thorny dilemmas in the "one team" construct: The LSI is intended to act as a neutral party in assessing program tradeoffs and in offering advice. Thus, in theory, the LSI should not have a financial stake in developing and building the individual elements of the system; rather, it should recruit and oversee the best of the industry. Boeing, however, has a large financial stake in the future of the program.

• On the Government side, many staff are dual-hatted as IPT members while performing their Governmental responsibilities, including oversight of contractor cost and schedule performance, setting user requirements, conducting operational and live-fire testing, and establishing system architectures.

Given these internal tensions, we felt the Government faced the risk of becoming too heavily reliant on its industry partners. Success with the FCS program requires a strong cadre of "smart buyers" on the Government side, who are looking out for the Army's interests, and are equipped to counter-balance corporate incentives in order to keep the FCS program focused on delivering an integrated and effective unit of action.

We advocate three actions to strengthen the Army's ability to shape the FCS program:

1. A corporate Army process for identifying and resolving key FCS decisions.
2. An Army institutional capability to develop independent, corporate Army perspective on FCS cost, schedule, and performance issues. We recommended five specific responsibilities for the organization assigned this job:
   - Independent assessments of cost, schedule, and performance
   - Support for FCS program reviews
   - Support for Training and Doctrine Command (TRADOC) quarterly futures reviews
   - Assessments of the "one-team's" management information systems
   - Strategic risk assessments with associated contingency options for FCS to enable the program to continue to adjust as development matures
3. Army test activities that continue their collaboration in support of the Army's FCS development efforts, but in a way that ensures their independence.

ETHICS

The IDA review examined Boeing's ethics initiatives in some depth, looked briefly into the ethics programs in the other companies involved in FCS, and considered Government workforce ethics issues as well. My comments today will focus on Boeing.

In the 2 years prior to the IDA review, Boeing had commissioned a series of external reviews to address some serious ethical problems unrelated to the FCS program. Such violations led to Boeing's debarment from the Air Force's Evolved Expendable Launch Vehicle program. One review, "The Boeing Company: An Assessment of the Ethics Program," was performed by the Ethical Leadership Group at the request of the Air Force.[4] Former Senator Warren Rudman performed two additional ethics reviews at the request of Boeing.[5] R. William Ide, a former president of the American Bar Association, conducted a third review that focused on Boeing's legal department.

These external reviewers found Boeing's ethics activities to be understrength, integrated too closely with the business and operating units, too narrowly focused, and not sufficiently aggressive in addressing issues. The Ethical Leadership Group noted that more than 90 percent of Boeing employees participating in their study were aware of the Boeing ethics hotline; however, a significant percentage of those same employees also felt that complaints would not be acted upon thoughtfully, in a timely manner, and worse, would subject the complainant to retaliation.

In response to the recommendations of these reviews, Boeing management took many steps to strengthen needed enforcement mechanisms, provide stronger awareness of the company's commitment to ethical behavior, and strengthen the mecha-

[4] Ethical Leadership Group, Wilmette, IL, October 2003.

[5] Paul, Weiss, Rifkind, Wharton, and Garrison, LLP, "A Report to the Chairman and Board of Directors of the Boeing Company Concerning the Company's Ethics Program and its Rules and Procedures for the Treatment of Competitor's Proprietary Information," (Washington, DC: November 3, 2003) and "A Report to the Chairman and Board of Directors of the Boeing Company Concerning the Company's Policies and Practices for the Hiring of Government and Former Government Employees," (Washington, DC: February 26, 2004).

nisms for reporting and investigating potential violations. (These are detailed in the IDA report.)

Boeing has, in particular, realigned its corporate structure to increase the independence of corporate governance functions, including establishing:

- A Senior Vice President (VP) for Internal Governance (reports to CEO and separately to the Board's audit committee)
- An Integrated Defense Systems Compliance Review Board—chaired by the President of Boeing
- Direct reporting lines for all Ethics Advisors to Headquarters VP for Ethics

With these and other actions, Boeing makes a strong case that they are making every effort to "win back the trust of their customers"; IDA did not, however, audit execution at Boeing so we can only report on these actions and the formal processes that Boeing has put in place.

Our report recommended three additional steps for the Army to help ensure that ethical issues would not harm the FCS program:

1. The Army should adopt a policy of "trust but verify" with regard to the ethics programs of the FCS industry participants.
   - In the case of Boeing, the Army should take advantage of planned future Air Force surveillance activities. As part of an administrative agreement to address Boeing's prior problems, Boeing will hire a special compliance officer, approved by and reporting directly to the Air Force. Boeing also will agree to a follow-up independent audit 30 months after the agreement takes effect.
   - The Army also should task the tier 1 subcontractors, through Boeing, to assess lessons learned from the Boeing independent reviews and, where relevant, adopt these lessons learned in their own operations.
2. We recommend that the Army should also require all contractors to screen current employees who have Government backgrounds for possible FCS conflict of interest exposure. Relevant disqualification letters also should be obtained. The Rudman report recommended careful screening of future hires. Boeing agreed to do this, but we were also concerned about risks associated with those already hired before the Rudman review.
3. A comprehensive personnel-tracking program should be implemented within FCS to help manage conflict of interest exposure for all program participants; it should be geared especially toward containment of proprietary information within the FCS "firewall."

Senator MCCAIN. Thank you very much, Dr. Graham.

On the Rudman report, Rudman said that we should have well-known former Pentagon officials who go to work for defense contractors, and we put it in the defense authorization bill, and then it was removed in conference. Do you think we still need that, Dr. Graham?

Dr. GRAHAM. I think it's important to avoid conflict of interest of people coming from Government into industry.

Senator MCCAIN. Mr. Francis?

Mr. FRANCIS. I would agree, Mr. Chairman.

Senator MCCAIN. Secretary Bolton, I'm very concerned, obviously, as we all are, about the cost escalation of defense procurement. We've talked about it a lot, and we have been concerned about the failure to bring costs under control on a broad variety of programs. Outside of the F–22, or Joint Strike Fighter (JSF) program, this is the biggest single defense procurement and the total fixed and incentive fee earned to date by the manufacturers under the LTA is $424.1 million. This is fixed and incentive fees—fixed fee of $280.7 million and incentive fee of $143 million. Meanwhile, the cost of the program has gone up 76 percent. What's the rationalization for paying incentive fees—as I understand, maximum incentive fees—when the cost escalation and the program has been delayed? How do you rationalize that?

Mr. BOLTON. Mr. Chairman, I'll break it down into a couple of parts here. The cost growth in the program has been driven by the Army, not by the contractor.

Senator MCCAIN. How is that driven by the Army?

Mr. BOLTON. Sir, when we started this program, when the Army took the program over and baselined it in 2003, it was a program that was aimed at a field date of 2010. In 2004, after several months of study by the Army—and in several areas, aviation being one, and FCS and others—our leadership made a determination that the soldiers on the battlefield deserved the best available technology as soon as possible.

Senator MCCAIN. Something they didn't, I assume, in 2003.

Mr. BOLTON. That is true. That is true. For the FCS, sir. We were providing, and have been providing, to the battlefield technologies from the technical base and off-the-shelf resulting in programs like the rapid equipping, rapid fielding initiatives. But our new Chief of Staff at the time said, "I want to take whatever technologies are available and ready out of this FCS and put it in the field as soon as possible." When that decision was made, we restructured the program and wound up with four spirals, initially, to take technology that was maturing at that time and put it into the field. The first spiral starts in 2008. That will look at increased network capability, unattended sensors on the battlefield, as well as two or three other technologies we believe will be ready and can be used by our current forces. As we laid out those spirals, which happened on a 2-year center, starting in 2008, the program grew.

We also added 4 more years to take care of the concerns that had already been raised by the GAO and others about maturing technologies. The Army elected, at that time, to add 4 more technologies, to come to a total of 18, that we had taken out previously, before 2003. So, the program and scope changed. When it changed, the cost of that program changed, as well.

Senator MCCAIN. Was the contract renegotiated?

Mr. BOLTON. At that point, we actually modified the contract vehicle that we had. So, we—at that point—and this is 2004—went ahead and put in a new baseline. That baseline was not approved by OSD, for reasons we can go into later, until November 2005. However, in the self-assessment report that we delivered to Congress in December—I think it was December 2004—we explained how we had restructured, how we, the Army, had increased the size of this program, and that we would update the costs as soon as we had an official baseline, from OSD.

Senator MCCAIN. When was that cost updated?

Mr. BOLTON. That was updated in November of last year.

Senator MCCAIN. Whew, boy.

Mr. BOLTON. If I just——

Senator MCCAIN. This is an interesting scenario.

Mr. BOLTON. Yes, sir.

Senator MCCAIN. In 2003, we enter into a contract; 2004, we decide to change it; 2005, we notify Congress; and, during that period of time, the contractor gets maximum incentive fees.

Mr. BOLTON. Yes, sir, because he did exactly what we asked him to do.

Senator MCCAIN. It's stunning.

Mr. BOLTON. If I could use——

Senator MCCAIN. Stunning.

Mr. BOLTON. It's just——

Senator MCCAIN. It's quite stunning. You—they ask you—you just—there's no such thing as a contract. You just ask them to do more things, and then the cost escalates, and then we ask them to do some more things, and then the cost escalates.

Senator LIEBERMAN. We pay more.

Senator MCCAIN. Yes, and we pay more. So, we give them more incentives. How do you—that's the damnedest way of doing business I've ever—no private corporate could stay in business.

Mr. BOLTON. I reflect back on why we did it. We thought it was the right thing to do. We had technologies that were going to mature over time. This Chief of Staff did not want to wait to have all technologies available at once in 2010. He thought soldiers deserved to have the technology when it's available and we restructured the program. To me, that's a good premise.

Senator MCCAIN. Mr. Francis, has the GAO commented on this process?

Mr. FRANCIS. We haven't. We have talked, in general. We have a report out now that talks about how awarding incentive fees works, or, maybe more appropriately, doesn't work. I think in this situation we have reported on FCS, and I do think the restructuring was the right thing to do, because the program, as approved in May 2003, I don't believe, was executable.

Senator MCCAIN. But if you structure a contract, don't you sign a new contract?

Mr. BOLTON. You actually "mod" the contract. That is you have a signed contract, and the legal way to hold someone accountable is to modify that contract signed by a contracting officer. In this case, it was a grants officer.

Mr. FRANCIS. The contract has to be written in such a way that allows for the risk in the program and this program has a lot of risk, which the Government bears. I think I'll come back to what I had said in my opening remarks, which is, the contract itself isn't going to be any better than the program. The program should have been in better shape when it started. You brought up the corporate example. A corporate example, would have had a very tight business case, so that you wouldn't have an unpleasant discovery like this. In the contract at the time, and in the current one, it would still work that way. If the Government were to decide that the program can't be executed as planned, it would revise the cost and schedule estimate, and the basis for the fee would be reset, and the contractor would be judged against the new cost and schedule estimate.

Senator MCCAIN. Would you agree that there was a much lower level of scrutiny or accounting because it was originally an Office of Technology Assessment (OTA) contract?

Mr. FRANCIS. Mr. Chairman, I don't know that the contract type would have made a difference at that point. I think the risks in the program would have overpowered any contract instrument.

Senator MCCAIN. Dr. Graham?

Dr. GRAHAM. That's been our view at IDA. I was here a year ago and said we had told the Army we thought they had sufficient visi-

bility of costs and sufficient authority to control the contractor under the OTA to execute the program effectively. The OTA that was in use at that time, as I said, had a lot of FAR-like provisions put into it by the Army. I agree wholeheartedly and my colleagues at IDA also agree wholeheartedly with Mr. Francis. At that time, we saw that the uncertainty in the program, the technological risks, and the ability to manage those things was the big challenge to the program. We didn't see the OTA itself as the centerpiece of the issue.

Senator MCCAIN. In your report, Dr. Graham, you made several observations regarding the LSI. Boeing has a major financial stake in the program, receives about one-third of the program's fund for its work as the LSI and for developing a system of systems common operating environment; thus, creating an inherent tension in Boeing's roles and responsibilities. Do you think we should be addressing what seems to be a conflict of interest?

Dr. GRAHAM. Again, our approach to the Army was that the Army had to be able to develop its own independent views on cost, schedule, and performance so that it could be an equal, or better, partner in this relationship. That was the solution that we recommended a year ago.

The risk that we saw was that the program was set up under what they call a "one-team" management structure where you had integrated product teams—I don't know, 15 or so of those—looking at different aspects of the program. LSI representatives would come together with Government representatives and a lot of the Government representatives were dual-hatted, so they had to come together and work in this partnership, while, at the same time, carrying out their governmental responsibilities.

At the time we looked at the program, we were somewhat concerned that the Government side may not have the horsepower that was needed for them to engage effectively in all cases. So, we were a little concerned that this IPT process might become dominated by the contractor side, just because of the resources that they had to bring to bear on these processes.

So, that's why our recommendations were aimed toward strengthening the Government's ability to engage in that process.

Senator MCCAIN. Mr. Francis? Comment on this LSI issue?

Mr. FRANCIS. Yes, Mr. Chairman. I think I would agree with Dr. Graham that these are definitely concerns, in the continuing interest of the LSI. Ideally, you'd want the LSI to be financially indifferent to the outcome of the program. In this case, Boeing does have a stake in it. You mentioned the system of systems, common operating environment. There's another element of software they're working on. Plus, they have responsibility for systems engineering, which will continue into production.

I will say the contract that's being negotiated right now does limit Boeing's future involvement in subcontracts, and essentially prevents it. So, that's better. But still, I think, short of starting over with a different contracting arrangement, from here on in the Army will have to try to mitigate the risk with Boeing, versus eliminating it.

Senator MCCAIN. Secretary Bolton, my understanding is the latest cost is $161 billion for the FCS. Is that accurate?

Mr. BOLTON. The contract I'm negotiating right now is $17 billion. If you include what we will estimate the first units of action, 15 of those and then-year dollars, you can get out to about 160. If it's in base-year dollars, it's 125.

Senator MCCAIN. Do you foresee any further cost escalations?

Mr. BOLTON. It's hard for me to answer that, because 2 or 3 years ago when I looked at 2010, I did not anticipate the Army wanting to make a change to put technology into the field as quickly as we're doing in the spin-outs. So, I don't know what the future entails. I do know that if I can stay to the baseline that I have right now, we have a good chance of keeping the cost where it is today.

Senator MCCAIN. Do you share that optimism, Mr. Francis?

Mr. FRANCIS. I'm afraid I don't. I'd like to be optimistic, but, in this case, on the FCS, the base of knowledge right now for developing an estimate is very low, the schedule is very tight, and our analysis shows that a lot of things are going to come together late in the program when the burn rate, if you will, for the dollars is very high. So, I think it will be very difficult for the program to execute within the current estimate.

Senator MCCAIN. Dr. Graham, do you have an opinion?

Dr. GRAHAM. There are features the networking and so forth, that just involve unproven technologies. I think it's very hard to even describe what FCS ultimately will look like, much less predict the cost of it.

Senator MCCAIN. Well, that's comforting. [Laughter.]

Dr. GRAHAM. But, on the other hand, as I said, there are several programs in DOD which are driving toward a level of integration that is needed to take the next step in military capability. There just are tremendous challenges in pulling off those programs.

Mr. BOLTON. Mr. Chairman, if I could add——

Senator MCCAIN. Yes, Mr. Secretary.

Mr. BOLTON.—a little bit to this, because my task is to bring the program in once I have the requirement—if I have the resources to bring it in—and then to apply every tool we have to stay within those resource bounds. I've tried to explain why it grew. Not driven by the contractor, but we, the Army, said we had to do this.

Now, if the Secretary and the Chief had said, "Okay, this is it, that's the money you have, now go make it happen." We have put in—while we don't use the business-case approach—that's not the DOD way of doing this type of program—we do have, in place of that, a strategy, and acquisition strategies, that take all of the things, in terms of requirements and readiness for technology and so forth, into account, and, for each one of the technologies that we are pursuing, the 8 that are now—the 49 that are ready to go now, in terms of level six—23 by the end of this year—by the time we get to the preliminary design review in 2008, all of them will be at the level that the DOD says it has to be for this program to go forward—and for each one of those, there is a detailed risk mitigation plan and an off-ramp, which means if this technology is not ready on that day, I take a technology that already exists, that's here. That's how we're going to control this. What that means is, if we took all these technologies and, boom, we have the FCS, and here's its capability—if we don't get all those technologies, I'll take

something else in lieu of, and it'll be a little less, but it'll still be a whole heck of a lot more than what we have today.

So, my challenge is, once I understand the requirements and have the resources to stay within, we're going to do everything we can to stay there.

Senator MCCAIN. I appreciate that very much, Mr. Secretary. The problem that we're facing—and I'm a student of history—is that sooner, rather than later, we're going to start seeing a leveling off of defense spending.

Mr. BOLTON. Yes, sir.

Senator MCCAIN. There's just too great a deficit. Here we are—history shows that we go in these constant——

Mr. BOLTON. Yes, sir.

Senator MCCAIN.—cycles—so here we are with $2 billion destroyers, $14 billion aircraft carriers, a doubling of the cost of the FCS to $161 billion. There's going to come a terrible collision here and if we don't keep the cost down, it may be great technology, but we're not going to be able to buy it.

Mr. BOLTON. Mr. Chairman, I agree. I, too, have looked at history in this business for at least the last 100 years, and I've seen the same cycles. I ask my folks, "what are we going to do if, 2 or 3 years from now, the budget is cut in half? How do we prioritize?" What are we going to do with this program? We're already looking at that, expecting, one day, for reasons completely outside of this department, that we're going to have to live with that.

Senator MCCAIN. One of the places you could start is not paying off incentive bonuses for contracts that fall behind in schedule and increase in cost.

Mr. BOLTON. Mr. Chairman, I will do that——

Senator MCCAIN.—and if you think that it's justified, we have a difference of opinion.

Mr. BOLTON. Yes, sir.

Senator MCCAIN. Go ahead, please.

Mr. BOLTON. We may. What I've tried to explain is that in this case, this contractor—actually, the group of contractors—did exactly what the Army wanted done. We, the Army, changed. The analogy I use—when I build a house and I go in there and I say, "I'm going to pay this much for a four bedroom, two-car garage." Now my mother-in-law is going to come and visit. That's after I've signed the contract. I need another room. I need handicap ways of getting in and out.

Senator MCCAIN. A lot of times, I say, "Mom, we can't afford it." [Laughter.]

Mr. BOLTON. Sir, you may be able to get away with that. I can't. [Laughter.]

Senator MCCAIN. Well, I mean——

Mr. BOLTON. But the point I'm trying to drive is that if the owner decides to make a change, and the contractor is doing exactly what you asked him to do, why do you penalize the contractor?

Senator MCCAIN. If you are a student of history, Mr. Secretary, you'll go back and see, in the 1980s, we had fixed-cost contracts.

Mr. BOLTON. Yes, sir.

Senator MCCAIN. We had fixed-cost contracts. We didn't have incentive contracts and somehow we got completely away from that. For doing their job, I'm not sure that people deserve incentives. Again, in the corporate world, you go enter into a contract with somebody, and they do the job, and you pay them their money. You don't have to have "incentive contracts," particularly in this case, of 141—or 400—a half a billion dollars, total. That's not the way to negotiate contracts. That's not the way we used to negotiate contracts. We used to say, "Here's the cost." If you renegotiated the cost, fine, then you got a new cost. You didn't need an incentive. Are there penalties in this contract for failure to perform?

Mr. BOLTON. You don't get the incentive.

Senator MCCAIN. That's what I thought.

Mr. BOLTON. But let me point out—because it reflects back to what the GAO has just recently said—we have no award fee with the LSI. There is no award fee.

Senator MCCAIN. There's just incentive fees.

Mr. BOLTON. The incentive fee, which is a very small percentage of all the contracts that are let in DOD—you're not going to find a whole lot who have incentive fees.

Senator MCCAIN. Half a billion dollars this time.

Mr. BOLTON. The reason you don't is because the incentive fee has to be extremely objective. In fact, the two that they've gotten so far were go/no-go, either you do exactly what we say—in that case, it was to definitize the OTA; the other was an extremely important part for this program, otherwise who could not go forward, and that was the systems of systems functional requirements review. Without that, the program literally could not go forward. So we put an incentive on that. Then, within that, we broke out exactly what the contractor had to do.

So, we can disagree on that. The fixed-price contracts that I went through, back in the 1980s, or the cost-plus, back in the 1970s, and you go back to the 1950s, you'll find it going the other way, and they ran afoul for the same reason that any contract would run afoul. As Mr. Francis already has pointed out, it is not the contract type that I worry about, it's the people actually executing the contract, both on the Government side and the contractor, that I worry about. Do they have the expertise, training, and experience to do that work?

Senator MCCAIN. I guess we could extend this discussion for a long time, but there are benefits of old age, Mr. Secretary. I remember when President Reagan came in, and Secretary of the Services gave fixed-cost contracts with penalties associated, not incentive contracts that caused us to spend hundreds of millions of dollars in addition because they did their job.

So, we're going to work every way from this side to eliminate those kinds of contracts so we can save hundreds of millions of dollars, because I'm sure there are defense contractors out there who will do the job, and be satisfied with being paid, as most corporations in America are, for just getting the job done.

Secretary Lieberman—Senator Lieberman.

Senator LIEBERMAN. Well, thank you for that nomination. [Laughter.]

Senator MCCAIN. Secretary Lieberman. [Laughter.]

Senator LIEBERMAN. If you offer it, I might accept it. [Laughter.]

I agree with all the questions and the comments that Senator McCain has made. We're in a crisis here, because we are asking the military to do more. We're not giving you the resources to do it, and there's a definite—taken from here to fill this gap. So, as we said in the last panel, we have this tremendously urgent need to reset the force coming out of Iraq and Afghanistan. So, how are you going to do it? You reach into the institutional Army. That begins to affect training and education and other aspects of the institutional Army. As I said before, I don't think we have enough personnel in the Active Army.

Acquisition is a critical part of this, and somehow we have to figure out how to buy you what you need and get it at a better price. This is because, otherwise, we're ultimately going to compromise our security.

I have just a couple of questions to add. I want to start, Secretary Bolton, with you, about the FCS, and just repeat what I said briefly in my opening statement. As you well know, there was a run made at this program, a serious run, of altering it significantly in the House last year. Chairman Hunter led the drive. That's a very significant person to be raising these questions. On the Senate side, Senator McCain and I and others worked hard to protect the program, because we believe in it.

Mr. BOLTON. Right.

Senator LIEBERMAN. But you're going to be challenged a lot, as you've been today, reasonably, you'll be challenged by those who are not as supportive and it's important that your friends challenge you, too.

The GAO has asserted that the FCS does not represent a good business case for an acquisition program. In the written testimony that Mr. Francis has given us, he said that the elements of a sound business case are firm requirements, mature technologies, a knowledge-based acquisition strategy, a realistic cost estimate, and sufficient funding and he concludes that those are not present in the FCS. As he said in his oral testimony, FCS has all the markers for risks that would be difficult to accept for any single system; they are even more daunting in the case of FCS, not only because of their multiplicity, but because FCS represents a new concept of operations that is predicated on technological breakthroughs.

So, Mr. Secretary, do you agree with the GAO that the FCS program is not based on a solid business case?

Mr. BOLTON. That's difficult for me to answer. As I mentioned earlier, DOD does not process programs using a business case.

Senator LIEBERMAN. Yes.

Mr. BOLTON. What the GAO——

Senator LIEBERMAN. Maybe we should.

Mr. BOLTON. I'll leave that to the Department. I have my personal opinions, but I'm not going to speak for the Department. So, what we have done——

Senator MCCAIN. We'd be glad to hear your personal opinion, Secretary Bolton.

Senator LIEBERMAN. Yes, really. [Laughter.]

Mr. BOLTON. I do agree with a lot of what the GAO and what the Defense Acquisition Performance Assessment (DAPA) report has put out.

Senator LIEBERMAN. Right.

Mr. BOLTON. But we have a process. In order for me to get the program through the building, I follow that process.

Senator LIEBERMAN. Yes.

Mr. BOLTON. The GAO would like to have a higher level of technology maturity—a seven, at least, and probably an eight, which is a prototype. The DOD says, "Six is what you need to get through these particular milestones."

When I look at that, I can agree with a lot of it, but it requires a lot of changes outside of what I call the "small 'a' acquisition," program management, contracting, so forth. In fact, if you look at the DAPA, if I could just go on a little bit of a tangent here, where they look for 6 years from milestone "a" to fielding, it sounds great. But then you must realize that everything changes. The threat community has to adjust to input from the requirement community, who has to speed up their process, the resourcing has to speed up; of course, the acquisition needs to speed up, all the testing, if you're going to stay within that; and the technology has to be at least seven or eight.

What Mr. Francis talked about, we have already been doing for the last 3½ years. Look at the Stryker. We went from an idea to a full combat deployed brigade in 4 years. Not just the vehicle, but the entire brigade. We did all the requirements, all the resourcing, all the acquisition, all the testing, trained the soldiers, and put them over in northern Iraq. Four years. The vehicle itself probably takes 15 years, 10 to 15 years, to do that. If you look at what Mr. Francis said, here and also in previous GAO reports, you will find that we followed that. We don't use the same terms, but we followed that.

Senator LIEBERMAN. That's a good model, and that's a good example. I think as you look to the GAO definition of a sound business case—firm requirements, mature technologies, knowledge-based acquisition strategy, realistic cost estimates, efficient funding—those are standards that——

Mr. BOLTON. Yes, sir.

Senator LIEBERMAN.—we ought to hold the Pentagon to. If it's not operating on a good business case, then it ought to—you have a very impressive background that you bring to this job, and I'd just urge you to look at it in those terms and shake up the system if you have to.

Mr. BOLTON. As a matter of fact, I've already asked my chief scientist to go and see what it would take for us to move from six to eight. I know that's not what the GAO's looking for; the seven would be fine with them. No, eight.

Senator LIEBERMAN. Yes.

Mr. BOLTON. That's a prototype. It's going to stay in the lab, and we're going to prototype this and put it out. On the resourcing side and the test side, we've asked the same questions, so I can come back to my leadership over this year and see what we can do about this.

There is a caution here. I have not thought through this, but I do see it, and I can't get over this hurdle. What I have described, and what the GAO has described, this knowledge-based acquisition is great, as long as your horizon is 12, 18 months, 24 max. Why? Because that's what business uses.

Senator LIEBERMAN. Sure.

Mr. BOLTON. If you get longer than that, you have lost market share. You're out of there.

Senator LIEBERMAN. You've lost more money.

Mr. BOLTON. Yes, sir. We're doing that on the battlefield today. What's our problem? We're barely staying ahead of the adversary, in terms of technology. What we want to do is be able to have technology that gives you some deterrence that's more than 18 months long—2 years, 5 years, 10 years. When you do that, you have to push technology a little harder than your adversary. Now, granted, I have not thought through this, but I'm trying to figure out, "how do I do this and not get into the same cycle that business has all the time?"

Senator LIEBERMAN. Yes.

Mr. BOLTON. I have not been able to solve that.

Senator LIEBERMAN. Mr. Francis, what's your advice to the Secretary, at this point? Because I know you feel that that FCS program has been allowed to proceed into systems development and demonstration prematurely.

Mr. FRANCIS. Yes, Senator Lieberman. Our view is that, really, right now the FCS is in a technology development phase, and I think what Secretary Bolton said about the Stryker is apropos. I think that's what mature technology enables you to do.

Senator LIEBERMAN. Right.

Mr. FRANCIS. You can move that, quickly. In a case like FCS, I think when we're talking technology and maturity levels, I think where we would part company is, even if we were to accept the—a standard of six, if you'll go along with the levels here even the DOD policy is to have all your key technologies at six when you start, which would have been May 2003. What we're talking about here is, if everything goes as planned, we might be there in 2008. So, my view is, the first 5 years of the program is dominated by technology development. We're going to have to develop the technologies but right now the program is approved, and the contract will be for all of development, going even beyond the product decision. So, I think that's the mismatch. I think the issue it raises is, if you want to pursue a solution like this, and you have to invent technologies, how would you do it in the current system? Because it's very difficult to get big money before you get to milestone B. So, programs want to get to milestone B so they can get access to the bigger bang. So, there is a structural issue there.

Mr. BOLTON. I would just add that it is true that the Department looks for level six. But also in that same paragraph, unless you have a risk mitigation plan or an off-ramp, that's also an option, and that's what the OSD staff will look to, and did on this program. That's why they approved us with the level of technology we had.

Senator LIEBERMAN. Let me just ask a final question. We're going to keep asking you about the one I just asked, which is on

the LSI question. In the IDA review of FCD management report, it says, "Army documentation noted that one of the critical reasons to select Boeing SAIC as the lead systems integrator was because it would have an integrating role, not a producing one, in developing FCS. This opens up potential opportunities for non-LSI companies and FCS development."

As you've said, in the case of the FCS, Boeing now has a significant financial stake in the future of the program, which does create a tension in Boeing's roles and responsibilities. I know you talked earlier, Dr. Graham, about the tension, in a sense, between the Pentagon personnel and the LSI. I want you to focus for a moment on this other part of the equation. I know that in your report you state that the LSI is intended to act as a neutral party in assessing program tradeoffs, in offering advice. That's 3 years since that report. Has your opinion changed regarding the LSI's role in program development? Are you worried about a conflict in roles here, and the impact it may have on the program?

Dr. GRAHAM. We are concerned, for all the reasons we've just talked about, that if FCS remains a dynamic program, there are lots of decisions yet to be made that will shape the program. On the corporate side, there are financial interests, as well as interests in the outcome or the Government interest. The Government needs to have an effective countervailing capability to stand above all of this fray and identify what's best for the Army——

Senator LIEBERMAN. Right.

Dr. GRAHAM.—and then shape the program accordingly. That's how we see it.

Senator LIEBERMAN. Okay. Do you have an opinion on this question of the LSI also having a development role in the program?

Dr. GRAHAM. I've thought a lot about that. The real dilemma, I think, is that, on the one hand, you want somebody who's a neutral party——

Senator LIEBERMAN. Right.

Dr. GRAHAM.—on the other hand, you need somebody who is big enough and knowledgeable enough and engaged enough in the program that they can manage the details. I think that's the tradeoff that we saw. I don't think we saw a way of creating an LSI that would be pure in this theoretical sense.

Senator LIEBERMAN. Yes.

Dr. GRAHAM. So, we saw it as building the capability in the Government as—that was the solution that——

Senator LIEBERMAN. So, you followed the program. Do you think the Army has set up enough systems to avoid adverse consequences of the dual roles that Boeing is playing?

Dr. GRAHAM. We were impressed by the Army's engagement when they restructured the program. That started to happen as our study was coming to conclusion and I don't have any insight as to what they've done since then.

Senator LIEBERMAN. Okay. Mr. Francis, do you have an opinion on this question, about the LSI also being involved in FCS development?

Mr. FRANCIS. Yes. I think where I would start is with the solution that we're trying to manage. I'm not talking just FCS here, but if our process is generating solutions that require multiple inven-

tions of new technologies, and the solutions outstrip the Service's abilities to integrate and the solution also requires significant growth in future budget, I think the first question I'd ask is, are we arriving at the right solutions? Are these indications that maybe we are thinking too grandly? Now, if you agree, then, that the solution is the right thing to do, then I think our options are limited, in terms of management. If our abilities are outstripped, then you end up having to go to something like an LSI and put in the safeguards against that.

Senator LIEBERMAN. In other words, ideally the Army itself might have played an LSI role. Is that what you mean?

Mr. FRANCIS. Yes. In the past, that's what would have been done. Of course, the scope of the program would have been much smaller.

Senator LIEBERMAN. Right.

Mr. FRANCIS. This isn't a fact; I'll raise it as a concern—it is, what happens over time? Because I think the Army has done a lot of good things to try to safeguard itself against that risk. But what happens as the workforce ages over time? I worry about people who were once doers, Army people who——

Senator LIEBERMAN. The workforce of the Army.

Mr. FRANCIS.—who worked for the Army are now overseeing and participating on teams and I think they'd be in pretty good shape to watch the store, if you will. But, over time, as those people retire, we'll have people who were never doers——

Senator LIEBERMAN. Right.

Mr. FRANCIS.—now being the overseers. I would worry about that equation.

Senator LIEBERMAN. Yes. Me, too.

Secretary Bolton, I want to give you the last word. In one sense—I don't have the exact words Mr. Francis raised in his question, but to ask, based on what we see, whether—and I think you'll be asked this, this session—this is too grand a program, whether we're reaching beyond our means here.

Mr. BOLTON. Yes, there are those folks who would claim that I look at a glass half full, and some of my critics might say half empty. I've always just looked at the glass.

Senator LIEBERMAN. Yes.

Mr. BOLTON. I might be an optimistic realist, but that's just the way I am. I believe we can do this. When I came to this position, I told the Chief of Staff at that time, and the Secretary, "There is no way you'll ever do this program. With the processes that you have in place today, it will not work."

Senator LIEBERMAN. Yes.

Mr. BOLTON. When we went to the milestone B meeting, we have a model that I use that we put in place that looks at probability of success, that looks at all aspects of the program, both inside and out, and we had gone from my zero percent to, like, 60. But what changed in that year and a half was the way we were doing business, as Mr. Francis already alluded.

We chose an LSI because I needed someone to integrate this. I then decided that the heart and soul of integration here is that middleware, that software. It's kind of like framing a house, half of the general contractors who build houses are also the framers, because it's important. You can change the foundation if you find

something late, you can do a lot of things, but if that frame is off, everything else does not work. So, we told the LSI, "You're going to do that, and you're going to do the weapon interface," because that's what the crew interfaces with. That's all they do.

Senator LIEBERMAN. Yes.

Mr. BOLTON. That's all they do.

Senator LIEBERMAN. So, you don't worry about the conflict with them being involved in programming at all.

Mr. BOLTON. I don't worry about the conflict because when I get to production—and I'm working on that now, in terms of what we're going to do in production—there is no production for this LSI. There is no production. The production is done by the other 18 contractors.

Now, we safeguard this. We put a two-star out there. He has a staff. They're 24/7 with the LSI. Every quarter, they get together with two three-stars, who oversee what they're doing. It's a Government meeting, looking at every aspect. There's only one person sitting at the table from the LSI, and that's the program manager from the LSI side. The two-star then takes that direction and goes back to the LSI and says, "This is what we need to do." Every quarter, I sit down with the Secretary of the Army and all the chief executive officers and get the briefing from that team out there to figure out what they need to do the job right. Then we have live-in triple audit, or the audit folks. We have the House Appropriations Committee Survey and Investigations Team. We have the GAO. We have our own folks looking at this, day-in and day-out.

I think we can do this. As I said earlier, to the chairman's concern, if you don't perturbate this anymore—and I don't mean you, sir—the Army, in terms of the fundamental requirements—we can do this. We also have to change a whole lot more, in terms of the management we're doing, and also the process we're going to go through, tests being one of them. We have never done a system-of-systems test like this in the DOD.

Senator LIEBERMAN. Right.

Mr. BOLTON. So we're trying to figure out how to do that and not break this apart and cost us more time and money.

Senator LIEBERMAN. It's a big plan. The motivations for it are excellent. I would just say, based on what we've heard today and what I know you're going to hear in both houses this year, that in too many programs, as Senator McCain and I have both said today, the status quo for acquisitions is not working and we're heading toward a real confrontation, or toward—not a confrontation, but toward the kind of succession of subtle, but ultimately very damaging, decisions to borrow from here to pay this bill, and we're not going to have the military we want to have. So, as I said before, you bring a great record to your position, and I urge you to not hesitate to shake it up. Just say, "The status quo is not working," and, in the interest of the Army, be willing to do things that are bold and unprecedented to make it better.

In the meantime, thank you all for your testimony. It's been very helpful.

Senator MCCAIN. Sounds to me like you have too many generals, Secretary Bolton.

Thank you very much. This hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

ARMY RESTRUCTURE

1. Senator MCCAIN. General Cody, last year, the Army asserted that 43 Active component combat brigades and the 34 Army National Guard (ARNG) combat brigades would ensure the Army could maintain a 17 brigade force deployed with Active component brigades having 2 years between rotations and the ARNG combat brigades having 5 years between rotations. With the fiscal year 2007 budget request, the Army, supported by the Quadrennial Defense Review (QDR), has modified its plan to increase the number of combat brigades in the Active and Reserve component. The Army will increase the Active component force structure to 42 combat brigades and will increase the ARNG force structure to 28 combat brigades. This action represents a reduction of one Active component combat brigade and six ARNG brigades from previous plans. How will fewer combat brigades impact the anticipated "dwell" time in the U.S. between rotations?

General CODY. Prior to QDR 2006, the Army had developed a plan for 34 combat brigades and 72 support brigades in the ARNG and 43 combat brigades and 75 support brigades in the Active component. This provided up to 20 combat brigades for a steady state of operations. Based on analysis associated with the 2006 QDR, the Army determined the need to be able to supply 18 to 19 combat brigades in a steady state of operations and surge another 18 to 19 combat brigades to respond to major combat operations. As a result, the Army is restructuring to form a rotational pool of 70 brigade combat teams and 211 supporting brigades of various types among the three components. The Army's plan is to transition to cyclic readiness under the Army force generation model. This will place forces on deployment cycles of one rotation every 3 years for the Active component and one rotation every 6 years for the Reserve component. At endstate, the Army provides a sustained deployment posture of modular, trained, ready, cohesive, and rapidly deployable and employable Army forces in predictable patterns to meet requirements for continuous full-spectrum operations while retaining the capability to surge combat power for major combat operations.

2. Senator MCCAIN. General Cody, do you believe that the QDR has taken into consideration the ARNG's State mission, especially homeland defense and disaster relief?

General CODY. Yes sir, I do. While the Department of Defense (DOD) does not specifically create unique capabilities to address State-only needs, we consider State needs when determining the force mix between Active and Reserve components and how Army capabilities are distributed across the 54 States and Territories. In years past, we sought to ensure that every State had an appropriate amount of several key capabilities, including command and control, communications, aviation, transportation, medical, and engineering. Since then, Congress has authorized the creation of 55 weapons of mass destruction civil support teams—one for each State (except California which will host two such teams), Territory, and the District of Columbia. More recently, the National Guard Bureau has identified 10 key capabilities that each State and Territory should maintain: aviation, engineering, civil support teams, security, medical, transportation, maintenance, logistics, command and control, and communications. For States that do not host all of these Army capabilities, the National Guard Bureau encourages States to leverage regional capabilities through emergency management assistance compacts with neighboring States. Additionally, the Army and the National Guard Bureau work together to manage the operational deployments of Guard troops for the global war on terror in an effort to ensure that each State has at least 50 percent of its Guard forces available for State missions and homeland defense.

MODULARITY FUNDING

3. Senator MCCAIN. General Cody, I understand the Army intends to maintain the National Guard at its authorized end strength of 350,000. However, I understand the fiscal year 2007 budget request funds the Guard at an end strength of only 333,000. How does the Army intend to make up the funding shortfall and how will that be transmitted to Congress?

General CODY. The Army is committed to funding the ARNG up to the 350,000 strength level. The Army fully funded the National Guard for 350,000 in the fiscal year 2006 budget. The Army will recommend modifying the fiscal year 2007 budget

to address the additional personnel and associated training costs required for up to 350,000, and is in the process of identifying the sources to meet this commitment. In affecting this modification, the Army will follow prescribed procedures and congressional notification requirements.

4. Senator MCCAIN. General Cody, will funding an additional 17,000 soldiers in the Guard impact the Guard's force structure?

General CODY. Funding an additional 17,000 soldiers will allow the ARNG to restructure its authorized end strength of 350,000 to a force structure allowance of 342,000 with a personnel training account of 8,000. Within its operational force, the ARNG is building toward 28 brigade combat teams in a total of 106 brigades. The goal is to rebalance its operational force structure to meet warfight requirements, current operational demands, and potential homeland defense missions without decreasing existing end strength or capabilities within the individual states. The Army is working collaboratively with the Chief of the National Guard Bureau, the Director of the ARNG, and the Adjutants General Association of the United States Force Structure Committee to optimize these proposed force structure changes. The results of this effort will ensure the right mix of capabilities across the States and within the 106 brigades.

5. Senator MCCAIN. General Cody, the ARNG asserts that there is a $318 million shortfall in its equipment accounts for modularity. Is this true? If so, will the Army fund this requirement?

General CODY. National Guard force structure adjustments resulting from the 2005 QDR caused a $262 million decrement to National Guard equipping accounts in fiscal year 2007. This force structure decision is currently being refined by the Army and National Guard leadership in consultation with the State Adjutants General. The outcome of this decision will determine force structure, equipment requirements, and the funding strategy. Given the post-September 11 security environment and increased utilization of all components, the Army is committed to fully equipping all units—Active, Guard, and Reserve—with priority to the "next deploying" units and "State mission equipment" requirements.

6. Senator MCCAIN. Secretary Bolton and General Cody, the fiscal year 2007 budget request represents the first year that the Army has included modularity in its base budget request. Will the Army continue to fund its modularity initiative in the base budget requests?

Mr. BOLTON and General CODY. Yes. The Army has programmed known modularity requirements for fiscal years 2007–2011 in the base budget.

7. Senator MCCAIN. Secretary Bolton and General Cody, 2 years ago at this time, the Army estimated modularity costs at $28 billion. Last year, the estimate was raised to $48 billion. The Army has stated that it required $5 billion per year over the period of fiscal years 2005–2011 for its modularity initiative. In last year's Program Budget Decision Memorandum 753, the Department increased the Army's top line by $5 billion in each of the fiscal years 2007–2011 for modularity to be included in the President's budget request. The DOD and the Army said they would use fiscal year 2005 and fiscal year 2006 supplemental appropriations to cover the fiscal years 2005–2006 requirement. The fiscal year 2006 enacted bridge supplemental and supplemental budget request included $5 billion. However, the fiscal year 2006 supplemental request was expected to include $3 billion in additional funding for Abrams tanks and Bradley Fighting Vehicles required for modularity, but that request was dropped in the final stages of formulation before it was sent to Congress. It appears that the Army is underestimating the cost of modularity. What is the cost of modularity over the fiscal years 2005–2011 period?

Mr. BOLTON and General CODY. The Army estimates the total cost of the modularity initiative at $52.5 billion through fiscal year 2011. For fiscal year 2005, the cost was $5 billion, for the current fiscal year, 2006, the cost is $6.5 billion. The fiscal year 2007 budget request for modularity is $6.6 billion. The remaining years are estimated at: fiscal year 2008, $7.6 billion; fiscal year 2009, $9.1 billion; fiscal year 2010, $9.2 billion; and fiscal year 2011, $8.5 billion.

8. Senator MCCAIN. Secretary Bolton and General Cody, the Army has estimated that the cost of modularity is $48 billion. Does this include Reserve component equipment? If not, how does the Army intend to fund these Guard requirements?

Mr. BOLTON and General CODY. Yes, the $48 billion includes Army Reserve and ARNG equipment.

9. Senator MCCAIN. General Cody, the committee understands that the Army intends to "pure fleet" its Active component heavy modular brigades with M1A2 Safety Enhancement Program (SEP) tanks and M2A3 Bradley Fighting Vehicles and its ARNG heavy brigades with M1A1 AIM tanks and M2A2 Bradley ODS vehicles. Are you concerned that the Active component and the Reserve component will have a different mix of tanks and Bradley Fighting Vehicles? What is the operational impact?

General CODY. The Army plan is to migrate to a two variant fleet of Abrams and Bradley from its current six variants of the Abrams tank and four variants of the Bradley Fighting Vehicle. The Active component will have both M1A2SEP/M2A3 and M1A1AIM/M2A2ODS heavy brigade combat teams and the ARNG will be upgraded from its older M1A1/M2A2 fleet to the M1A1AIM/M2A2ODS. Abrams and Bradley fight as a team. The objective is to field similar capabilities (i.e., M1A2SEP/M2A3 Bradley and AIM/ODS) in vehicles to the same unit. The Abrams tank and the Bradley Fighting Vehicle will remain the dominant maneuver systems through 2050, while complementing the Future Combat Systems (FCS) and overall modular force structure. As FCS Units of Action are fielded, M1A2SEP/M2A3s will be cascaded and AIM/ODSs will be retired from the fleets.

ARMY AVIATION

10. Senator MCCAIN. General Cody, I understand that the Army reduced the number of ARNG aviation brigades in order to increase the aviation force structure of the Special Operations Command. Can you please tell us whether a Guard heavy aviation brigade or a Guard aviation expeditionary brigade (AEB) was reduced, the aviation assets associated with this brigade, and the rationale for this reduction?

General CODY. There is a pending decision to convert one ARNG combat aviation brigade (expeditionary) (CAB–E) to an ARNG sustainment or engineer brigade but it has no relationship with any increase in Army Special Operations aviation. The decision to convert one ARNG CAB–E was done for several reasons: 1) to better balance combat arms, combat support, and combat service support across the ARNG; and 2) to ensure the ARNG has seven fully resourced CABs vice eight partially resourced CABs (the ARNG will retain the same number of aircraft as currently planned). If this decision is implemented, the ARNG could expect to lose an aviation support battalion and an attack battalion headquarters but will keep the CAB headquarters. All other assets are expected to be redistributed to fully resource equipment shortfalls across the other seven Reserve component CABs.

11. Senator MCCAIN. Secretary Bolton, it appears that Army aviation faces a dilemma. It needs all its helicopters to meet today's operational challenges, yet it also needs to upgrade a good portion of the fleet to meet tomorrow's challenges. How will you meet the Army's operational and readiness challenges if you have a large proportion of your helicopters being upgraded back in the continental U.S.?

Mr. BOLTON. The Army has several ongoing efforts to ensure we meet the combatant commander's (COCOM) requirements for Army Aviation aircraft. These include preset, reset, recapitalization (RECAP), OH–58D SEP, and modernization. Preset is our program to install the latest mission equipment packages to prepare our aircraft for combat. Reset is our program to restore our aircraft to pre-deployment conditions upon return from combat operations. For both of these programs we typically induct no greater than 50 percent of a unit's aircraft to ensure our aviators have sufficient aircraft for training. RECAP and OH–58D SEP are programs to upgrade key components to improve safety and extend the life of our platforms. The OH–58D SEP induction rate is contracted for 2 aircraft per month while our RECAP induction rates are 20 aircraft per year for the UH–60A and 3–5 for the CH–47D. Our modernization strategy differs depending on the type aircraft. We are modernizing our OH–58D and UH–60 fleets with new build Armed Reconnaissance Helicopter (ARH) and UH–60M aircraft, negating any requirement to induct existing airframes. Our greatest modernization challenge will be in the CH–47 and AH–64 fleets. In order to modernize these aircraft while simultaneously conducting the global war on terrorism, the Army will be forced to use a combination of stay behind equipment and cross leveling programs to ensure mobilizing and deploying units are properly resourced to meet the COCOM's requirements.

12. Senator MCCAIN. Secretary Bolton and General Cody, the Army has over 500 helicopters deployed to Iraq and Afghanistan alone. How many helicopters can you afford to pull off line for upgrades and still perform your mission?

Mr. BOLTON and General CODY. The Army has several ongoing efforts to ensure we meet the COCOM requirements for Army aviation aircraft. These include preset, reset, RECAP, OH–58D SEP, and modernization. Preset is our program to install the latest mission equipment packages to prepare our aircraft for combat. Reset is our program to restore our aircraft to pre-deployment conditions upon return from combat operations. For both of these programs we typically induct no greater than 50 percent of a unit's aircraft to ensure our aviators have sufficient aircraft for training. RECAP and OH–58D SEP are programs to upgrade key components to improve safety and extend the life of our platforms. The OH–58D SEP induction rate is contracted for two aircraft per month while our RECAP induction rates are 20 aircraft per year for the UH–60A and 3–5 for the CH–47D. Our modernization strategy differs depending on the type aircraft. We are modernizing our OH–58D and UH–60 fleets with new build ARH and UH–60M aircraft, negating any requirement to induct existing airframes. Our greatest modernization challenge will be in the CH–47 and AH–64 fleets. In order to modernize these aircraft while simultaneously conducting the global war on terrorism, the Army will be forced to use a combination of stay behind equipment and cross leveling programs to ensure mobilizing and deploying units are properly resourced to meet the COCOM's requirements.

13. Senator MCCAIN. Secretary Bolton, when budgets are tight, as they often seem to be, it appears that aircraft survivability equipment (ASE) does not get the funding it should. Considering the rather alarming number of helicopter losses in Afghanistan and Iraq, please reassure me that your modernization plan adequately addresses ASE. What are the most promising ASE upgrades for existing aircraft?

Mr. BOLTON. Army senior leadership made ASE and force protection a top priority for Army aviation and is using funds from the Comanche termination and programmed funding to address critical ASE requirements. The fiscal year 2007 budget request includes $2 billion for aircraft survivability equipment through the Future Years Defense Program (FYDP)—more than double what was in fiscal year 2005's FYDP. In the immediate aftermath of the November 2003 "shootdown" of an Army CH–47 Chinook helicopter, the G3 of the Army approved immediately upgrading the entire deployed Chinook fleet with an improved Infrared (IR) Countermeasure Flare Dispenser (ALE–47). On January 14, 2004, the acting Secretary of the Army and Chief of Staff of the Army approved accelerating the acquisition of the "next generation" ASE system the Common Missile Warning System (CMWS). CMWS detects an incoming missile and dispenses the appropriate counter measure, removing the "Man-in-the-Loop" requirement of older ASE systems. Installation of the CMWS commenced in November 2004 and continues in theater. The deployed CH–47 fleet has since been upgraded from the ALE–47 to CMWS. All theater aircraft will be CMWS equipped by September 2006. Industry is currently at maximum rate production.

There have been 14 helicopter losses in Iraq and Afghanistan attributed to missile/rockets engagements. To counter the IR missile threat the Army is aggressively procuring the most advanced systems available, beginning with CMWS which is a subcomponent of the Advanced Threat Infrared Countermeasures System (ATIRCM). The complete ATIRCM consists of two components; CMWS and a laser jam head. The laser jam head in conjunction with CMWS will detect an incoming missile and with a directed laser defeat that missile by jamming the missile seeker. The laser jam head development is in low rate initial production (LRIP) for testing, with expected fielding in fiscal year 2010. In addition to active countermeasures, passive ASE is also being fielded to include engine suppressors and heat shielding of critical components to reduce aircraft IR signatures.

These actions continue to be funded through a combination of Army reprogramming, congressionally supported global war on terror supplemental funding, and the redistribution of Comanche program funding.

14. Senator MCCAIN. Secretary Bolton, how and why will the ARH and Light Utility Helicopter (LUH) be more survivable than the aircraft they replace?

Mr. BOLTON. The ARH will replace the OH–58D helicopter. The ARH will provide the crew with a greater power margin, better infrared missile countermeasures, more survivable crew stations, and more crashworthy fuel systems.

The LUH will replace OH–58A/C, UH–1, and return some UH–60 helicopters to combat formations. The procurement of a Federal Aviation Administration (FAA) certified Commercial/Non-Developmental Item solution precludes designing-in additional specific aircraft survivability equipment attributes. The LUH operational missions are not envisioned to require significant survivability capabilities as the LUH is to be employed in non-combat environments. The LUH will generally have unrestricted operational freedom. The LUH will initially meet the 1989 FAA standards

for crashworthy seats and fuel tanks with an objective of meeting the 1994 FAA standards.

AVIATION FUNDING

15. Senator MCCAIN. General Cody, has the Army backed away from its commitment to use the $14.6 billion made available by the termination of Comanche for the Army aviation restructure?

General CODY. No, the Army is committed to fixing Army aviation as directed by the Chief of Staff. Equally important is the continued commitment of Congress to maintain fully resourced aviation programs. If either of these two commitments wanes, Army aviation will not be able to reach its required modernization in support of the current fighting force or integration into the future force.

LIGHT UTILITY HELICOPTER

16. Senator MCCAIN. General Cody, I understand that the AEBs will be augmented with LUH for Active Army installation support and for State and homeland defense missions. I support the notion that we should use a helicopter that is cheaper to acquire and less costly to operate for Army installation support. However, I question the Army's desire to add a low-density, less-capable, and nondeployable helicopter in the AEBs. Based on the use of ARNG aircraft in Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) as well as in response to natural disasters such as Hurricanes Katrina and Rita, has the Army reevaluated its plans to acquire the LUH for ARNG AEBs?

General CODY. The acquisition objective for the LUH is 322 aircraft. The LUH acquisition facilitates the rapid retirement of the aging UH–1 and OH–58NC fleets. These aircraft are at the very end of the useful life spectrum, and the LUH will add increased capability to units currently struggling to keep the UH–1 and OR–58NC aircraft flying. The LUH will operate worldwide in permissive environments only; however, the primary use of the LUH will be within the continental United States, Alaska, Hawaii, Europe, and all U.S. territories and possessions. The LUH will provide an affordable, modular, and standardized single airframe capable of conducting all missions currently being done by the UH–1 and OH–58A/C aircraft. After LUH fielding, the National Guard will have an increased capability to meet its diversified set of missions. The Army supports the Capabilities Development Document approved by the Joint Requirements Oversight Council (JROC) on 25 April 2005, and looks forward to improving the operational effectiveness of the end user.

If the Army had the LUH during disaster assistance operations such as Hurricane Katrina and Hurricane Rita, we would: have a single aircraft system designed to perform medical evacuation, personnel recovery and rescue, reconnaissance, and command and control; have an aircraft capable of 100 percent communication with military and civilian emergency services (police, fire, medical, etc.); and have an aircraft that was capable of performing the full range of missions in support of disaster and humanitarian relief, drug interdiction, and homeland security.

17. Senator MCCAIN. General Cody, why is it not worth the additional cost to acquire more Black Hawks and avoid a separate low-density fleet of helicopters that the Army cannot employ in non-permissive environments?

General CODY. The analysis of alternatives reviewed five potential courses of action to replace the aging UH–1 and OH–58C fleets. One of the alternatives was to pure fleet the LUH with procurement of new UH–60M aircraft. Pursuing the alternative to procure new UH–60M aircraft would have led to procurement and operational support costs three to four times higher than the commercial/nondevelopmental item options that can meet the mission required capabilities.

18. Senator MCCAIN. Secretary Bolton, I understand that the Army reduced the number of ARNG aviation brigades by one so that the Army could add a Special Operations Forces aviation element. The aviation brigade came from the ARNG. Did this impact the requirement for the LUH? If so, how does this affect the unit cost of the LUH?

Mr. BOLTON. The Army is considering the conversion of one ARNG CAB–E to an ARNG sustainment or engineer brigade. This decision has nothing to do with any increase in Army special operations aviation. A reduction in ARNG aviation brigades may or may not result in a reduction to the LUH procurement objective. If the ARNG were to reduce its requirement for LUHs it would not impact the unit

cost of the aircraft because the LUH is procured under a firm fixed price contract and the Army is not obligated to procure 322 aircraft.

ARMED RECONNAISSANCE HELICOPTER

19. Senator MCCAIN. Secretary Bolton, the Director, Operational Test and Evaluation Fiscal Year 2005 Annual Report highlighted the aggressive ARH schedule and recommended that the Army begin integration testing for mission equipment as early as possible. How is the ARH program structured to mitigate risk?

Mr. BOLTON. The building of the System Development and Demonstration (SDD) airframes remains the primary program focus and these will be involved in early testing efforts. One of these SDD airframes, designated as the Mission Equipment Aircraft, is utilized for down selection testing of the Target Acquisition Sensor suite. The addition of a sixth SDD airframe as an engine prototype aircraft further reduces overall conflicts for testing aircraft. Additionally, the program uses a software integration laboratory for software development and testing prior to integration onto testing aircraft. The testing strategy is streamlined to eliminate a separate developmental test followed by operational testing. Also, risk review boards between the program office and Bell occur regularly to discuss identified mitigation steps for integration into the master program schedule.

20. Senator MCCAIN. Secretary Bolton, the requirement for the ARH is for an off-the-shelf helicopter. Isn't this a step backward in terms of performance?

Mr. BOLTON. The Bell Helicopter proposal significantly leverages aspects of previous Bell commercial helicopter successes. The ARH performance requirements are Army directed and improve upon the performance capabilities of the currently deployed OH–58D aircraft. The selected Bell proposal baseline for the ARH meets or exceeds the Army defined threshold performance requirements. Specifically, the operational radius, cruise speed, and range estimates demonstrate significant off-the-shelf capabilities beyond the current Army reconnaissance helicopter.

21. Senator MCCAIN. Secretary Bolton, I can understand how a utility helicopter can capitalize on commercial products, but the ARH is a combat helicopter. To be effective and survivable, shouldn't this helicopter's performance exceed commercial standards?

Mr. BOLTON. Yes, the military should require the best possible performance in all combat aircraft. The Bell proposed baseline for the ARH meets or exceeds the Army defined threshold performance requirements in the ARH capability development document.

WARFIGHTER INFORMATION NETWORK-TERRESTRIAL/JOINT NETWORK NODE

22. Senator MCCAIN. Secretary Bolton, the Joint Network Node (JNN) is based on commercial off-the-shelf equipment. Concurrent with JNN, the Army competitively awarded the Warfighter Information Network-Terrestrial communications program to two contractors, one of which also builds the JNN. Given that the JNN is commercially-based equipment, why wasn't the contract competed when the JNN requirement was originally identified?

Mr. BOLTON. The JNN equipment and services were purchased under unusual and compelling urgency to meet critical requirements of units that were deploying in support of OIF/OEF and purchased using contracts already in place. Any other source would have required a new contracting effort that would not have met the schedule. Failure to provide this equipment and support services on time would have significantly impacted the units' ability to support OIF/OEF, thereby jeopardizing successful mission accomplishment. For clarification in the future, Warfighter Information Network-Tactical (WIN–T) stands for WIN–T.

23. Senator MCCAIN. Secretary Bolton, I understand that the Army has completed JNN fielding to units either deployed or deploying to Iraq and Afghanistan. Why should the Army continue to field JNN when the program has not been operationally tested nor has it been through the Joint Capability Integration and Development System (JCIDS) process?

Mr. BOLTON. The JNN Network (JNN–N) is vital to a unit's ability to communicate in Iraq and Afghanistan. The unit's Mobile Subscriber Equipment (MSE) does not provide the connectivity required to operate in Iraq and Afghanistan. When a unit receives their JNN–N equipment their current signal equipment is replaced and in some cases MSE shelters are reconfigured for JNN equipment. Signal sol-

diers are also replaced to facilitate JNN operations. Once a unit converts to JNN we cannot remove their JNN equipment or the unit becomes combat ineffective with no means to communicate or train.

The Army Test and Evaluation Command (ATEC) provided a system assessment (SA) January 31, 2006. The SA cover letter states:

> "2. The SA provides an independent assessment of the JNN–N capabilities and limitations for the purpose of:
>
> (a) improving JNN–N development, integration, and unit training;
> (b) mitigating risk;
> (c) preparation for more effective future evaluation.
>
> 3. The SA supports the ATEC position that JNN–N is capable of providing the warfighter communications backbone requirements in a stability and support operations environment. JNN–N requires further testing to properly determine Effectiveness, Suitability and Survivability for full spectrum operations."

The JNN–N has an initial operational test scheduled in June 2006 to address the issues of effectiveness, suitability, and survivability for full spectrum operations. The Army is also in the process of making JNN a formal program of record and expects a Milestone C/Full Rate Production decision (MSC/FRP) fourth quarter fiscal year 2006.

The JNN–N requirements document (Bridge to Future Network—Capabilities Production Document with JNN–N Annex) is currently in JROC staffing for approval. The approved document is required prior to the MSC/FRP decision in fourth quarter, fiscal year 2006.

24. Senator McCain. Secretary Bolton, what is the Army's plan to complete the required documentation and testing so that JNN can be fielded using fiscal year 2006 and fiscal year 2007 requested funding?

Mr. Bolton. The Army plans to make JNN a program of record in fourth quarter, fiscal year 2006. An initial operational test is scheduled for June 2006. The JNN–N requirements document (Bridge to Future Network-Capabilities Production Document with JNN–N Annex) is currently in JROC staffing for approval. All required programmatic documentation is currently in various phases of completion to support a MSC/FRP decision in fourth quarter, fiscal year 2006. Our plan is to obligate the main supplemental dollars as soon as possible after the MSC/FRP decision.

LEAD SYSTEMS INTEGRATOR

25. Senator McCain. Dr. Graham, in your report you made several observations regarding the Lead Systems Integrator (LSI):

> — Boeing has the major financial stake in the FCS program and will receive about one-third of programmed funds ($4.9 billion) for its work as the LSI, and for developing the System-of-Systems Common Operating Environment (SoSCOE) for the FCS information network, thus creating an inherent tension in Boeing's roles and responsibilities;
>
> — The Army-Boeing agreement does not anticipate future rounds of competition for FCS systems or components as the program transitions to production. Nor does it appear that the current agreement provides the Army access to technical information sufficient to enable future rounds of competition;
>
> — The Army should adopt a policy of "Trust But Verify" with regard to the ethics programs of the FCS industry participants and seek to address the kinds of gaps in prior hiring practices identified in the review of Boeing ethics practices conducted by Senator Warren Rudman by requiring that all contractors involved in the FCS program screen current employees who have Government backgrounds for possible FCS conflict of interest exposure; and
>
> — Industry and Government members of the FCS "One-team" will face substantial pressures to vie for outcomes favorable to Boeing stockholders.

Would you agree that there should be DOD policy or regulation that provides firm guidance for the use of LSIs in DOD programs?

Dr. Graham. The Institute for Defense Analyses (IDA) report provides a snapshot of the program in mid-2004, and it describes 18 substantial actions to manage the program effectively. The IDA review did not address broader public policy issues, such as the costs and benefits of possible changes in policy or regulation with regard to the establishment of LSIs. In general, there is not a single optimal Government-industry relationship, since each project must take into account the scope and com-

plexity of the task, and the capabilities of the Government and industry participants.

However, in the context of FCS, we recommended a number of steps to strengthen the Army's independent ability to shape the execution of the program. There are inherent tensions when an LSI has a financial stake in the future shape and success of a program. In theory, alternative Government-industry LSI arrangements could span a spectrum from a strictly engineering and advisory activity to an arrangement with essentially the same business interests as are involved in a prime contract. As the industrial partner's financial interests in the outcome of the program grow, it becomes increasingly challenging for executives to set aside their corporate interests in advising their Government partners. The IDA report emphasized that the Government customer is responsible to ensure it has an adequate capability to independently assess program objectives and progress in order to ensure Government interests are served over the life of the program.

The FCS management approach intermixes Government and industry experts through the "One-team" structure of integrated product teams (IPTs) co-chaired by Government and LSI officials, and relies heavily on Boeing's management information system for information and analyses. This results in inherent tensions in the roles of Army participants—teammate vs. customer representative, and in the roles of industry representatives—teammate vs. representative of corporate management and stockholders.

To achieve an effective balance in the roles of Government and industry participants in the "One-team" management structure, IDA recommended that the Army strengthen its institutional capability for establishing a corporate Army perspective on FCS cost, schedule, and performance issues. A corporate perspective would assist both FCS program participants as well as the Army's senior leadership in addressing the competing interests within the "One-team," and in balancing broader joint and Army-wide programmatic factors, in order to keep the FCS program focused on delivering an integrated and effective unit of action.

26. Senator McCain. Dr. Graham, do you think it would be helpful to the Department if they received congressional intent on LSIs?

Dr. Graham. The Army's acquisition strategy for the FCS program calls for a significant amount of competition at the level of individual systems and technologies within the overall system of systems. We have yet to further evaluate the program's execution of this issue.

The IDA study did not examine this question, and it would be difficult to respond without specific details about the proposed statement of intent. However, the key principle—that the Government is responsible for the cost, schedule, and performance of all industrial efforts—is well established in law and intent. The execution challenges in carrying out the Government's responsibilities require judgment and flexibility.

27. Senator McCain. Secretary Bolton, how does the DOD define a LSI?

Secretary Bolton. Section 805 of the National Defense Authorization Act for Fiscal Year 2006 defines "lead system integrator," for the purpose of that section, as either with or without system responsibility. Specifically, it provides that:

> "Lead system integrator with system responsibility" means a prime contractor for the development or production of a major system if the prime contractor is not expected at the lime of award, as determined by the Secretary of Defense for purposes of this section, to perform a substantial portion of the work on the system and the major subsystems.
>
> "Lead system integrator without system responsibility" means a contractor under a contract for the procurement of services whose primary purpose is to perform acquisition functions closely associated with inherently governmental functions with regard to the development or production of a major system.

DOD has no other definition of an LSI.

28. Senator McCain. Secretary Bolton, how does the Army define a LSI?

Mr. Bolton. The Army's LSI management approach was devised to tackle today's program complexity and integration challenges. The LSI maximizes the use of an integrated, single step design process across functions to promote effective and efficient horizontal integration of a large scale system-of-systems. The linchpin of the LSI approach is integrated program management and execution by the LSI. This is affected through one contract and one management baseline. The LSI is the focal point for the Government program manager office, not its substitute; the Govern-

ment under this approach does not abrogate its responsibility to perform functions that are inherently governmental.

29. Senator MCCAIN. Secretary Bolton, Mr. Francis, and Dr. Graham, has the Army outsourced its program management responsibilities with regards to acquisition? Please provide an explanation for your response.

Mr. BOLTON. No. The Army is structured in a way that the program executive officers (PEOs) and project/product managers (PMs) are responsible for managing Army acquisition programs, using Army and Defense acquisition policy, guidance, and processes. Their responsibilities include providing oversight of a cross-functional team of acquisition professionals, including contractors, in order to meet program objectives, goals, and overall mission.

Today's complex weapon system programs necessitate analysis on the best management approach. Where warranted, the LSI approach is instituted rather than the prime contractor management methodology. This approach was devised to tackle today's program complexity and integration challenges. If instituted, the LSI's integrated program management approach does not replace the Government PM's exercise of discretion and authority, but rather, the LSI becomes the focal point for the Government PM office, not its substitute.

Mr. FRANCIS. While the Army has not "outsourced" its responsibilities on FCS, it has decided to share a large part of those responsibilities with the LSIs. LSIs are, in essence, prime contractors with increased program management responsibilities. While this is true in the case of the FCS program, the Government and the LSI are each represented on the program's IPTs. The Government, with few exceptions, is expected to be involved in all major program decisions. For example, Boeing conducted source selection boards to competitively award major subcontracts for key systems and subsystems of the complete FCS. The Government provided oversight and final agreement to the awards. In addition, the Government also provides this same oversight in the selection of lower tier subcontracts.

Dr. GRAHAM. No. Our review found that the Army remains responsible, and that it recognizes and accepts this responsibility. The recommendations in the IDA review focused on ways to strengthen the Army's execution of these responsibilities.

30. Senator MCCAIN. Dr. Graham, in your report "IDA Review of FCS Management," you stated "that the LSI is intended to act as a neutral party in assessing program tradeoffs and in offering advice. Thus, in theory, the LSI should not have a financial stake in developing and building the individual elements of the system; rather, it should recruit and oversee the best of industry." It's been 3 years since the report. Are there inherent organizational conflicts of interest associated with programs in which the LSI has a financial interest in developing and building the individual elements of a system?

Dr. GRAHAM. This question is addressed in the answer to question 25.

31. Senator MCCAIN. Mr. Francis, what is your view regarding the role of the LSI in program development?

Mr. FRANCIS. Although there is no consensus on the definition of LSI, in general, an LSI is a prime contractor with increased program management responsibilities. These responsibilities have included greater involvement in requirements development, design, and source selection of major system and subsystem contractors. The Government also has used the LSI approach on programs that require system-of-systems integration.

Our observations to date are that the FCS LSI structure allows for a number of potential efficiencies, but that it also carries a number of potential risks. Among the potential efficiencies is the LSI's overarching responsibility to know, understand, and integrate functions across the various FCS platforms—instead of focusing on one "stovepiped" platform at a time, as has often been the case in the past. This is particularly important in that the LSI has the ability to facilitate movement of requirements and make trade-offs across platforms. However, the extent of contractor responsibility in so many aspects of the FCS program management process, including responsibility for making numerous cost and schedule tradeoffs and for conducting at least some of the subcontractor source selections, is also a potential risk. As an example, many of the LSI's subcontractor source selections are for major weapon systems that, in other circumstances, would have been conducted by an Army evaluation team, an Army Contracting Officer, and a senior-level Army source selection authority. These decisions, including those on the scale of procuring a major weapon system, are being made by the LSI with some level of Army involvement. (We have not reviewed the Army's oversight of the LSI or how FCS source selections have been conducted.) This level of responsibility, as with other LSI re-

sponsibilities in the program management process, requires careful Government oversight to ensure that the Army's interests are adequately protected now and in the future. While we understand that the Army has a number of oversight processes in place, we have not yet evaluated them to know how well they are working.

32. Senator MCCAIN. Secretary Bolton, has the Army taken any action to preclude the LSI from bidding FCS contracts? Has the DOD issued any policy in this regard? What is it?

Mr. BOLTON. Yes. The Federal Acquisition Regulation (FAR)-based contract awarded September 23, 2005, contains an "Organizational Conflicts of Interest" clause at H–106 that incorporates FAR subpart 9.5 "Organizational and Consultant Conflicts of Interest (OCI)." This clause specifies that the LSI (Boeing and SAIC) is specifically prohibited from competing for work at any tier during the course of this contract. Additionally, Boeing is contractually required to flow down an OCI provision in all subcontracts.

33. Senator MCCAIN. Secretary Bolton and Dr. Graham, has the Army turned Government responsibility over to the LSI?

Mr. BOLTON. No. The Government's PM is ultimately accountable for the execution of the FCS acquisition program baseline. The LSI role in FCS is principally integration; the Army's LSI management approach was devised to tackle today's program complexity and integration challenges. The linchpin is integrated program management and execution (one design process, one contract, and one performance management baseline). The approach promotes effective and efficient large-scale systems development and horizontal integration. The LSI provides a focal point to enable the overarching responsibilities of the Government PM, Army acquisition leadership, and DOD oversight. This management approach does not abrogate any inherently governmental functions; the LSI is not a substitute for the Government PM office.

Dr. GRAHAM. No. As noted in answering question 29, the Government is legally responsible for program outcomes. The FCS contract gives the Government formal control over program cost, schedule, and performance. In fact, the IDA report notes that the Army undertook a major restructuring of the program in parallel with the IDA review of the FCS program.

34. Senator MCCAIN. Secretary Bolton, Dr. Graham, and Mr. Francis, IDA's August 2004 report states, "At the LSI level, the Office of Technology Assessment (OTA) agreement laid the groundwork for Boeing to continue as the LSI through initial production and into full rate production." It goes on to say, "At the subcontractor level, current FCS program plans do not position the Army to conduct future competitions at the major end-item level. . ." In your opinion, is it prudent for the Army to position itself to depend on an LSI through the life cycle of the program?

Mr. BOLTON. The Army is not dependent upon the LSI for the life cycle management of the FCS program. The role of the LSI for low-rate initial production (LRIP) and full-rate production will be analyzed more in depth as the program proceeds through system operational design (SOD). The Army is in the process of developing an enterprise-based production strategy or follow-on procurement plan for the program.

Dr. GRAHAM. Some ongoing role for the LSI is likely to be a practical necessity: support of operations, maintenance, and evolutionary upgrades of FCS capabilities will be an enormous industrial undertaking. The IDA review concluded that the Army might benefit from continuing to rely upon an LSI—Boeing or a follow-on Services' contractor—for configuration and technical data management for the FCS system of systems. In addition, follow on competition for production (and associated follow on support) could be run either by the Army or by the LSI. IDA did not address the criteria or method for reaching such a decision.

Mr. FRANCIS. It is not prudent for the Army to prematurely position itself to depend on an LSI through the life cycle of the program. The Army must protect its ability to make choices on the FCS program, including the possible choice to discontinue the use of an LSI for the later phases of the program. It is also important that the LSI have financial indifference—that is, ideally, Boeing should not have a stake in the outcome of the program. According to the Army's acquisition strategy report, the Army plans to maintain the LSI for all FCS development throughout the acquisition and perhaps into the procurement phase. The Army feels that competition is not feasible at the prime contractor level through the development process, but the program intends to foster competition over the life cycle by incentivizing competition at the system, subsystem, and component levels. However, we do not

anticipate that there will be extensive competition at the FCS system level, particularly for the manned ground vehicles.

35. Senator MCCAIN. Secretary Bolton, does the Army intend to compete FCS systems or components as the program transitions to production?

Mr. BOLTON. As in any acquisition, competition will be a key factor in deciding how the Army will acquire post-SOD phase requirements. Appropriate decisions on future competitions for FCS systems and components outside of the SDD phase will be made by Army and DOD leadership at identified decision points (post-LRIP) for the program, as described in the FCS acquisition strategy report. Risk versus schedule and cost will be appropriately weighed at that time to reach these programmatic decisions.

These decision points include procurement of long lead materials, initiation of LRIP, and initiation of full rate production.

ETHICS PROGRAMS

36. Senator MCCAIN. Secretary Bolton, according to the report, "IDA Review of FCS Management," one particularly sensitive issue raised by IDA was Boeing's system for hiring former Government employees into the FCS program. The Rudman review, authored by former Senator Rudman, found that, contrary to Boeing policy, the company did not have Government advisory letters on file for every former Government employee. According to the IDA report, the FCS program office had not requested copies of these letters from Boeing. What is the status of this critical IDA recommendation?

Mr. BOLTON. More than 200 actions have been implemented by Boeing to strengthen and improve its ethics processes, procedures, and personnel. Boeing revised numerous policies and procedures to include code of conduct and guidelines for employees. Boeing also improved ethics training (new employee orientation and Boeing Leadership Center) and hiring and employment practices as follows:

- Established policies and procedures for former competitor employees
- Set up conflict of interest requirements
- Procedures for recruiting and hiring of Government employees
- Set up Office of Internal Governance (Ethics and Business Conduct)
    - Internal audits conducted
    - Compliance assessment team/compliance review board
    - Ethics and business conduct committee
    - External audits conducted
    - Audit committee

37. Senator MCCAIN. Secretary Bolton, will you provide this subcommittee a written statement from Boeing and the Army that you have fully completed this action?

Mr. BOLTON. Yes; the Government has formally requested the advisory letters and this subcommittee will be formally notified after the copies have been received.

38. Senator MCCAIN. Secretary Bolton, what formal oversight procedures are in place and will they be listed in the formal FAR Part 15 contract for Government and industry personnel to fully understand?

Mr. BOLTON. Post-employment restrictions are covered by 18 U.S.C. § 207, 41 U.S.C. § 423 and FAR Part 3. Specifically, 41 D.S.C. § 423 prohibitions and restrictions are implemented through FAR Part 3, which required insertion of FAR 52.203–8 and 52.203–10 in the FCS SDD FAR-based contract that places prohibitions and restrictions on certain categories of procurement officers when contacted by offerors regarding non-Federal employment. The FCS SDD FAR-based contract also includes other contract clauses to protect the integrity of the procurement process.

The Program Manager, FCS Brigade Combat Team (PM FCS BCT) maintains oversight over Boeing's ethics program by reviewing Boeing's monthly ethics issues and metrics report, and Boeing's annual ethics report. This information is further reviewed at the monthly IPT tag up meetings that include Army leadership. The IPT process is the preferred approach for development, review, and oversight of the acquisition process since it was adopted by the Secretary of Defense in 1995.

Additionally, in 2003, the Department of the Air Force and Boeing entered into an interim administrative agreement that requires Boeing to maintain its ethics and compliance policies, programs, and procedures. It also requires the appointment of an independent special compliance officer (SCO) who reports directly to the Air Force and to the Boeing chief executive officer. The Air Force, through SCO, pro-

vides oversight to Boeing's ethics and compliance policies, programs, and procedures. The Office of Army General Counsel (OGC) maintains close coordination with the Air Force Office of General Counsel with regard to Boeing's ethics and compliance policies, programs, and procedures.

39. Senator MCCAIN. Secretary Bolton, the IDA report was critical of the FCS management structure. The LSI "one-team" concept cannot guarantee that Government or industry partners in the FCS program will behave appropriately to reduce the likelihood of inappropriate behavior or violation of law. The IDA recommendation is quite clear: it is imperative that the Army look after its own interests on the FCS program and not expect industry participants—no matter how well-intentioned—to act independently of their explicit contractual obligations and financial interests. The Army needs an institutional capability to assess and manage competing corporate interests. I understand that Boeing and the Army negotiated a set of additional firewall arrangements to permit the flow of contractor proprietary data to and from the FCS program to ensure technical coordination and effective interoperability with complementary systems. Has this process been accepted by the subcontractors to the FCS contract? Do they feel that their proprietary data is being protected?

Mr. BOLTON. Boeing and the Army negotiated a clause at FCS FAR contract paragraph H–106(g) that requires Boeing to protect all third party proprietary data that it receives in the course of the FCS contract performance and to use this data only for the purpose for which it was furnished. Boeing is continuing to work the nondisclosure, limited access, and all limited transfer agreements with its "one team" partners to ensure that all such arrangements are understood and institutionalized. The primary goal of this effort is to protect the "one team" partner's proprietary information. The Army believes that the measures taken to date will adequately protect proprietary data.

40. Senator MCCAIN. Secretary Bolton, has there been an independent review of these additional firewall arrangements? If so, who conducted these reviews and what were the results?

Mr. BOLTON. Yes, I understand that the Government Accountability Office (GAO) (Audit 120456) and previous audits requested firewall data, but to our knowledge did not comment or study them. Results will be provided if such reviews are completed.

41. Senator MCCAIN. Secretary Bolton, have the Army General Counsel and Army Inspector General reviewed the firewall agreements?

Mr. BOLTON. The use of firewall as a mitigation strategy to address the potential for a conflict of interest based upon impaired objectivity was examined not only by IDA, but also by the OGC in their investigation of the firewalls. Neither IDA, nor OGC, objected to the use of the firewall as a mitigation strategy for potential conflicts arising as a result of an OTA. In addition, the firewalls were entered into under the concept technology development agreement with Defense Advanced Research Projects Agency (DARPA) and their use was coordinated with DARPA representatives. This review continues with regard to the recently awarded FAR-based contract with Boeing.

Further, OGC and the U.S. Army Tank Automotive-Armaments Command legal counsel supporting PM FCS BCT have reviewed Boeing's FCS Source Selection Plan that governs the conduct of the LSI as well as its subcontractors on organizational conflicts of interest. They have also reviewed provision H–130(g), the Non-Disclosure of Sensitive Government Program Information in the FCS FAR contract.

42. Senator MCCAIN. Secretary Bolton, how often do you review and update these agreements?

Mr. BOLTON. The firewall agreements are periodically reviewed and updated, especially prior to source selection activities by the procurement contracting officer (PCO), Tank and Automotive Command (TACOM) counsel, and LSI counsel.

43. Senator MCCAIN. Secretary Bolton, the IDA report made several recommendations regarding the ethics programs associated with the FCS program. Specifically, the report recommended that the Army "adopt a policy of 'trust but verify' with regard to the ethics programs of the FCS industry participants." How has the Army implemented this policy?

Mr. BOLTON. Boeing has implemented more than 200 actions to strengthen and improve ethical training, processes, reporting, and auditing within its corporate structure. Boeing has established an Office of Internal Governance to oversee ethics

and business conduct. Internal and external audits are being conducted. To better monitor, PM FCS BCT receives a monthly ethics issues and metrics report and is further reviewed in a monthly meeting that includes Army leadership. Additionally, Boeing revised numerous policies and procedures to include code of conduct and guidelines for employees. Hiring and employment practices have also been improved to address former competitor employees, conflict of interest requirements, and hire of former or retired Government employees.

44. Senator McCAIN. Secretary Bolton, the IDA report also said that "[t]he Army should seek to redress the kinds of gaps in prior hiring practices identified in the Rudman report by requiring that all contractors involved in the program screen current employees who have Government backgrounds for possible FCS conflict of interest exposure. Relevant disqualification letters also should be obtained." Has the Army completed this recommendation?

Mr. BOLTON. Boeing's FCS legal office has verified conflict of interest reviews in accordance with Boeing policy for all Boeing FCS employees and consultants. All newly hired employees and new consultants are subject to the existing Boeing policies for conflict reviews prior to employment discussions (for current Government employees) and prior to assignment (for former Government employees).

Boeing implemented a firewall tracking system on February 28, 2005, which supports implementing and tracking ethics related actions recommended by IDA.

GOVERNMENT ACCOUNTABILITY OFFICE REPORT ON AWARD FEES/CRITERIA FOR THE AWARD OF INCENTIVE FEES

45. Senator McCAIN. Secretary Bolton, I understand that the original FCS Office of Technology Assessment (OTA) contract included a base fee of 10 percent and a potential incentive fee of 5 percent. How much of the potential incentive fee was earned by the LSI and what was the criteria on which the incentive fee was based?

Mr. BOLTON. Only one incentive fee event was held under the OTA, and the entire incentive fee was earned by the LSI for that event. The LSI met the established cost, schedule, and performance criteria required to earn this incentive fee.

46. Senator McCAIN. Secretary Bolton, how much of the criteria were event-driven, such as conducting the Systems Functional Review by a certain date?

Mr. BOLTON. All of the criteria were event driven.

47. Senator McCAIN. Secretary Bolton, how is the LSI incentivizing the subcontractors to the FCS contract?

Mr. BOLTON. The LSI uses award fee provisions, tied to cost, schedule, and performance, to motivate its "one team" partners, with the exception of small businesses. The LSI uses cost-plus-fixed-fee contracts with its small businesses to simplify the accounting burden and guarantee greater fee.

48. Senator McCAIN. Secretary Bolton, have all of the contracts awarded by the LSI been definitized? If not, why not? What is the impact on the program and the contract conversion?

Mr. BOLTON. The LSI continues to award new subcontracts. For the major subcontractors, these contractors are performing the same effort under the FAR-based contract definitization process as they did under the OTA. The requirements or subcontractors' scope of work transferred intact from the OTA to the FAR contract. Flow-down of FAR-based changes and clauses are ongoing since the Government definitized the SDD contract and reached agreement with Boeing on March 28, 2006. Contract modifications are ongoing. The program will remain nearly unaffected by the "one team" partner contract modifications.

49. Senator McCAIN. Secretary Bolton, Mr. Francis, and Dr. Graham, I understand that the new FCS contract will be a cost plus fixed and incentive fee contract. In the undefinitized contract action/FAR Part 15 Contract, a fixed fee of 7 percent and a potential incentive fee of 8 percent has been established. In their December 2005 report on award and incentive fees, GAO found that the goal of performance incentive fees, to motivate contractors to deliver exceptional outcomes, is negated by the manner in which the Department awards these fees. Contractors are evaluated on criteria not related directly to outcomes (such as responsiveness to requests for information), are rewarded for all levels of performance—from acceptable to excellent, and are given several chances to obtain fees, regardless of actual results. In general, what are the criteria for which the LSI will earn incentive fees?

Mr. BOLTON. The definitized FAR-based contract has a 7.5-percent fixed fee portion and an additional 7.5-percent incentive fee arrangement. The fee structure has concrete and measurable performance targets oriented at critical program performance, cost, and schedule activities. There are nine incentive fee events for the SDD contract. The events are designed to incentivize the contractor to prove out technologies and systems integration, and to move the program forward into readiness for initial production at an affordable cost, and on schedule. The LSI will earn the incentive fee by successfully completing specific sub-events that contain objectively measurable and weighted performance, schedule, life-cycle cost containment plan cost, and average unit procurement cost criteria related to each incentive fee event.

Dr. GRAHAM. IDA's review of FCS concluded that the fee structure needed to be altered to provide the contractor stronger incentives to report on substantive progress.

By setting firm goalposts for design reviews and other incentive award schedule events, the Army could accomplish two critical objectives. First, it would set expectations within the Army on the need to converge on important FCS design decisions. Second, it would provide needed checks on the feasibility of the FCS management concept; of program assumptions regarding technologies, costs, and schedules; and of the quality of the supporting data and analysis available to support major program design decisions.

We are aware of reports that in restructuring the FCS contract, the Army has modified the incentive fees to strengthen reporting requirements. Such an action would be an improvement: Linking the goalposts for reviews to the program's incentive fee structure will allow the Army to clarify expectations regarding needed management data and set the standards for the quality of the information and assessments supporting each major milestone review.

Mr. FRANCIS. There are 10 program events outlined in the incentive plan in the new contract (one of which was already held under the OTA). At each of these events, the contractor will be evaluated on three main evaluation areas: performance, cost, and schedule. There will be specific dollars associated with each of these areas, so it appears the contractor is evaluated on each area independently. In other words, even if the contract is over cost and behind schedule at an incentive event, the contractor could still earn the fee associated with the performance area. Specific performance criteria will be defined in the program's integrated master plan and detailed criteria will be incorporated into the contract one incentive event prior to each scheduled event date. These detailed criteria will be mutually agreed upon by the Government and contractor and subject to the disputes clause.

The criteria outlined for the cost and schedule evaluation areas are not entirely different from an award fee contract. Specifically, at least half of it is subjective and could reward the contractor for program inputs, not outcomes. In the cost area for incentive events 2–8, there are two main criteria used for evaluation: (1) Management of life cycle cost, which involves activities, such as the development and delivery of quarterly life cycle cost reports, among others; and (2) whether or not the current approved LSI-generated acquisition unit program cost estimate is at or below the established glide path. The contract does not state how each of these criteria are weighted. For events 9 and 10, the acquisition unit program cost glide path is not evaluated. Similarly, the two criteria for the schedule area are split between inputs and outcomes. On the input side, Boeing will be evaluated on its ability to update the integrated master plan and integrated master schedule in a timely manner. On the outcomes side, Boeing must also successfully meet the completion criteria for the event within the threshold listed in the acquisition program baseline, or if not listed, within 90 calendar days of the scheduled date in the integrated master schedule. Finally, the contract allows rollover of the incentive fee. The program manager may decide to rollover any unearned incentive fee to subsequent events, or to apply the fee to specific program risks or objectives.

50. Senator MCCAIN. Mr. Francis, in your estimation, does the proposed incentive fee structure for the new FCS contract increase contractor risk while adequately protecting the financial interest of the Government?

Mr. FRANCIS. At the outset, it should be recognized that, regardless of the fee structure, the bulk of the financial risk for the FCS contract remains with the Government. The new contract is still a "cost-reimbursement" contract, which means the Government reimburses the contractor for all allowable incurred costs, to the

extent prescribed in the contract. As we have reported, the risk in the program will be governed mainly by technology development, design integration, and testing.[1]

In terms of the balance between risks for the Government and rewards for the contractor, the new contract is a slight improvement over the original OTA. Under the new contract, more of the contractor's fee is tied to performance. The OTA included a 10-percent fixed fee and a 5-percent incentive fee; the new contract includes a 7-percent fixed fee and an 8-percent incentive fee. However, there are still multiple areas of concern. While some of the criteria related to this incentive fee appear to be related to interim program events and milestones, half of the cost and schedule criteria are still focused on management areas or program inputs that are not directly related to the desired acquisition outcomes. In addition, because each evaluation area is assessed separately for each incentive event, the contractor could receive a portion of the available fee if it is performing well technically, even if the program is overrunning cost and not meeting schedule. The inclusion of a rollover provision could reduce the Government's leverage in holding the contractor accountable for its performance.

51. Senator McCain. Secretary Bolton, I understand the FCS contract conversion will be completed by the end of March. Will the contract be updated for any regulatory changes that occur during the undefinitized timeframe before definitization?

Mr. Bolton. The FAR-based contract was definitized on March 28, 2006. The contract has been updated due to numerous changes or negotiated agreements over the past 6 months. AFAR "sweep" was conducted 2 weeks prior to definitization to ensure that the latest versions of all FAR clauses were reflected in the contract. Future regulatory changes will be included routinely as they apply to the FCS contract.

52. Senator McCain. Secretary Bolton, how will the FCS contract strengthen oversight and keep costs down?

Mr. Bolton. The FCS contract will incorporate all of the appropriate FAR and Defense Federal Acquisition Regulations Supplement (DFARS) clauses and provisions. These include the requirement for truth in negotiations, submission of cost and pricing data, procurement integrity, and recurring reporting of cost and schedule data. Additional contract language provides for Government participation in source selection, make/buy decisions and a voice on internal LSI decisionmaking bodies. The FAR contract strengthens the FCS integrated program management approach; it bolsters the approach of providing a focal point to enable the overarching responsibilities of the Government PM, Army acquisition leadership, and DOD oversight.

53. Senator McCain. Mr. Francis and Dr. Graham, will the converted FCS strengthen oversight and keep costs down?

Mr. Francis. The Army's new contract was finalized in March 2006 and is based on the FAR, which governs acquisition in the Federal Government. The new contract incorporates standard FAR clauses including those that protect the Government's interests, such as the provisions relating to procurement integrity, truth in negotiations, and cost accounting standards. Some provisions of the new contract represent improvements for the Government, such as the organizational conflicts of interest clause, which states that the LSI shall not compete for any subcontracts at any tier of the program. This clause will be included in subcontracts and flowed down to all tiers. However, the revised contract retains a similar oversight structure and should have little impact on the likelihood of controlling FCS costs. Cost control will be determined by how the Army manages FCS technology, design integration, and testing.

The conversion to a FAR-based contract was appropriate for the FCS program and should help to safeguard the Government's interests. In the coming months, we will be examining the new contract and its implementation to determine if the Government's interests are better protected.

Dr. Graham. The IDA review concluded that there are major challenges in executing the FCS program associated with the scope of the program, the technical challenges, and the strategic risks cited in our report. IDA made 18 recommendations to the Army on the steps to address such challenges. We reviewed the then existing contract, and concluded that the Army had included adequate contractual provisions. Our review concluded that the form of the contract was not a major contributor to the program challenges, and we do not believe that the change in the

[1] GAO, Defense Acquisitions: Improved Business Case Needed for FCS's Successful Outcome, GAO–06–367 (Washington, DC: March 14, 2006.)

form of the contract will, in itself, substantially alter the fundamental challenges facing the program.

54. Senator MCCAIN. Secretary Bolton, does the LSI charge fee on fee from its subcontractors, and if so, why?

Mr. BOLTON. The LSI's fixed fee was developed against its costs line. Subcontractor fee is treated as costs to the LSI. This practice is in accordance with industry-wide accounting practices and Boeing's approved disclosure statement. As is customary, and in line with industry standard, all prime/LSI contractors charge and receive fee for any agreed-to fee from immediate subcontractors. Therefore, "one team" partner price, which includes the "one team" partner fee, would be treated as a cost to the program, and therefore part of the base for the LSI's fee.

55. Senator MCCAIN. Mr. Francis, in the GAO report and your statement, it is mentioned that award-fee evaluations are generally time-based rather than event-based. Please explain what is meant by this and why this may not be an effective practice.

Mr. FRANCIS. On award-fee contracts, DOD personnel (usually members of an award-fee evaluation board) conduct periodic evaluations of the contractor's performance and recommend the amount of fee to be paid for that period. The frequency of evaluation periods can be based on specific dates or milestones. For most DOD award-fee contracts in our study population, evaluation periods were time- or calendar-based, and held generally about every 6 months. Only about 10 percent of DOD award-fee contracts in our study population used event-based evaluations conducted after the completion of program milestones or scheduled for the anticipated completion date for program milestones.

Time-based award-fee evaluations of contractor performance on weapon system development programs that can last a decade or more may not generate meaningful information about progress. Adopting event-based award-fee evaluations would be a logical extension of DOD's new award-fee policy. In its March 2006 policy memo on award fees, DOD recognized the benefits of moving toward more outcomes-based award fee criteria. To do so, the memo stated that it is imperative that award fees be tied to identifiable interim outcomes, discrete events, or milestones, as much as possible, and offered as examples milestones such as timely completion of preliminary design review, critical design review, and successful system demonstration.

56. Senator MCCAIN. Secretary Bolton, the GAO report found that neither award nor incentive fees were effective in helping the Department achieve the outcomes it wanted. Isn't this indicative of larger problems in the defense acquisition system? What actions are you taking, in terms of the QDR or DAPA project, to address those problems?

Mr. BOLTON. Yes, there are issues in the defense acquisition system as described in the GAO report that can affect the effectiveness of using award or incentive fees. However, proper use of award or incentive fee arrangements can be useful in achieving performance objectives. The DAPA report recommends creating acquisition strategies for each program prior to Milestone A to streamline procurement, reduce time-to-market, require formal subcontractor level competition, and tie award fees to contractor performance using contractor performance assessment reporting system ratings. These recommendations are under consideration.

57. Senator MCCAIN. Mr. Francis, I'm trying to understand the way these award fees have been used is helping the Department to get the outcomes it wants. First, we sign a cost-plus contract that puts most of the risk for these major development programs on the Government. Next, we offer the contractor the chance to earn an award fee on top of having their costs reimbursed. Then, when a program experiences problems and I think it is fair to say they almost always do, the contractor can still earn millions of dollars in award fees for helping to correct the issues which they are partially responsible for creating. Please explain to me how anyone can consider this to be an effective way of doing business.

Mr. FRANCIS. DOD's current award-fee practices are not an effective way of doing business. In December 2005, we reported that DOD programs have engaged in practices that undermine efforts to motivate contractor performance and that do not hold contractors accountable for achieving desired acquisition outcomes, such as

meeting cost and schedule goals and delivering desired capabilities.[2] These programs frequently paid most of the available award fee for what they describe as improved contractor performance, regardless of whether acquisition outcomes fell far short of DOD's expectations, were satisfactory, or exceeded expectations.

In the case of FCS, we have found that the program is well behind where it should be, in that they will be working on pre-development activities 5 years after the program was approved for system development and demonstration. Yet the LSI has received all of the available incentive and award fees that were available thus far. Further, the Army has adjusted the program schedule, such as for the recently completed System of Systems Functional Review, which was a fee event in the FCS contract.

To address this issue, DOD must structure award and incentive fees to ensure that the Government is only paying contractors for meeting or exceeding cost, schedule, and performance goals. In March 2006, DOD issued a new award fee policy that recognized the benefit of moving toward more outcomes-based award fee criteria. To do so, the memo stated that it is imperative that award fees be tied to identifiable interim outcomes, discrete events, or milestones, as much as possible, and offered as examples milestones such as timely completion of preliminary design review, critical design review, and successful system demonstration. As always, the key will be how DOD implements this new policy and ensures that it translates into practice.

58. Senator MCCAIN. Secretary Bolton, Mr. Francis, and Dr. Graham, fixed-price contracts shift the risk to the contractor and incentivize the contractor to increase the reliability of the system components. What do you think DOD can do to return to more common use of fixed-price contracts?

Mr. BOLTON. In accordance with the FAR and current policy, the selection of contract type, whether fixed-priced or cost reimbursement, involves considering factors such as the type and complexity of the requirement, whether adequate price competition is a reasonable expectation, and other economic factors such as our ability to analyze price and/or cost, the history of the acquisition, and the period of performance or length of the production run. These factors along with several others contribute to our ability to utilize a fixed-price contract for a given requirement and thus shift the risk to the contractor. Obviously, there are cost/risk tradeoffs that envelope this process which must be considered when deciding upon the best acquisition strategy or contract type.

Mr. FRANCIS. According to the FAR, fixed-price contracts are generally the preferred contracting method. However, this preference applies in research and development contracting only to the extent that "goals, objectives, specifications, and cost estimates are sufficient to permit such a preference." The FAR further explains, "Because the absence of precise specifications and difficulties in estimating costs with accuracy normally precludes using fixed-price contracting for research and development, the use of cost-reimbursement contracts is usually appropriate." FAR 35.006(e) states that, "Projects having production requirements as a follow-on to research and development efforts normally should progress from cost-reimbursement contracts to fixed-price contracts as designs become more firmly established, risks are reduced, and production tooling, equipment, and processes are developed and proven."

In general, to attract cooperation from the contractor base to compete on fixed-price contracts, DOD would need to ensure that the project is well-defined, has a predictable schedule and scope, and has low technical risk. As the level of uncertainty in a project increases, contractors will be less likely to participate on a fixed price basis.

Dr. GRAHAM. The fundamental variables in any program are cost, schedule, and performance. A good contract is one that brings these three variables into alignment to provide a feasible and predictable transaction for both the buyer and the seller. Often, the high degree of uncertainty in weapon programs makes it impossible to set fixed cost, schedule, and performance with enough confidence to define an executable transaction. Historically, DOD's attempts to set fixed prices in the face of great uncertainty, such as in the development phase of major weapon programs, have not contributed to successful program outcomes.

This suggests that the best way for the Government to gain the considerable benefits of sound and fair fixed price development contracts would be to significantly reduce the uncertainty in the likely cost. This could be done in principle by specifying new equipment that requires much less ambitious technical advances than has recently been the case. On the other hand, if the United State were to slow the rate

[2] GAO, Defense Acquisitions: DOD Has Paid Billions in Award and Incentive Fees Regardless of Acquisition Outcomes, GAO–06–66 (Washington, DC: December 19, 2005).

at which it fields new military technology primarily in order to reap the financial predictability benefits of lower technical risk, there is no assurance that our future adversaries will follow suit and slow their advances.

59. Senator MCCAIN. Secretary Bolton, what are you doing to ensure fee determining officers use their training to follow regulation and published acquisition guidance when determining award fees?

Mr. BOLTON. The Department of the Army has implemented specific regulatory requirements with respect to the role of the fee determination official and the necessary training for personnel participating in an award fee evaluation board (AFEB). The Army Federal Acquisition Regulation Supplement (AFARS) Subpart 5116.4, Incentive Contracts, requires that any award fee determining official (AFDO) appointed by the principal assistant responsible for contracting or authorized contracting officer, be made in writing. The AFARS further requires that the AFDO appoint in writing the AFEB and its chairman and that the appointment letters clearly outline the responsibilities and limitations of the AFEB and its chairman. The AFARS also requires that the AFEB consist of contracting and acquisition personnel most knowledgeable of the requirements and contractor performance and that the AFEB chairman ensure that all AFEB evaluators are sufficiently trained in their responsibilities. Finally, the AFARS requires that the rationale for the recommended award fee be documented in sufficient detail in order to ensure that the integrity of the award fee process is preserved.

60. Senator MCCAIN. Mr. Francis, the GAO report briefly described the personnel who generally make up the award-fee boards. I understand that program office personnel may be in the best position to offer input on the contractor's performance, but since they may have a vested interest in presenting the program in its best light, are they the most appropriate officials to be recommending how much fee the contractor should earn?

Mr. FRANCIS. Independence is a key factor for ensuring the integrity of the award-fee process. Award-fee boards on major weapons programs are generally made up of personnel from the program office, which, as you point out, may be in the best position to offer input on contractor performance. However, our past work[3] has shown that programs are incentivized to suppress bad news—largely due to continual funding competition. Moving towards more outcomes-based award fee criteria helps to address this issue. Using outcomes-based award-fee criteria that reflect cost, schedule, and performance goals would provide a more objective and transparent basis for award-fee decisions.

FUTURE COMBAT SYSTEMS CONTRACT CONVERSION

61. Senator MCCAIN. Secretary Bolton, what is the status of the conversion of the FCS contract to a FAR part 15 contract?

Mr. BOLTON. A FAR-based letter contract was awarded on September 23, 2005. This letter contract was definitized by modification PZ0020 issued on March 28, 2006.

62. Senator MCCAIN. Secretary Bolton, in the 2006 Defense Authorization Law, Congress instructed the Pentagon to report on every program that costs at least 50 percent more than initial projections. The provision was designed to tie programs to their original cost estimates, rather than updated cost and schedule baselines. The Pentagon has been allowed to change its baseline without invoking the penalty. For example, the FCS program hasn't triggered an official breach despite a $161 billion cost estimate that is more than double its original baseline estimate. What plans do you have in place to ensure your acquisition programs are held to their original baseline figures instead of allowing the current practice of rebaselining?

Mr. BOLTON. While the Army's implementation plans for this new amendment depend partly on the guidance from the Office of the Secretary of Defense, the Army intent is full, timely compliance with the law. Oversight of the program baselines will continue through milestone decision reviews and program executive officer updates to the Army acquisition executive. Deviation reports using the new criteria outlined in the amendment will be reported using current processes and procedures.

While this amendment does not prohibit the rebaselining of programs, it does hold program managers accountable to the original baseline estimate. By keeping the

[3] GAO, DOD Acquisition Outcomes: A Case for Change, GAO–06–257T (Washington, DC: November 15, 2005).

original estimate as a data point in selected acquisition reports (SARs), the entire DOD acquisition chain is sensitive to the cost growth of the entire program. This is an improvement of the current practice of rebaselining which does not retain the original baseline estimate in official reports.

With respect to the FCS program, the $161 billion figure cited in the question represents the total acquisition cost in then-year dollars, and was reported in the November 2005 SAR. The comparable original baseline figure is $92.2 billion, a 75-percent increase. When calculated using base-year dollars so that the rate of inflation (which is beyond a program manager's control) does not influence the result, the overall increase is 54 percent (From November 2005 SAR: SAR Development Baseline of $77.8 billion; acquisition program baseline objective of $120.15 billion).

63. Senator MCCAIN. Secretary Bolton, how do you plan to implement this new amendment to Nunn-McCurdy specifically as it applies to the FCS program?

Mr. BOLTON. In compliance with the new amendment, each SAR must reflect the originally established baseline estimate along with the estimate deemed to be the original under this amendment. Under this amendment, the FCS current baseline would be deemed the original baseline estimate. The current FCS acquisition program baseline was signed by the Defense Acquisition Executive on November 2, 2005, and reported in the November 2005 SAR.

Oversight of the program baselines will continue through milestone decision reviews and program manager updates to the Army Acquisition Executive. The Army will not lose sight of the baseline estimate that was originally established for the program in 2003.

64. Senator MCCAIN. Secretary Bolton, the FCS program has been rebaselined at least twice in the past 3 years; what does this say about the soundness of the business cases that the Army is using to justify this system?

Mr. BOLTON. The FCS program has only two baselines (initial and current). The reason the baseline changed is that the Army decided to accelerate fielding FCS capability to the current force. Based on this change in Army's strategy, the FCS funding profile was adjusted and deferred systems were added back into the program creating a new baseline.

QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

IMPACT OF BRIGADE REDUCTION

65. Senator LIEBERMAN. General Cody, the decision to restructure the National Guard by reducing the number of brigade combat teams (BCTs) apparently also included the elimination of an aviation brigade. Does that mean that the Army is reducing from 19 to 18 aviation brigades in its force structure?

General CODY. ARNG restructuring is not reducing the number of brigades but converting six BCTs and one CAB–E, to sustainment and engineer brigades. Yes, if this decision is implemented the Army will reduce from 19 to 18 CABs. However, it will also ensure the seven remaining ARNG CABs are fully resourced with personnel and aircraft vice eight partially resourced CABs.

66. Senator LIEBERMAN. General Cody, does that mean that the National Guard will lose helicopters as a result of this restructuring?

General CODY. The number of assigned aircraft will remain the same or increase. The ARNG may lose the authorization for some helicopters depending on how the decision is implemented; however, the total number of aircraft will remain the same or increase.

MODULARITY

67. Senator LIEBERMAN. Secretary Bolton and General Cody, the fiscal year 2007 budget request represents the first year that the Army has included modularity in its base budget request. Will the Army continue to fund its modularity initiative in the base budget requests?

Mr. BOLTON and General CODY. Yes. The Army will continue to include modularity in its base budget requests.

68. Senator LIEBERMAN. Secretary Bolton and General Cody, 2 years ago at this time, the Army estimated modularity costs at $28 billion. Last year, the estimate

was raised to $48 billion. Do you have a revised estimate for modularity costs for fiscal year 2007?

Mr. BOLTON and General CODY. The revised estimate for modularity is $52.5 billion. The fiscal year 2007 budget request for modularity is $6.6 billion. This amount includes $5.9 billion for equipment procurement and $504 million for construction and $196 million for operations and maintenance. For fiscal year 2005, the cost was $5.0 billion, for current year fiscal year 2006, the cost is $6.5 billion. The remaining years are estimated at: fiscal year 2008, $7.6 billion; fiscal year 2009, $9.1 billion; fiscal year 2010, $9.2 billion; and fiscal year 2011, $8.5 billion.

69. Senator LIEBERMAN. Secretary Bolton and General Cody, the Army has estimated that the cost of modularity is $48 billion. Does this include Reserve component equipment? If not, how does the Army intend to fund these Guard requirements?

Mr. BOLTON and General CODY. Yes, the $48 billion includes Army Reserve and ARNG equipment.

70. Senator LIEBERMAN. Secretary Bolton and General Cody, given the high operational tempo for OIF and OEF, has the Army been able to adequately man and equip the new modular brigades, including the additional nine brigade-size units, by 2007 as originally intended?

Mr. BOLTON and General CODY. The units that the Army sends into harm's way are fully manned and equipped to accomplish the range of missions assigned to them. The rebalancing the Army is undertaking is aimed at reducing stress on the Active and Reserve components, improve the responsiveness of the overall force to achieve National Security Strategy goals, and improve the readiness and deployability of units. These efforts will ultimately ensure predictable deployment cycles for Army forces of one rotation every 3 years for the Active component and one rotation every 6 years for the Reserve component. The Army will use this cyclical force readiness model to generate forces that are fully manned and equipped.

FUTURE COMBAT SYSTEMS

71. Senator LIEBERMAN. Secretary Bolton and General Cody, there have been many criticisms about the FCS. I believe at least some of the criticisms derive from two factors: The Army has had some difficulty describing concretely what the FCS is expected to be and how the Army intends to fight an FCS-equipped force differently than a force equipped with modifications to current systems, and that the program rests on very high risk technologies.

GAO has found that the program does not yet have firm requirements. I understand the Army has completed an operational requirement document (ORD) that outlines 522 requirements. The GAO has found that the Army has a good understanding of what FCS BCTs should be capable of, but not enough knowledge of what is needed for each of the 18 individual systems. It found that the Army and the LSI will later translate system of system requirements into more specific requirements for individual systems within FCS. This step is rather late in the usual acquisition process. When do you expect to have mature and stable requirements for the system of systems and for the individual systems?

Mr. BOLTON and General CODY. The fundamental requirements set forth in the FCS ORD have remained relatively unchanged since the first JROC-approved ORD in April 2003. Change 2 of the ORD was approved by the Army Requirements Oversight Council (AROC) on December 16, 2005, and is scheduled for JROC approval on April 27, 2006. This change encompasses previously coordinated materiel developer and user agreed-to requirements clarifications, addition of the Spin Out Capabilities Description Document Annex, mandated change to key performance parameter (KPP) 7 incorporating language for force protection and a change to KPP 5 to update previously agreed-to maintenance ratios for the class IV unmanned aerial vehicle (UAV). The actual number of ORD requirements has been reduced from 555 to 544 as a result of this maturation activity.

These ORD requirements were translated into performance requirements by the materiel developer. These FCS SoS requirements were established and baselined at the SoS functional review (FR) in August 2005. At SoSFR, this functional baseline, which includes the SoS specification, architecture, and a design concept baseline, was placed under formal configuration management and control. This signaled the formal flow-down of requirements to the system level. Beginning in November 2005, a series of system functional reviews (for each of the integrated platforms and the network) have been held to establish and baseline the system-level requirements.

These system level baselines were placed under formal configuration management and control. Preliminary interface requirements have been established and documented in interface requirements documents for complementary programs, interface control documents for hardware items and interface requirements specifications for software items. These reviews will culminate in a SoS-level validation of the requirements baseline at the August 2006 In-process Preliminary Design Review. This review signals the stability of the requirements baseline to begin the series of system-level preliminary design activities and reviews leading up to the SoS Preliminary Design Review in fiscal year 2008.

The requirements maturity and stability will vary given the point in time of the development lifecycle for a program. According to systems engineering fundamentals, at a systems functional review, the technical description (functional baseline) must be approved as the governing technical requirements. Further, the functional baseline must reflect the requirements that will meet user expectations found in the ORD. Draft subsystem specifications should be available. The FCS PM confirmed these tenets were met at the SoSFR for the SoS and at the system level SFRs for the integrated platforms. The SoS specification, prime item development specifications and draft configuration item specifications exist and are baselined.

Requirements maturity and stability will continue to evolve as we move forward in the systems engineering (SE) process towards SoS preliminary design review (PDR) (fiscal year 2008) and SoS critical design review (CDR) (fiscal year 2010)—resulting in an increasing level of maturity and stability at each of these milestones in accordance with best business practices.

72. Senator LIEBERMAN. Secretary Bolton and General Cody, what process are you using to determine the final requirements for the operational doctrine and tactical procedures for the system?

Mr. BOLTON and General CODY. The Army has developed detailed and iterative processes to accurately develop requirements, operational doctrine, and tactical procedures for the FCS family of systems. Focused on the pursuit of full spectrum operational concepts, requirements definition is enabled through an iterative evaluation process which includes experimentation, testing, analysis, documenting the operational doctrine and tactical procedures, retesting, and validating. This process develops, evaluates, and refines doctrine, organization, training, materiel, and leader development capabilities from the future BCT from individual platforms and soldier level through each collective echelon level to brigade. The FCS BCT maneuver battle lab employs live-virtual-constructive simulations employing a soldier-in-the-loop, collaborative, simulated environment, replete with mock-ups of the FCS platforms, staff work stations, and surrogates for the command and control systems in determining operational doctrine and tactical procedures. This rigorous disciplined methodology enables the achievement of credible fidelity in complex environments, for the operational doctrine and tactical procedures for the FCS BCT at the unit, leader, staff, and soldier levels. This top-to-bottom evaluation process is enabled by a dedicated evaluation BCT (EBCT) in conjunction with the U.S. Army Training and Doctrine Command (TRADOC) Analysis Center, the TRADOC proponents, U.S. Air Force, U.S. Marine Corps, and allied observers. The EBCT is a consistent, trained group of veteran warfighters and sustainers that fight the FCS in various defense planning guidance approved scenarios to develop tactics, techniques, and procedures, refine platform (system) requirements and doctrine for the future force. The source data for the development process comes from Army Materiel Systems Analysis Agency, independent threat sources, Center for Army Lessons Learned, and current operational environment sources to ensure the evaluation process includes both traditional and irregular challenges in complex environments. Additionally, Unit of Action Maneuver Battle Lab (UAMBL) performs the same mission for spin-out technologies for the current force. The UAMBL develops the operational concepts for evaluation, provides the soldier-in-the-loop to conduct the evaluation; then adjusts the concept, repeats the evaluation, develops and refines the tracking and impact prediction (TIP) for doctrinal development. Doctrine is being developed to support the timely evaluation, experimentation, and training related to fielding and sustaining the FCS BCT in support of the future force. To date, UAMBL has maintained the development schedule. Additionally, UAMBL has produced a manual, which describes implications for TIP of the four spin-out 1 systems to support ongoing test and evaluation planning. This is the process currently underway to determine the final requirements for the operational doctrine and tactical procedures for the FCS BCT.

73. Senator LIEBERMAN. Secretary Bolton and General Cody, a key part of the Army plan is to use FCS technologies to modernize the current force so that there

is not a significant technology gap between the FCS-equipped force and the current force. Yet we hear that the technologies are untested and high risk. What technologies have you selected and does your budget request prioritize those technologies for earlier development?

Mr. BOLTON and General CODY. Spiraling of FCS capabilities is accomplished through spin-outs. Each spin-out is structured to facilitate the insertion of promising and sufficiently mature technologies/capabilities to the current force, while allowing the base FCS program to focus on meeting threshold capabilities as described in the ORD. Knowledge gained through the experimentation, testing, and fielding of spin-outs benefits the main FCS program by providing early assessments and feedback which inform the continued development of FCS threshold capabilities. This approach will also allow the Army to field FCS network elements and some individual FCS systems over time, thus reducing the risk to the FCS program while simultaneously adding capability to the current force. This will culminate in the fielding of the FCS Battle Command Network to the current force in the same timeframe as the FCS BCT fielding.

The Army has prioritized, in its Acquisition Strategy Report, and has budgeted for spin-out 1. This spin-out will provide enhanced warfighter capabilities to the current force in three primary areas. It provides enhanced situation awareness, enhanced force protection, and enhanced lethality through the use of unattended sensors and munitions and an initial FCS communications network backbone for FCS BCT and battalion command nets. The lethality and sensor products are Non Line of Sight Launch System, Unattended Ground Sensor, and the Intelligent Munition System which will satisfy the National Land Mine Policy Objectives. The FCS spin-out systems are designed to interface with the Army Battle Command System and current force communications networks and platforms.

QUESTIONS SUBMITTED BY SENATOR DANIEL K. AKAKA

SCHEDULE SLIPPAGE

74. Senator AKAKA. Secretary Bolton, in your testimony, you asserted that in terms of critical technologies, you have more than 23 technologies with a technical readiness level (TRL) of 6 and that the program is on schedule to mature the rest by the preliminary design review in August 2008. While I am glad to hear of your progress, this schedule still represents a significant slip in schedule from that proposed at the start of the program. What have you done to identify the causes for such significant delays in technology maturation and what measures have been, or will be, put in place to prevent further schedule push backs?

Mr. BOLTON. The FCS program has a structured, time-phased approach to technology maturation for critical technologies (CT). The FCS program also planned for the integration of these technologies during the SDD process specifically for the purpose of properly and successfully fielding a revolutionary networked SoS. As part of the restructure in 2004, the program was realigned to create integration phases wherein segments of FCS capability would be designed, built, and evaluated providing risk reduction and knowledge to feed subsequent integration phases. The maturation of critical technologies is aligned with this time-phased and deliberate approach. To date, this has proven an informed and methodical approach to the management and mitigation of technical risk while enabling incorporation of rapidly evolving technology. FCS CTs were aligned to this phased approach with plans to have each demonstrated to a TRL 6 prior to its entry into an integration phase. This process is similar to approaches used in the commercial sector for software intensive, complex systems.

Significant changes were made to manage risks associated with technology maturation and additional experiments were added to mitigate technical risk; the revised FCS program schedule reduces technical risk; component maturation projects were added to reduce technical risk. The program continues to mature its critical technologies in an evolutionary and deliberate approach consistent with DOD acquisition policy. The FCS program is appropriately managing risks associated with the CTs in order to meet the overall program objectives. The plans for maturation of CTs assessed at less than TRL 6 are incorporated in the risk management plan (RMP) for each particular CT. These RMPs are actively managed and receive senior level review at the PM's risk review board, with quarterly events to track the technology maturation.

FEE STRUCTURE

75. Senator AKAKA. Secretary Bolton, in the OTA between the Army and LSI finalized in March 2005, the annual fixed fees for contractors were set at 10 percent of estimated cost and the incentive fee available was 5 percent. The Army intends to change the fee structure for the FCS program in the new contract to a proposed 7-percent fixed fee and an 8-percent incentive fee. In your testimony you noted that the DOD is attempting to address the concerns raised by a recent GAO report that found there was little evidence that contractor award fees improve performance and outcome. You also stated that, from your perspective, the proposed fee structure for the new FCS program contract strikes the right balance between contract risks and motivation of contractor performance. Can you explain to me how this proposed change in fee structure which raised the ceiling on the available incentive fee percentage addresses the issues raised by the GAO report?

Mr. BOLTON. The change to the FCS incentive fee structure to increase the percentage that is allocated to incentive fees is designed to increase the LSI's motivation to excel in accomplishing program goals. As suggested by the GAO report, the incentive fee arrangement has objectively measured critical path performance criteria (major program events and activities). This difference eliminates most of the subjectivity pitfalls with typical evaluation schemes. The final balance struck between the base fee and incentive fee is 7.5 percent for each, for a total of 15 percent. The fee criteria are clearly described in the fee provision of the contract.

BOEING RESTRUCTURE

76. Senator AKAKA. Secretary Bolton and General Cody, Mr. Graham from IDA has testified before this subcommittee that in response to IDA's 2004 review of FCS program management, Boeing has realigned its corporate structure to increase the independence of corporate governance functions. However, Mr. Graham also noted that IDA did not audit the execution of these realignments at Boeing. What, if any, controls have been put in place by the Army to ensure that Boeing successfully implements the changes to its corporate structure?

Mr. BOLTON and General CODY. The Army relies on two DOD agencies, the Defense Contract Audit Agency and Defense Contract Management Agency, to provide insight into Boeing's corporate structure, business practices, and systems. This oversight ensures that any restructure does not violate statutory requirements.

REALISTIC ESTIMATES

77. Senator AKAKA. Secretary Bolton and General Cody, the Army currently estimates that the total expected cost for the FCS program is $160.7 billion which represents a 76-percent increase over the original estimate of $91.4 billion. According to the Army, this is a more realistic cost estimate reflecting the progress made in defining systems requirements. How stable is this revised estimate given that, although progress has been made, the Army and its contractors are still working to complete the definitions of system level requirements?

Mr. BOLTON and General CODY. The fundamental requirements set forth in the FCS ORD have remained relatively unchanged since the first JROC approved ORD in April 2003. The FCS program is a complex SoS developmental effort involving 18 integrated platforms and a common network. System or platform level requirements will stabilize prior to entering the program's initial preliminary design review at the SoS level.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

FAIR COMPETITION

78. Senator BILL NELSON. Secretary Bolton, from time to time my office will receive complaints or allegations that the FCS program and LSI are not small business "friendly" or that development and selection of subsystem technologies are structured in a way that may, in effect, unfairly advantage one company over all others. What oversight systems does the Army have in place to ensure that the program is meeting requirements in law and regulation regarding opportunities for small businesses and promotion of free, fair, and open competition?

Mr. BOLTON. From a program oversight perspective, a centralized database has been developed and all FCS contractors and suppliers must submit their small business performance data semiannually. This database allows the Government to track

and assess performance data, historical data, and supplier profile information in order to ensure fair and open competition as well as to ensure maximum small business participation is achieved.

The LSI has established a collaborative and dedicated team, the Diversity Advocacy Round Table, to ensure an integrated approach is executed among the LSI and large business industrial partners to achieve the FCS program small business goals. Their outreach efforts include participating in a variety of forums such as: disadvantaged business conferences and trade fairs, the National Veterans Small Business Conference, National HUB Zone Small Business Conference, and the Minority Enterprise Development Week to name a few.

In addition, the LSI has formed the One Team Council with its first tier subcontractors to ensure maximum small business participation is achieved. The One Team Council is composed of top Army officials, LSI executives, program office personnel, functional proponents, and other key personnel. An FCS Web site has also been created. This Web site is used by LSI and its partners to post business opportunities, identify subcontracting opportunities, as well as promote transparency in the process.

79. Senator BILL NELSON. Mr. Francis, what is the GAO's assessment of the FCS program's compliance with law and regulation regarding access and opportunities for small businesses?

Mr. FRANCIS. The contract sets forth the Army's goals for subcontracting to small businesses. The Army hopes to award 25.5 percent of subcontracted dollars to small businesses and states that Boeing should endeavor to reach this goal. The contract also allows small business subcontractors to request payments more often than the standard of every 2 weeks. It also asks that the LSI report periodically on its efforts to include small businesses in subcontract awards. We have not yet fully analyzed the new FCS contract and its execution of these clauses.

80. Senator BILL NELSON. Mr. Francis, what is the GAO's assessment of the FCS program's promotion and execution of free, fair, and open competition across objective technologies and subsystems?

Mr. FRANCIS. The Army's acquisition strategy for the FCS program calls for a significant amount of competition at the level of individual systems and technologies within the overall system of systems. We have yet to further evaluate the program's execution of this issue.

QUESTIONS SUBMITTED BY SENATORS JOHN MCCAIN AND JOSEPH I. LIEBERMAN

UH–60M BLACK HAWK HELICOPTER

81. Senator MCCAIN and Senator LIEBERMAN. Secretary Bolton, last year Congress authorized multiyear procurement authority for the acquisition of Black Hawk helicopters. We note that fiscal year 2006 budget justification documentation indicated that the Army would acquire 351 Black Hawks over the fiscal years 2007–2011 time frame. Fiscal year 2007 budget justification documentation indicates that the Army intends to acquire only 273 Black Hawks over the fiscal years 2007–2011 time frame. This concerns us. What is the impact of the fiscal year 2007 budget request for Black Hawk helicopters on the multiyear contract and unit cost of the Black Hawk helicopter?

Mr. BOLTON. The Army will continue to leverage the multiyear procurement authority authorized in the fiscal year 2006 budget. A joint multiyear multiservice contract has been approved for the procurement of UH–60M, MH–60S, and MH–60R aircraft. The annual quantities to be procured under this multiyear contract will result in the cost avoidance associated with the multiyear buy since the joint program maintains a steady business base for Sikorsky Aircraft Company during the fiscal years 2007–2011 time frame. While the quantities for UH–60M have been reduced as a result of the addition of the upgrade program and Army budget cuts, the multiyear contract and the associated cost avoidance are still realized with the reduced UH–60M quantities.

82. Senator MCCAIN and Senator LIEBERMAN. Secretary Bolton, does the Army expect to receive additional Black Hawk helicopters as an earmark?

Mr. BOLTON. Congress has consistently provided supplemental funding for the procurement of Black Hawk aircraft. The Army does not expect to receive additional Black Hawk helicopters as an earmark; but the aircraft losses due to the warfight could result in future supplemental requests for Black Hawk aircraft.

83. Senator McCAIN and Senator LIEBERMAN. General Cody, are Black Hawk helicopters on the fiscal year 2007 Chief of Staff of the Army's unfunded requirements list? If not, why not?

General CODY. No. The Army is on track to fill its UH–60 shortages by fiscal year 2009.

84. Senator McCAIN and Senator LIEBERMAN. Secretary Bolton, how many Black Hawk helicopters have been lost in OIF and OEF and has the Army funded or requested funding for these battle losses?

Mr. BOLTON. There have been a total of 28 battle-related losses. Of these 28 aircraft, 27 aircraft have been replaced through congressional marks and fiscal years 2004–2006 supplemental funding.

85. Senator McCAIN and Senator LIEBERMAN. Secretary Bolton, the Director, Operational Test and Evaluation Fiscal Year 2005 Annual Report notes that the UH–60 Black Hawk program has technical risks include digital interoperability and reliability. Has the Army requested funding in the fiscal year 2007 budget request to address these technical risks?

Mr. BOLTON. The Army Aviation digital interoperability requirements solidified during 2005 and the UH–60M program is funded to address all of these requirements to include Blue Force Tracker and The Army Tactical Communications System (ATCS). No additional funding is requested. The Blue Force Tracker system is in the low rate initial production configuration and will be exercised at the initial operational test (IOT) which is scheduled for October 2006. The ATCS, which consists of two SINCGARS (ARC–201D) radios and two Multi-Mode Multi-Band radios (ARC–23I) will be integrated on all full rate production aircraft which will be procured in fiscal year 2007 and support the fiscal year 2008 first unit equipped. Both configurations will comply with interoperability requirements in the JCIDS approved ORD. The Black Hawk is following the same interoperability migration plan as other Army aviation platforms and will continue to track to emerging requirements.

With respect to reliability, the data from the most recent scoring conference indicates that the UH–60M aircraft is well-established on the reliability growth curve and will demonstrate compliance with requirements during IOT. No additional funding is requested, the program is adequately funded to track and also improve reliability further. The component data is continuously evaluated to identify high priority cost and maintenance issues. Future reliability improvements will be included in production as they are identified and qualified. In 2005, the Defense Acquisition Executive authorized the Army to build all new UH–60M vice remanufacturing older UH–60As which will result in even further improvements to system reliability metrics.

86. Senator McCAIN and Senator LIEBERMAN. Secretary Bolton, the committee understands that the Army is procuring ATCS to provide alternative communications because of the delay in the Joint Tactical Radio System (JTRS) program. We understand that these radios are analog and will not be interoperable with ground forces. Will the radios procured under this program be interoperable with the current Army digital architecture? If not, what is your plan to make ground and aviation assets interoperable?

Mr. BOLTON. In response to the JTRS program delay, the Commanding General (BG Sinclair), United States Army Aviation Warfighting Center, issued a memorandum subject "Joint Tactical Radio System Interim Radios," dated 16 May 2005 which defined the aviation requirements until JTRS becomes available. The PEO Aviation implementation of the requirement was defined in a 1 December 2005 memorandum, subject: "Alternative Communications (Alt Comms) radios to Meet Waveform Requirements." The ATCS or Alt Comms program was established to meet the interim communication requirements due to the delays of the JTRS program. ATCS consists of two SINCGARS (ARC–201D) radios and two Multi-Mode Multi-Band radios (ARC–231) with digital capability. The Improved Data Modem (IDM) currently installed on Army aviation helicopters provides interfaces that ensure analog to digital interoperability with Army ground forces. The ARC–201D is fully interoperable with the Ground SINCGARS. The ARC–231 is fully interoperable with the legacy air traffic control system, Havequick (ARC–164), and ground satellite communications (SATCOM) terminals (LST–5, PST 5C/D, PRC–148, and PRC–117F). In addition, the ARC–231 meets future air traffic control requirements (8.33 KHz channel spacing) and provides land mobile radio communications allowing interoperability with the police/fire/rescue and homeland security communities.

Army aviation is interoperable with the current Army digital architecture and will maintain future interoperability within the DOD by adding JTRS and future digital waveforms as they become available. Army aviation is committed to ensuring that interoperability is maintained with the current and future force.

[Whereupon, at 4:27 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2007

TUESDAY, MARCH 28, 2006

U.S. SENATE,
SUBCOMMITTEE ON AIRLAND,
COMMITTEE ON ARMED SERVICES
Washington, DC.

AIR FORCE AND NAVY TACTICAL AVIATION PROGRAMS

The subcommittee met, pursuant to notice, at 2:40 p.m. in room SR–232A, Russell Senate Office Building, Senator John McCain (chairman of the subcommittee) presiding.

Committee members present: Senators McCain, Inhofe, and Chambliss.

Majority staff members present: Ambrose R. Hock, professional staff member; Gregory T. Kiley, professional staff member; and Stanley R. O'Connor, Jr., professional staff member.

Minority staff members present: Richard D. DeBobes, Democratic staff director; and Creighton Greene, professional staff member.

Staff assistants present: Micah H. Harris and Jessica L. Kingston.

Committee members' assistants present: Christopher J. Paul, assistant to Senator McCain; John A. Bonsell, assistant to Senator Inhofe; Clyde A. Taylor IV, assistant to Senator Chambliss; Frederick M. Downey, assistant to Senator Lieberman; and William K. Sutey, assistant to Senator Bill Nelson.

OPENING STATEMENT OF SENATOR JOHN MCCAIN, CHAIRMAN

Senator MCCAIN. The Airland Subcommittee meets today. I want to apologize to the witnesses for being late. There are a lot of things that are going on in the Senate these days.

The subcommittee meets today to receive testimony on Air Force and Navy tactical aviation programs. The hearing will be conducted in two panels. The first will testify on the Air Force proposal to incrementally fund the multiyear procurement of the F–22 and enter into a multiyear procurement contract for 60 aircraft beginning in fiscal year 2007. The second panel will testify on the Joint Strike Fighter's (JSF) progress through the systems development and demonstration phase of the program with regard to cost, schedule, and performance.

The subcommittee is also interested in hearing testimony on the proposed termination of the F136 alternate engine program. Most

of our witnesses will describe how, historically, competition results in lower acquisition costs for engines, better responsiveness from the contractors, and also better readiness for the warfighter. The subcommittee is interested in hearing about that issue today.

I will make the remainder of my statement part of the record.

[The prepared statement of Senator McCain follows:]

PREPARED STATEMENT BY SENATOR JOHN MCCAIN

The Airland Subcommittee meets today to receive testimony on Air Force and Navy tactical aviation programs. The hearing will be conducted in two panels. The first panel will testify on the Air Force proposal to incrementally fund the multiyear procurement of the F–22 and enter into a multiyear procurement contract for 60 aircraft beginning in fiscal year 2007.

The second panel will testify on the Joint Strike Fighter's (JSF) progress through the systems development and demonstration phase of the program with regard to cost, schedule, and performance. The subcommittee is also interested in hearing testimony on the proposed termination of the F136 Alternate Engine Program. Most of our witnesses will describe how historically competition resulted in lower acquisition costs for engines, and better responsiveness from the contractors, but most importantly, better readiness for the warfighter. The subcommittee is interested in hearing why such benefits are not achievable today for the JSF competitive engine environment.

The F–22 represents the Air Force's top priority for providing the military with air dominance and cruise missile defense for the next 20-plus years. However, all of this capability comes with a cost, and the F–22 must compete with other weapons systems within the defense budget. Looking at the Air Force's desire to procure F–22s, JSFs, C–130Js, Joint Cargo Aircraft, a replacement tanker for the KC–135, just to name a few of the major Air Force procurement programs, one begins to wonder how we're going to pay for it all. Now, it appears, the Department has come to the same realization by proposing an incremental funding scheme for its proposed multiyear procurement of the F–22. With that proposal, the Air Force seeks to restructure the procurement profile to 20 aircraft per year for a 3-year multiyear procurement of 60 aircraft.

Under current law, the Air Force can't incrementally fund a multiyear procurement contract. So, in order for the Air Force to do so here, the Air Force needs legislative relief. But, the last time the Air Force came to Congress with a proposal to incrementally fund the multiyear procurement of aircraft (regarding the C–17 cargo aircraft), that proposal was rejected. It is not clear to me why the same result should not be obtained here. In this case, the Air Force is initially requesting incremental funding to pay for only components of the aircraft and, at the same time, excludes funding for cancellation liability. Why would Congress agree to this? Under this approach, Congress would have to authorize and appropriate more money—more money than it originally authorized—to either get completed, fully functional aircraft or cancel them. In my mind, the Air Force needs to state a case that justifies why Congress would want to hamstring itself on the F–22 program in that way. In my view, where the current acquisition environment counsels visibility, transparency, and simplicity, that justification should be just about overwhelming.

Although I appreciate that Congress has approved incremental funding for other defense programs, such as certain Navy ships, we have never authorized incremental funding for aircraft. For instance, Congress authorized incremental funding for the LHD–8 amphibious ship and CVN–78 nuclear power aircraft carrier because it takes 7 and 9 years respectively to build these multibillion ships. Aircraft, on the other hand—even ones as costly as the F–22—are less expensive than Navy ships and they are easier to budget for in full. Budgetary constraints can be accommodated by purchasing fewer aircraft in a given year rather than by funding only a part of the cost of the aircraft.

I am also concerned about whether the Air Force's proposal to acquire F–22s under a multiyear procurement contract complies with the requirements of the Federal multiyear procurement statute: Title 10 United States Code section 2306b. Among other things, this statute provides that: "The Secretary of Defense may obligate funds for procurement of an end item under a multiyear contract for the purchase of property only for procurement of a complete and usable end item."

I believe the intent of Congress is very clear on this subject: full funding within each fiscal year of the multiyear contract.

Setting the incremental funding scheme aside, the statute also requires the Air Force to provide Congress with a Business Case Analysis that shows that entering

into a multiyear procurement contract results in "substantial savings" as compared to procurement through a series of annual contracts. In this case, the Business Case Analysis has not yet been completed. Accordingly, it is premature for Congress to consider this proposal until that requirement has been completed and fully ventilated in the authorizing committees.

Among the concerns that will be conveyed today is the fact that the Air Force F–22 funding plan does not request appropriations sufficient to cover the potential cancellation liability—thus not offering sufficient protections for the taxpayer. This sounds all too familiar, and there is a record of this similar funding scheme that was proposed in the Boeing 767 tanker scandal.

In his written testimony, Air Force General Hoffman advocates a "back to basics approach in how we do acquisitions." While I appreciate the sentiment, in my view, I see nothing "basic" in the Air Force's proposal to acquire F–22 aircraft under a multiyear procurement contract. Like other acquisition methodologies that have proved so problematic in the past, the Air Force's proposal is opaque and Byzantine. To date, the case as to why we should revert to an acquisition methodology that actually limits visibility and accountability has not been persuasive.

I expect that some of today's witnesses will convey concern that incrementally funding a multiyear procurement contract and underfunding cancellation liability on a multibillion dollar procurement program are moves in the wrong direction. I look forward to hearing the Air Force's response to those concerns today.

Deferring recognition of the full cost of the F–22 would understate the nature of the government's obligations; potentially distorting budgetary choices by making the program appear less expensive than it is—and certainlly is not a return to the back to basics approach which the taxpayer should be guarenteed.

I want to welcome our witnesses in the first panel . . . Lieutenant General Hoffman, Military Deputy, Office of the Assistant Secretary of the Air Force for Acquisition; Michael Sullivan, Director, Acquisition and Sourcing Management at the Government Accountability Office; Donald Marron, Acting Director at the Congressional Budget Office; and Christopher Bolkcom, Senior Specialist in National Defense at the Congressional Research Service. We greatly appreciate all you giving us your time for this very important hearing.

I want to welcome our witnesses in the second panel . . . Rear Admiral Kilcline, Navy Director, Air Warfare; Rear Admiral Enewold, Program Executive Officer, Joint Strike Fighter Program; Michael Sullivan, Director, Acquisition and Sourcing Management at the Government Accountability Office; and Christopher Bolkcom, Senior Specialist in National Defense at the Congressional Research Service. Again, we greatly appreciate all you giving us your time for this hearing.

Senator CHAMBLISS. Mr. Chairman, I have no opening statement. I look forward to hearing our witnesses.

Senator MCCAIN. Good.

Our witnesses today, our first panel, are Michael Sullivan, who is the Director of the Acquisitions and Sourcing Management Team at the United States Government Accountability Office (GAO); Donald Marron, who's the acting Director of the Congressional Budget Office (CBO), Christopher Bolkcom, who is a Senior Specialist in National Defense in the Congressional Research Service (CRS); and Lieutenant General Donald Hoffman, U.S. Air Force, who is the Military Deputy of the Office of the Assistant Secretary of the Air Force for Acquisition.

Welcome. We'll begin with you, Mr. Sullivan.

STATEMENT OF MICHAEL J. SULLIVAN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT TEAM, UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE

Mr. SULLIVAN. Thank you, Mr. Chairman, and members of the subcommittee.

I'm privileged to be here today to discuss the status of two of the Department's major tactical aircraft programs, the F–22A and the JSF.

Senator MCCAIN. If you could bring that microphone a little closer, so that we can hear you.

Mr. SULLIVAN. Okay?

Senator MCCAIN. I think so. Lift it up. Lift it up just a little bit. There you go.

Mr. SULLIVAN. Okay.

Senator MCCAIN. Thank you.

Mr. SULLIVAN. Mr. Chairman, these programs represent an investment estimated at about $320 billion today; and, in fiscal year 2007 alone, the budget request for both will be about $8 billion.

I'll summarize my remarks here and ask that the full statement be submitted for the record.

Any discussion of the significance of the Department's investment in these two weapons systems demands that it be placed in the larger national context. Current fiscal imbalances and competing national needs will continue to constrain discretionary spending for years to come, and the Department will not be immune to those constraints.

That said, over the past 5 years the Department of Defense (DOD) has doubled planned investments in new weapons systems from about $700 billion in 2001 to nearly $1.4 trillion in 2006. At the same time, development cost on a typical major weapons system development continues to be about 30 to 40 percent. Given the larger context that I describe, this cannot continue.

My testimony today focuses on the current tactical aircraft capitalization efforts, the current status of these two programs' business cases, and potential options for recapitalizing the force moving forward.

There are still many unanswered questions about whether the Department can achieve its goals for modernizing its aging tactical air forces. In recent testimony, the Secretary of Defense stated that continued U.S. air dominance and flexibility depends on a recapitalized force. However, the 2006 Quadrennial Defense Review (QDR) report did not present a detailed investment strategy that measures needs, gaps, and affordability for that force.

Right now, the Department plans to replace legacy aircraft, that are in the field today, with about 1,300 fewer new aircraft, later than it had originally planned, resulting in increasing maintenance costs for those legacy aircraft.

Regarding the F–22A, the program does not currently have what we would call an executable business case, which we define as firm requirements, sufficient quantities, mature technologies, realistic estimates, and sufficient funding.

Since development began, in 1986, requirements have been added, cost has increased, and quantities have been reduced. The current stated need by the Air Force is for 381 aircraft to satisfy air-to-air missions, and recently added air-to-ground attack and intelligence capabilities. However, due to past cost overruns and current budget constraints, the Department can now only afford 183 F–22As. This leaves a 198-aircraft gap.

In addition, the Department's latest proposal for multiyear procurement of 60 aircraft over 3 years, beginning in 2008, requires almost $2.5 billion in fiscal years 2006 and 2007 to frontload that procurement.

Regarding the JSF, the program's business case still includes significant cost and schedule risk that continues to jeopardize timely recapitalization efforts. The program plans to begin procuring aircraft in 2007, with less than 1 percent of the flight test program completed. By the time the fully integrated aircraft flies for the very first time, in 2011, the program will already have procured 190 aircraft for about $26 billion. By the time flight test is complete, the program will have procured over 420 aircraft for almost $50 billion. Because of the risk associated with this strategy, the program plans to procure those aircraft using a cost-type contracting arrangement.

Also, because of affordability concerns overall in the Department, the Department is proposing termination of a competitive engine development program, to save about $1.8 billion over the next several years.

Despite these substantial setbacks, we believe the Department can reduce risk in its current acquisitions and recapitalize the aging force sooner if it changes the way it executes its business cases. Before procuring more F–22A aircraft, the Air Force and the Secretary of Defense must agree on a business case for an appropriate quantity of F–22As that both satisfies current needs and is affordable, given today's budget realities.

The JSF program should consider adjusting its business case to reduce risk by allowing more time for flight testing prior to starting procurement. More testing prior to buying aircraft may ultimately allow sooner delivery of greater quantities to replace aging aircraft. Requirements for undemonstrated technology should be deferred and managed separately.

Finally, at a broader level, the Department needs more discipline and controls in its acquisition process to ensure realistic business cases that can be executed more efficiently. This may require a new look at policy, and perhaps statute.

In conclusion, despite the Department's repeated declaration that recapitalizing the aging tactical air forces is a top priority, it continues to follow an acquisition strategy that results in higher costs, lower quantities, and late deliveries. This strategy must change, particularly given today's fiscal and national security realities.

Mr. Chairman, that concludes my remarks. I'll be happy to try to answer any questions you or the other members may have.

[The prepared statement of Mr. Sullivan follows:]

PREPARED STATEMENT BY MICHAEL J. SULLIVAN

Mr. Chairman and members of the subcommittee: I am pleased to be here today to participate in the subcommittee's hearing on the Department of Defense's (DOD) tactical air forces, including two of its major tactical aircraft fighter programs—the F–22A and the F–35, also known as the Joint Strike Fighter (JSF).[1] Both programs are intended to replace aging tactical fighter aircraft with highly advanced, stealthy aircraft. These two programs together represent a significant investment—currently estimated at almost $320 billion—for DOD. To date nearly $75 billion has been appropriated for these programs, and based on current plans, they represent a potential future investment of about $245 billion over the next 20 years. In fiscal year 2007 alone, the budget request under consideration for these programs represents over $8 billion. Given the large potential investment that the F–22A and JSF pro-

[1] The third major program, the F/A–18E/F, currently in production, is not a subject of this testimony.

grams represent, decisions based on fact and knowledge about needs and resources are key to ensure that sound program investments are made.

Any discussion of the significance of DOD's investment in these two weapon systems demands that they be placed in the larger context. Fiscal imbalances and competing national needs will continue to constrain discretionary spending for years to come. Over the past 5 years, the department has doubled its planned investments in new weapon systems from about $700 billion in 2001 to nearly $1.4 trillion in 2006. At the same time, research and development cost growth on new weapons continues to be about 30 to 40 percent. This is how one must view major new investments, such as the F–22A and JSF, because more money may not be an option for the future. Rather, the key to getting better outcomes is to make individual programs more executable.

We have reported and testified in the past on the disappointing outcomes of DOD's acquisitions of tactical aircraft and other major weapon systems (see GAO Related Products). DOD's budgeting plans and the reality of the costs of its systems have been vastly different. Performance—if defined as the capability that actually reaches the warfighter—tends to fall short of expectations, as cost increases often result in late deliveries of smaller quantities of weapon systems. DOD has lost opportunities and buying power in the process. Last year, we testified that weaknesses in the F–22A and JSF programs raised questions as to whether DOD's overarching tactical aircraft recapitalization goals were achievable.[2]

My testimony today focuses on: (1) the extent to which the current F–22A and JSF business cases are executable, (2) the current status of DOD's tactical aircraft recapitalization efforts, and (3) potential options for recapitalizing the air forces as DOD moves forward with its tactical aircraft recapitalization efforts. We performed our work in accordance with generally accepted government auditing standards.

SUMMARY

DOD currently does not have an executable business case for buying the F–22A. Over the 19 years that the aircraft has been in development, the world has changed and the capabilities the Air Force once needed and planned for the F–22A no longer satisfy today's needs. The Air Force's current stated need is for 381 F–22As to satisfy original air-to-air missions and recently added requirements for more robust air-to-ground attack and intelligence-gathering capabilities. However, because of past cost overruns and current budget constraints, DOD can now afford only 183 F–22As. This leaves a 198-aircraft gap between the Air Force's stated need and what the acquisition process is able to deliver. DOD's business case for the JSF program still includes significant cost and schedule risk that continues to jeopardize timely recapitalization of the tactical force. We recently reported that DOD plans to begin procuring large quantities of aircraft in 2007 with less than 1 percent of the flight test program completed.[3] By 2010, it expects to have procured 126 aircraft with only 35 percent of the flight test program completed. Concurrently testing and procuring the aircraft adds to the program's cost and schedule risks, further weakening DOD's buying power and jeopardizing its ability to recapitalize its aging tactical air force in a timely and efficient manner.

As there were last year at this time, there are many unanswered questions about whether DOD can achieve its overarching goals for modernizing its aging tactical air forces. In recent testimony on the results of the department's 2006 Quadrennial Defense Review (QDR), the Secretary of Defense stated that continued U.S. air dominance depends on a recapitalized fleet. However, DOD's 2006 QDR report, issued last month, did not present a detailed investment strategy for tactical aircraft systems that addressed needs, capability gaps, alternatives, and affordability. Lacking a strategy that identifies capability gaps and affordable alternatives, DOD cannot reasonably ensure that new tactical air capabilities will be delivered to the warfighter within cost and schedule targets. Right now, DOD plans to replace legacy aircraft with about 1,400 fewer new major tactical systems than it had originally planned—almost a one-third reduction in quantities. Additionally, delivery of these new systems has lagged far behind original plans, increasing operating costs to keep legacy aircraft relevant and in the inventory longer than expected and delaying delivery of needed capabilities to the warfighter.

Despite these substantial setbacks, we believe DOD can reduce cost risk on its current acquisitions and deliver needed capabilities more quickly. This could allow

[2] GAO, Tactical Aircraft: F/A–22 and JSF Acquisition Plans and Implications for Tactical Aircraft Modernization, GAO–05–519T (Washington, DC: Apr. 6, 2005).

[3] GAO, Joint Strike Fighter: DOD Plans to Enter Production before Testing Demonstrates Acceptable Performance, GAO–06–356 (Washington DC: March 15, 2006).

it to recapitalize the aging tactical air force sooner and reduce costs to maintain the current inventory. To do so, however, DOD must rethink the business cases for the F–22A and JSF programs. Before procuring more F–22A aircraft, the Air Force and the Office of the Secretary of Defense should agree on a business case for the appropriate quantity of F–22A aircraft that: (1) satisfies current Air Force needs and (2) is affordable given today's budget realities. The JSF acquisition program can reduce cost and schedule risks by adopting a new knowledge-based business case. The JSF program should delay production and investments in production capability until the aircraft design qualities and integrated mission capabilities of the fully configured and integrated JSF aircraft variants have been proven to work in flight testing. DOD should also develop a knowledge-based business case that matches requirements with proven technologies, design knowledge, and available funding. Capabilities that demand technological advances which are not yet demonstrated should be part of future increments that are funded and managed separately once demonstrated. With such an approach DOD could enter low-rate production sooner and deliver a useful product in sufficient quantities to start replacing DOD's aging tactical aircraft force. The F–16 acquisition program provides strong precedent for this type of acquisition strategy. It began delivering aircraft in 4 years and within predicted costs. GAO recommended these actions in a recent JSF report and DOD agreed that these were appropriate things to do but it believed its current acquisition strategy will allow it to achieve the JSF program objectives.

Finally, at a broader level, DOD needs to apply more discipline and controls to establish realistic business cases for acquisition programs and then execute them more efficiently. This may require a new look at policies and perhaps statute.

BACKGROUND

Over the past 20 years, DOD has been engaged in an effort to modernize its aging tactical aircraft force. The F–22A and JSF, along with the F/A–18E/F,[4] are the central elements of DOD's overall recapitalization strategy for its tactical air forces. The F–22A was developed to replace the F–15 air superiority aircraft. The continued need for the F–22A, the quantities required, and modification costs to perform its mission have been the subject of a continuing debate within DOD and Congress. Supporters cite its advanced features—stealth, supercruise speed, maneuverability, and integrated avionics—as integral to the Air Force's Global Strike initiative and for maintaining air superiority over potential future adversaries.[5] Critics argue that the Soviet threat it was originally designed to counter no longer exists and that its remaining budget dollars could be better invested in enhancing current air assets and acquiring new and more transformational capabilities that will allow DOD to meet evolving threats. Its fiscal year 2007 request includes $800 million for continuing development and modifications for aircraft enhancements such as equipping the F–22A with an improved ground attack capability and improving aircraft reliability. The request also includes about $2.0 billion for advance procurement of parts and funding of subassembly activities for the initial 20 aircraft of a 60-aircraft multiyear procurement.

JSF is a replacement for a substantial number of aging fighter and attack aircraft currently in the DOD inventory. For the Air Force, it is intended to replace the F–16 and A–10 while complementing the F–22A. For the Marine Corps, the JSF is intended to replace the AV–8B and F/A–18A/C/D; for the Navy, the JSF is intended to complement the F/A–18E/F. DOD estimates that as currently planned, it will cost $257 billion to develop and procure about 2,443 aircraft and related support equipment, with total costs to maintain and operate JSF aircraft adding $347 billion over the program's life cycle. After 9 years in development, the program plans to deliver its first flight test aircraft later this year. The fiscal year 2007 budget request includes $4 billion for continuing development and $1.4 billion for the purchase of the first 5 procurement aircraft, initial spares, and advance procurement for 16 more aircraft to be purchased in 2008.

We have frequently reported on the importance of using a sound, executable business case before committing resources to a new product development. In its simplest form, such a business case is evidence that (1) the warfighter's needs are valid and can best be met with the chosen concept and quantities, and (2) the chosen concept can be developed and produced within existing resources—that is, proven tech-

[4] The F/A–18E/F, which began development in 1992, evolved from the F/A–18 aircraft program and has been in production since 1997. Currently, the program is producing aircraft under its second multiyear contract. Because of the maturity of the F/A–18E/F program, we did not review it for this engagement.

[5] Global Strike is one of six complementary concepts of operations laying out the Air Force's ability to rapidly plan and deliver limited-duration and extended attacks against targets.

nologies, design knowledge, adequate funding, and adequate time to deliver the needed product. At the heart of a good business case is a knowledge-based strategy to product development that demonstrates high levels of knowledge before significant commitments of time and money are made.

F–22A AND JSF ACQUISITION BUSINESS CASES STILL INCLUDE CONSIDERABLE RISKS

The future of DOD's tactical aircraft recapitalization depends largely on the outcomes of the F–22A and JSF programs—which represent about $245 billion in investments to be made in the future. Yet achieving expected outcomes for both these programs continues to be fraught with risk. We have reported that the F–22A's original business case is unexecutable and does not reflect changing conditions over time. Currently, there is a significant mismatch between the Air Force's stated need for F–22A aircraft and the resources the Office of the Secretary of Defense (OSD) is willing to commit. The business case for the JSF program, which has 90 percent of its investments still in the future, significantly overlaps production with development and system testing—a strategy that often results in cost and schedule increases. Both programs are at critical junctures that require DOD to make important business decisions.

Matching F–22A Requirements and Resources Is Crucial to Future Recapitalization Investment Decisions

According to the Air Force, a minimum of 381 modernized F–22A aircraft are needed to satisfy today's national strategic requirements[6]—a buy that is roughly half the 750 aircraft originally planned, but more than double the 183 aircraft OSD states available funding can support. Since the Air Force began developing the F–22A in 1986, the business case for the program has changed radically—threats have changed, requirements have been added, costs have increased, funds have been added, planned quantities have been reduced, and deliveries of the aircraft to the warfighter have been delayed. There is a 198-aircraft capability gap today. Decisions in the last 2 years have worsened the mismatch between Air Force requirements and available resources, further weakening the F–22A program's business case. Without a new business case, an agreement on an appropriate number of F–22As for our national defense, it is uncertain as to whether additional investments in the program are advisable.

The original business case for the F–22A program was to develop air superiority fighters to counter a projected threat of significant quantities of advanced Soviet fighters. During the 19-year F–22A development program, that threat did not materialize to the degree expected. Today, the requirements for the F–22A have evolved to include what the Air Force has defined as a more robust ground attack capability to destroy expected air defense systems and other ground targets and an intelligence-gathering capability. However, the currently configured F–22A is not equipped to carry out these roles without further investments in its development. The F–22As modernization program is currently being planned for three basic blocks, or spirals, of increasing capability to be developed and delivered over time. Current Air Force estimates of modernization costs, from 2007 through 2016, are about $4.3 billion. Additional modernization is expected, but the content and costs have not been determined or included in the budget.

OSD has restructured the acquisition program twice in the last 2 years to free up funds for other priorities. In December 2004, DOD reduced the program to 179 F–22As to save about $10.5 billion. This decision also terminated procurement in 2008. In December 2005, DOD changed the F–22A program again, adding $1 billion to extend production for 2 years to ensure a next-generation fighter aircraft production line would remain in operation in case JSF experienced delays or problems. It also added 4 aircraft for a total planned procurement of 183 F–22As. As part of the 2005 change, aircraft previously scheduled in 2007 will not be fully funded until 2008 or later.

OSD and the Air Force plan to buy the remaining 60 F–22As in a multiyear procurement that would buy 20 aircraft a year for 3 years—2008 through 2010. The Air Force plans to fund these aircraft in four increments—an economic order quantity to buy things cheaper; advanced procurement for titanium and other materials

[6] The Air Force states a need for one squadron of 24 F–22A aircraft for each of the 10 Air Expeditionary Forces, the planned organization of the Air Force aircraft and personnel for operations and deployments. This equates to 240 aircraft. The remaining 141 aircraft are needed for training, and attrition, and to allow for periodic depot maintenance required for each aircraft. The Air Force states that if all 381 aircraft are acquired, the Air Force could retire about 566 legacy aircraft; if not, several billions of modification dollars will be required to extend their structural life to keep them operational.

and parts to protect the schedule; subassembly; and final assembly. The Air Force plans to provide Congress a justification for multiyear procurement in May 2006 and the fiscal year 2007 President's budget includes funds for multiyear procurement. The following table shows the Air Force's plan for funding the multiyear procurement. Air Force officials have told us that an additional $400 million in funds are needed to complete the multiyear procurement and that the accelerated schedule to obtain approval and start the effort adds risk to the program, creating more weaknesses in the current F–22A business case.

TABLE 1: F–22A PROPOSED MULTIYEAR PROCUREMENT FUNDING

[In millions of dollars]

	Fiscal Year						Total
	2006	2007	2008	2009	2010	2011	
Lot 7 Buy							
Economic Order Quantity	.....	200.0	.....	.....	.....	.....	200.0
Advance Procurement	569.2	.....	.....	.....	.....	.....	569.2
Subassembly	.....	1,503.9	.....	.....	.....	.....	1,503.9
Final Assembly	.....	.....	1,362.4	.....	.....	.....	1,362.4
Other Cost	.....	68.1	.....	.....	.....	.....	68.1
Subtotal	$569.2	$1,772.0	$1,362.4	.....	.....	.....	$3,703.6
Lot 8 Buy							
Advance Procurement	.....	277.4	.....	.....	.....	.....	277.4
Subassembly	.....	.....	1,433.3	.....	.....	.....	1,433.3
Final Assembly	.....	.....	.....	1,342.8	.....	.....	1,342.8
Other Cost	.....	.....	47.4	.....	.....	.....	47.4
Subtotal	.....	$277.4	$1,480.7	$1,342.8	.....	.....	$3,100.9
Lot 9 Buy							
Advance Procurement	.....	.....	366.6	.....	.....	.....	366.6
Subassembly	.....	.....	.....	1,515.7	.....	.....	1,515.7
Final Assembly	.....	.....	.....	.....	1,694.5	.....	1,694.5
Other Cost	.....	.....	.....	48.3	16.2	12.9	77.4
Subtotal	.....	.....	$366.6	$1,564.0	$1,710.7	$12.9	$3,654.2
Total	$569.2	$2,049.4	$3,209.7	$2,906.8	$1,710.7	$12.9	$10,458.7

Source: DOD data.
Note: Other cost includes funding for modifications and munitions.

A 198-aircraft gap between what the Air Force needs and what is affordable raises questions about what additional capabilities need to be included in the F–22A program. In March 2005, we recommended that the Air Force develop a new business case that justified additional investments in modernizing the aircraft to include greater ground attack and intelligence-gathering capabilities before moving forward. DOD responded to our report that business case decisions were handled annually in the budget decisions and that the QDR would analyze requirements for the F–22A and make program decisions. However, it is not clear from the QDR report, issued last month, what analyses were conducted to determine the gaps in capability, the alternatives considered, the quantities needed, or the costs and benefits of the F–22A program. Therefore, questions about the F–22A program remain:

- What capability gaps exist today and will exist in the future (air superiority, ground attack, electronic attack, intelligence gathering)?
- What alternatives besides the F–22A can meet these needs?
- What are the costs and benefits of each alternative?
- How many F–22As are needed?
- What capabilities should be included?

Until these questions are answered and differences are reconciled, further investments in the program—for either the procurement of new aircraft or modernization—cannot be justified.

JSF Business Case Still Contains Cost and Schedule Risks

The JSF program appears to be on the same path as the F–22A program. After being in development for 9 years, the JSF program has not produced the first test aircraft, has experienced substantial cost growth, has reduced the number of planned aircraft, and has delayed delivery of the aircraft to the warfighter. Moreover, the JSF program remains committed to a business case that invests heavily in production before testing has demonstrated acceptable performance of the aircraft. At the same time, the JSF program has contracted to develop and deliver the aircraft's full capability in a single-step, 12-year development program—a daunting task given the need to incorporate the technological advances that, according to DOD, represent a quantum leap in capability. The business case is a clear departure from the DOD policy preference that calls for adopting an evolutionary approach to acquisitions. Furthermore, the length and cost of the remaining development are exceedingly difficult to accurately estimate, thereby increasing DOD's risks in contracting for production. With this risky approach, it is likely that the program will continue to experience significant cost and schedule overruns.

The JSF program expects to begin low-rate initial procurement in 2007 with less than 1 percent of the flight test program completed and no production representative prototypes built for the three JSF variants.[7] Technologies and features critical to JSF's operational success, such as a low observable and highly common airframe, advanced mission systems, and maintenance prognostics systems, will not have been demonstrated in a flight test environment when production begins. Other key demonstrations that will have not been either started or only in the initial stages before production begins include:

- testing with a fully integrated aircraft—mission systems and full software,
- structural and fatigue testing of the airframe, and
- shipboard testing of Navy and Marine Corps aircraft.

When the first fully integrated and capable development JSF is expected to fly in 2011, DOD will already have committed to buy 190 aircraft at an estimated cost of $26 billion. According to JSF program plans, DOD's low-rate initial production quantities will increase from 5 aircraft a year in 2007 to 133 a year in 2013, when development and initial operational testing are completed.[8] By then, DOD will have procured more than double that amount—424 aircraft at an estimated cost of about $49 billion, and spending for monthly production activities is expected to be about $1 billion, an increase from $100 million a month when production is scheduled to begin in 2007. Figure 1 shows the significant overlap in development and testing and the major investments in production.

[7] The JSF aircraft design includes three variants: a conventional takeoff and landing variant; an aircraft carrier-suitable variant; and a short takeoff and vertical landing.

[8] These figures do not include the potential for orders for international partners during low-rate initial production. Preliminary data indicate that these orders could significantly increase this rate.

Figure 1: Overlap of Low-Rate Initial Production Investments and Testing Demonstrations of the JSF Variants

	2006	2007	2008	2009	2010	2011	2012	2013
Cumulative production investment (in billions of dollars)	$0.2	$1.5	$4.9	$11.7	$18.7	$26	$36.9	$49.3
Cumulative aircraft	0	5	23	70	126	190	291	424
Basic flying qualities and aircraft first flights	Early prototype	Short takeoff plane	Conventional plane	Carrier plane				
Mission capabilities								
Block 1 (air interdiction)				Developmental testing		Operational testing		
Block 2 (close air support, improved air interdiction)					Developmental testing		Operational testing	
Block 3 (deep strike capabilities)						Developmental testing	Operational testing	
Ground tests								
Airframe durability and reliability tests		Static tests		Lifetime 1 / Fatigue tests	Lifetime 2			
Percentage of flight test program complete[a]	0	1%	3%	13%	35%	56%	77%	98%

Source: DOD (2005 data), GAO (analysis and presentation).

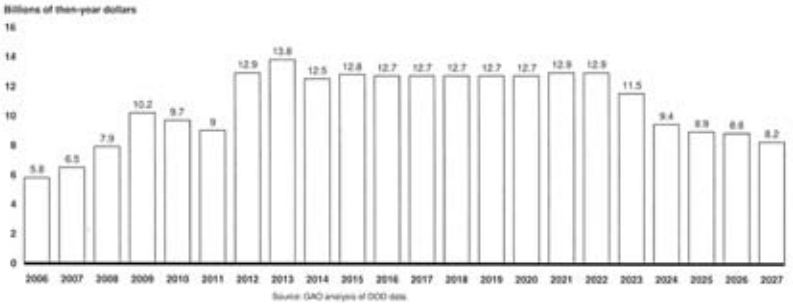
[a]Flight testing data reflects the percentage of the total flight tests completed at the time of the planned investment decision, which is currently planned for January of each year.

The overlap in testing and production is the result of a business case and acquisition strategy that has proven to be risky in past programs like F–22A, Comanche, and B–2A, which far exceeded the cost and delivery goals set at the start of their development programs. JSF has already increased its cost estimate and delayed deliveries despite a lengthy replanning effort that added over $7 billion and 18 months to the development program. JSF officials have stated that the restructured program has little or no flexibility for future changes or unanticipated risks. The program has planned about 8 years to complete significant remaining activities of the system development and demonstration phase, including:

- fully maturing seven of the eight critical technologies;
- completing the designs and releasing the engineering drawings for all three variants;
- manufacturing and delivering 15 flight test aircraft and 7 ground test articles;
- developing 19 million lines of software code; and
- completing a 7-year, 12,000-hour flight test program.

The JSF program's latest planned funding profile for development and procurement, produced in December 2004 by the JSF program office, assumes annual funding rates to hover close to $13 billion between 2012 and 2022, peaking at $13.8 billion in 2013. If the program fails to achieve its current estimated costs, funding challenges could be even greater than that. The Office of Secretary of Defense Cost Analysis Improvement Group was to update its formal independent cost estimate in the spring of 2005. The group now does not expect to formally complete its estimate until spring 2006, but its preliminary estimate was substantially higher than the program office's. A modest cost increase would have dramatic impacts on funding. For example, a 10 percent increase in production costs would amount to over $21 billion (see fig. 2).

Figure 2: JSF's Annual Funding Requirements, as of December 2004



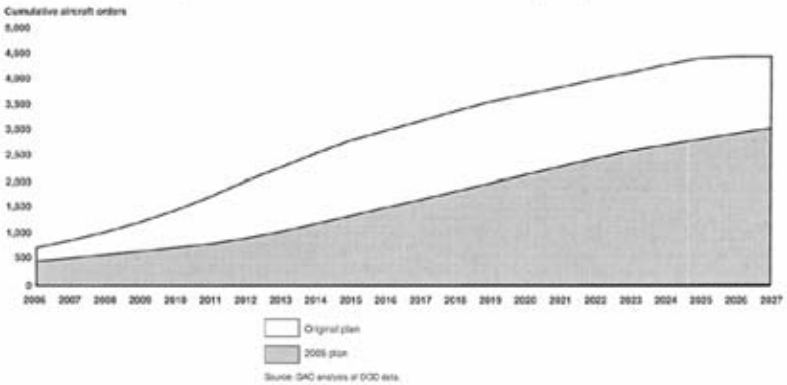
DOD has recently made decisions to reduce near-term funding requirements that could cause future JSF costs to increase. It had begun to invest in the program to develop an alternative engine for the aircraft, but now plans to cancel further investments in order to make the remaining funds available for other priorities. According to DOD, it believes that there is no cost benefit or savings with an engine competition for the JSF and there is low operational risk with going solely with a single engine supplier. DOD has already invested $1.2 billion in funding for this development effort through fiscal year 2006. By canceling the program, it expects to save $1.8 billion through fiscal year 2011. Developing alternative engines is a practice that has been used in past fighter aircraft development programs like the F–16 and F–15 programs. An alternative engine program may help maintain the industrial base for fighter engine technology, result in price competition in the future for engine acquisition and spare parts, instill incentives to develop a more reliable engine, and ensure an operational alternative should the current engine develop a problem that would ground the entire fleet of JSF aircraft. As result, the JSF decision should be supported by a sound business case analysis. To date, we have not seen such an analysis.

Finally, the uncertainties inherent in concurrently developing, testing, and producing the JSF aircraft prevent the pricing of initial production orders on a fixed price basis. Consequently, the program office plans to place initial procurement orders on cost reimbursement contracts. These contracts will provide for payment of allowable incurred costs, to the extent prescribed in the contract. With cost reimbursement contracts a greater cost risk is placed on the buyer—in this case, DOD. For the JSF, procurement should start when risk is low enough to enter into a fixed price agreement with the contractor based on demonstrations of the fully configured aircraft and manufacturing processes.

DOD'S TACTICAL AIRCRAFT RECAPITALIZATION GOALS ARE NOT BEING MET

DOD has not been able to achieve its recapitalization goals for its tactical aircraft forces. Originally, DOD had planned to buy a total of 4,500 tactical aircraft to replace the aging legacy force. Today, because of delays in the acquisition programs, increased development and procurement costs, and affordability pressures, it plans to buy almost one-third fewer tactical aircraft (see fig. 3). The delivery of these new aircraft has also been delayed past original plans. DOD has spent nearly $75 billion on the F–22A and JSF programs since they began, but this accounts for only 122 new operational aircraft.

Figure 3: Comparison of Original and Current Procurement Quantities for the F/A-18E/F, F-22A, and JSF Tactical Aircraft



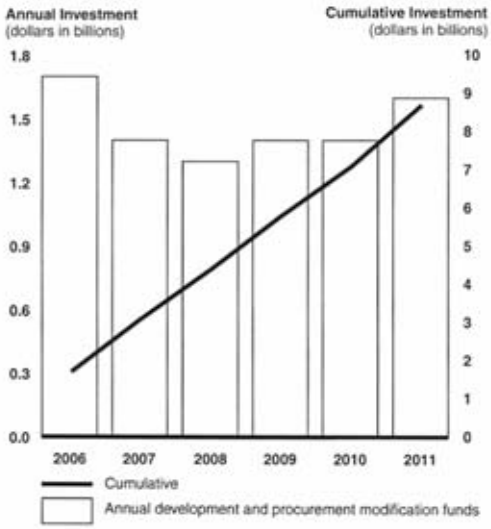
Because DOD's recapitalization efforts have not materialized as planned, many aircraft acquired in the 1980s will have to remain in the inventory longer than originally expected, incurring higher investment costs to keep them operational. According to DOD officials, these aging aircraft are approaching the end of their service lives and are costly to maintain at a high readiness level. While Air Force officials assert that aircraft readiness rates are steady, they agree that the costs to operate and maintain its aircraft over the last decade have risen substantially. Regardless, the military utility of the aging aircraft is decreasing.

The funds used to operate, support, and upgrade the current inventory of legacy aircraft represent opportunity costs that could be used to develop and buy new aircraft. From fiscal years 2006 to 2011, DOD plans to spend about $57 billion[9] for operations and maintenance and military personnel for legacy tactical fighter aircraft. Some of these funds could be invested in newer aircraft that would be more capable and less costly to operate. For example, the Air Force Independent Cost Estimate Summary shows that the F–22A will be less expensive to operate than the F–15. The F–22A will require fewer maintenance personnel for each squadron, and one squadron of F–22As can replace two squadrons of F–15. This saves about 780 maintenance personnel as well as about $148 million in annual operating and support cost according to the independent cost estimate.

Over the same timeframe, DOD also plans to spend an average of $1.5 billion each year—or $8.8 billion total—to modernize or improve legacy tactical fighter aircraft (see fig. 4). Further delays or changes in the F–22A or JSF programs could require additional funding to keep legacy aircraft in the inventory and relevant to the warfighter's needs.

[9] Figure includes cost data for F/A–18E/F because it could not be broken out from the F–18 costs.

Figure 4: Development and Modification Estimates for Legacy Tactical Fighter Aircraft



Source: Fiscal year 2007 President's Budget Request.

Note: Not all modification costs may be reflected. Decisions stemming from the 2006 QDR or recent DOD actions have changed tactical aircraft program funding. Also, F/A-18E/F data were included because they could not be broken out from the F/A-18 data.

In testimony last year, we suggested that the QDR would provide an opportunity for DOD to assess its tactical aircraft recapitalization plans and weigh options for accomplishing its specific and overarching goals. In February 2006, the Secretary of Defense testified that recapitalization of DOD's tactical aircraft is important to maintain America's air dominance. Despite this continued declaration about recapitalizing tactical aircraft, DOD's 2006 QDR report did not present a detailed investment strategy that addressed needs and gaps, identified alternatives, and assessed costs and benefits. With limited information contained in the QDR report, many questions are still unanswered about the future of DOD's tactical aircraft modernization efforts.

DOD HAS AN OPPORTUNITY TO SET ITS TACTICAL AIRCRAFT RECAPITALIZATION EFFORTS ON TRACK

As DOD moves forward with its efforts to recapitalize its tactical aircraft force, it has the opportunity to reduce operating costs and deliver needed capabilities to the warfighter more quickly. To take advantage of this opportunity, however, DOD must fundamentally change the way it buys weapon systems. Specifically, the department must change how it selects weapon systems to buy, and how it establishes and executes the business case. Although the F–22A program has progressed further in the acquisition process than the JSF program, both programs are at critical decisionmaking junctures, and the time for DOD to implement change is now.

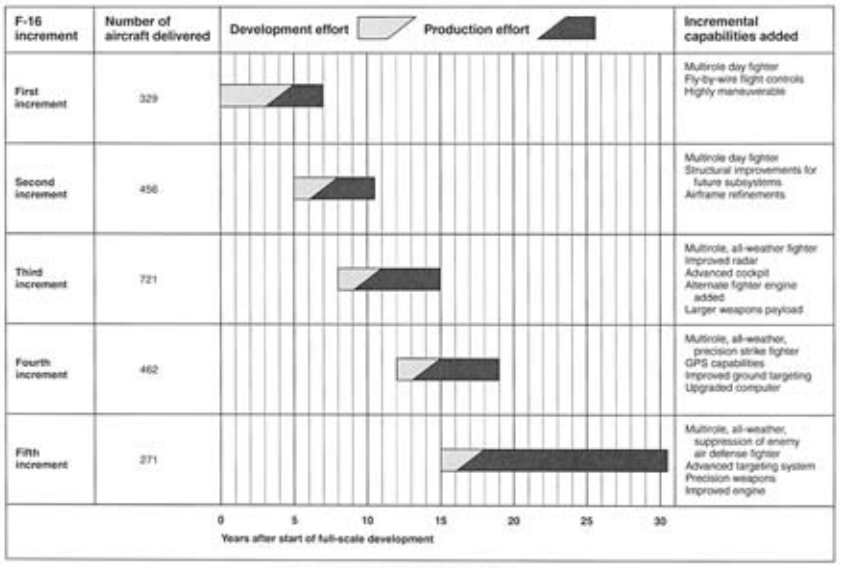
Before additional investments in the F–22A program are made, DOD and the Air Force must agree on the aircraft's capabilities and quantities and the resources that can be made available to meet these requirements. A cost and benefit analysis of F–22A capabilities and alternative solutions weighed against current and expected threats is needed to determine whether a sound business case for the F–22A is possible and whether investing an additional $13.8 billion over the next 5 years to procure or modernize these aircraft is justified.

With more than 90 percent of investment decisions to develop, test, and buy JSF aircraft remaining, DOD could implement significant changes in its business case

before investing further in the JSF program. The JSF program should delay production and investments in production capability until the aircraft design qualities and integrated mission capabilities of the fully configured and integrated JSF aircraft variants have been proven to work in flight testing. Also, an evolutionary acquisition strategy to limit requirements for the aircraft's first increment of capabilities that can be achieved with proven technologies and available resources could significantly reduce the JSF program's cost and schedule risks. Such a strategy would allow the program to begin testing and low-rate production sooner and, ultimately, to deliver a useful product in sufficient quantities to the warfighter sooner. Once the JSF is delivered, DOD could begin retiring its aging and costly tactical aircraft. Capabilities that demand as yet undemonstrated technologies would be included as requirements in future JSF aircraft increments that would be separately managed. An evolutionary, knowledge-based acquisition approach would not only help significantly minimize risk and deliver capabilities to the warfighter sooner, it would be in line with current DOD policy preferences.[10]

DOD's use of an evolutionary, knowledge-based approach is not unprecedented. The F–16 program successfully evolved capabilities over the span of 30 years, with an initial F–16 capability delivered to the warfighter about 4 years after development started. Figure 5 illustrates the F–16 incremental development approach.

Figure 5: F-16 Incremental Development Approach



Source: DOD (data); GAO (analysis and presentation).

The F–16 program provides a good acquisition model for the JSF program. For JSF, an evolutionary approach could entail delivering a first increment aircraft with at least as much capability as legacy aircraft with sufficient quantities to allow DOD to retire its aging tactical aircraft sooner and reduce operating inefficiencies. Limiting development to 5-year increments or less, as suggested in DOD's acquisition policy, would force smaller, more manageable commitments in capabilities and make costs and schedules more predictable. Some of the more challenging JSF capabilities, such as advanced mission systems or prognostics technologies, would be deferred and added to follow-on efforts once they are demonstrated in the technology development environment—a more conducive environment to maturing and proving

[10] DOD argues that the JSF program is using an evolutionary approach because it is developing capabilities in a series of blocks. However, the approach is not truly evolutionary, as DOD does not consider each block as a separate program—a critical aspect of an evolutionary approach. In addition, DOD currently expects to buy 95 percent of the JSF aircraft in the final block—which delays providing useful capabilities to the warfighter.

new technologies. A shorter system development phase would have other important benefits. It would allow DOD to align a program manager's tenure to the completion of the phase, which would enable program managers to be held accountable for decisions. It also would allow DOD to use fixed-price-type contracts for production, and thereby reduce the government's cost risk.

Additionally, DOD should do a more comprehensive business case analysis of the costs, benefits, and risks before terminating the alternative engine effort. A competitive engine program may: (1) incentivize contractors' to minimize life cycle costs; (2) improve engine reliability and quality in the future; (3) provide operational options; and (4) maintain the industrial base.

At a broader level, DOD needs to make more substantive changes to its requirements, funding, and acquisition processes to improve weapon system program outcomes. We have recommended these changes in past reports and DOD has agreed with them. The January 2006 Defense Acquisition Performance Assessment report, based on a study directed by the Deputy Secretary of Defense, made some important observations regarding DOD acquisitions. The report concluded that the current acquisition process is slow, overly complex, and incompatible with meeting the needs of DOD in a diverse marketplace. Notably, the report confirmed that a successful acquisition process must be based on requirements that are relevant, timely, informed by the combatant commanders, and supported by mature technologies and resources necessary to realize development. The report also pointed out that DOD's acquisition process currently operates under a "conspiracy of hope," striving to achieve full capability in a single step and consistently underestimating what it would cost to attain this capability. The report makes a number of key recommendations for changing DOD's acquisition process including the following:

- develop a new requirements process that has greater combatant commander involvement and is time-phased, fiscally informed, and jointly prioritized;
- change the current acquisition policy to ensure a time-constrained development program is strictly followed;
- keep program managers from the start of development through delivery of the "Beyond Low-Rate Initial Production Report"; and
- move the start of a development program to the point in time that a successful preliminary design review is completed.

Our work in weapons acquisition and best practices over the past several years has drawn similar conclusions. We have made numerous recommendations on DOD's acquisition processes and policy—as well as recommendations on specific major weapon system programs—to improve cost, schedule, and performance outcomes and to increase accountability for investment decisions. In 2000, DOD revised its acquisition policy to address some of our recommendations. Specifically, DOD has written into its policy an approach that emphasizes the importance of knowledge at critical junctures before managers agree to invest more money in the next phase of weapon system development. Theoretically, a knowledge-based approach results in evolutionary—that is, incremental, manageable, predictable—development and uses controls to help managers gauge progress in meeting cost, schedule, and performance goals. However, DOD policy lacks the controls needed to ensure effective implementation of this approach. Furthermore, decision makers have not consistently applied the necessary discipline to implement its acquisition policy and assign much-needed accountability for decisions and outcomes. Some of key elements of acquisition that we believe DOD needs to focus on include the following:

- constraining individual program requirements by working within available resources and by leveraging systems engineering;
- establishing clear business cases for each individual investment;
- enabling science and technology organizations to shoulder the technology burden;
- ensuring that the workforce is capable of managing requirements trades, source selection, and knowledge-based acquisition strategies;
- establishing and enforcing controls to ensure appropriate knowledge is captured and used at critical junctures before moving programs forward and investing more money; and
- aligning tenure for program managers that matches the program's acquisition time to ensure greater accountability for outcomes.

In conclusion, despite DOD's repeated declaration that recapitalizing its aging tactical aircraft fleet is a top priority, the department continues to follow an acquisition strategy that consistently results in escalating costs that undercut DOD's buying power, forces DOD to reduce aircraft purchases, and delays delivering needed capabilities to the warfighter. Continuing to follow a strategy that results in dis-

appointing outcomes cannot be encouraged—particularly given our current fiscal and national security realities.

Mr. Chairman, this concludes my prepared statement. I will be happy to answer any questions you or other members of the subcommittee may have.

GAO RELATED PRODUCTS

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Defense Acquisitions: DOD Has Paid Billions in Award and Incentive Fees Regardless of Acquisition Outcomes, GAO–06–66, (Washington DC: December 19, 2005).

Unmanned Aircraft Systems: Global Hawk Cost Increase Understated in Nunn-McCurdy Report, GAO–06–222R, (Washington DC: December 15, 2005)

DOD Acquisition Outcomes: A Case for Change, GAO–06–257T, (Washington DC: November 15, 2005).

Defense Acquisitions: Progress and Challenges Facing the DD(X) Surface Combatant Program GAO–05–924T. (Washington DC: 07/19/2005).

Defense Acquisitions: Incentives and Pressures That Drive Problems Affecting Satellite and Related Acquisitions. GAO–05–570R. (Washington DC: 06/23/2005).

Defense Acquisitions: Resolving Development Risks in the Army's Networked Communications Capabilities is Key Fielding Future Force. GAO–05–669 (Washington DC: 06/15/2005).

Progress of the DD(X) Destroyer Program. GAO–05–752R. (Washington DC: 06/14/2005)

Tactical Aircraft: F/A–22 and JSF Acquisition Plans and Implications for Tactical Aircraft Modernization. GAO–05–519T. (Washington DC: 04/06/2005).

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Defense Acquisitions: Future Combat Systems Challenges and Prospects for Success. GAO–05–428T. (Washington DC: 03/16/2005).

Defense Acquisitions: Changes in E–10A Acquisition Strategy Needed Before Development Starts. GAO–05–273 (Washington DC: 03/15/2005).

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Tactical Aircraft: Opportunity to Reduce Risks in the Joint Strike Fighter Program with Different Acquisition Strategy. GAO–05–271. (Washington DC: 03/15/2005).

Tactical Aircraft: Status of F/A–22 and JSF Acquisition Programs and Implications for Tactical Aircraft Modernization. GAO–05–390T (Washington DC: 03/03/2005).

Defense Acquisitions: Plans Need to Allow Enough Time to Demonstrate Capability of First Littoral Combat Ships. GAO–05–255 (Washington DC: 03/01/2005).

Defense Acquisitions: Improved Management Practices Could Help Minimize Cost Growth in Navy Shipbuilding Programs. GAO–05–183 (Washington DC: 02/28/2005).

Unmanned Aerial Vehicles: Changes in Global Hawk's Acquisition Strategy Are Needed to Reduce Program Risks. GAO–05–06 (Washington DC: 11/05/2004).

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Senator MCCAIN. Thank you very much, Mr. Sullivan.

Mr. Marron.

STATEMENT OF DONALD B. MARRON, ACTING DIRECTOR, CONGRESSIONAL BUDGET OFFICE

Mr. MARRON. All right, thank you, Mr. Chairman, and members of the subcommittee. It's a pleasure to be here this afternoon to discuss the Air Force's proposed procurement approach for the F–22 fighter program.

To briefly summarize my written testimony, from CBO's perspective the key issue with the proposed procurement is the degree to which it deviates from the usual budget practice of full funding. To quote from the Office of Management and Budget's (OMB) Circular A–11, which guides administration budget requests, "Good budgeting requires that appropriations for the full costs of asset acquisition be enacted in advance to help ensure that all costs and benefits are fully taken into account at the time decisions are made to provide resources."

This policy of full funding strengthens the budget process, because it enables Congress to control spending at the time the commitments are made, it increases the likelihood that complete, usable assets will be delivered without the need for additional funds, it promotes transparency and accountability in the budget process, and it makes clear the tradeoffs that have to be made among competing priorities.

The Air Force's proposed procurement approach for the F–22 program deviates from the policy of full funding. There are three related concerns:

First, the Air Force proposed to fund the program on an incremental basis, rather than a fully funded basis. For 2007, for example, the Air Force is requesting funds only to purchase components and subassemblies for 20 fighters, not the full fighters themselves. Next year, the Air Force would request funds to assemble those components into complete aircraft.

This approach reduces the apparent cost of the F–22 program this year. The budget request is about $2 billion, rather than the roughly $3.5 billion that would be necessary for a comparable number of complete fighters. In so doing, it pushes funding requirements out into future years. In order to procure 20 complete fighters, Congress would have to provide additional appropriations in the future.

Second, the Air Force is proposing a multiyear procurement, but is not funding all the potential costs of that approach. Multiyear procurement can provide significant benefits to the Air Force, and, thereby, the taxpayer, if it enables the Air Force to purchase the fighters at lower cost. Contractors may be willing to offer a lower price for the multiyear commitment, because it enables them to plan for more efficient production and make productivity-enhancing investments. In return for such cost-reducing efforts, however, contractors often require some commitment that any costs associated with those efforts will be paid if the contract turns out to get canceled.

When the Air Force enters into a multiyear procurement, therefore, the full costs of the first year would include not just the cost of the aircraft ordered in that year, but also an amount to cover any potential cancellation liabilities. If such monies are not appropriated, the contract is not fully funded. If the program gets canceled, the Air Force would have to seek more funds from Congress, reduce planned F–22 purchases, or cut into other approved programs.

The third concern with the Air Force's proposed procurement is that, as just described, it attempts to combine incremental funding and multiyear procurement. These procurement approaches are not a natural fit, because the logic underlying them is inconsistent. Incremental funding makes the most sense if you do not intend to make a full commitment to the program, while multiyear procurement only makes sense if you want to make an extended commitment to the program. Perhaps for that reason, the use of incremental funding is currently prohibited for multiyear procurements. Indeed, Congress explicitly rejected this approach for funding another aircraft, the C–17, some years ago, saying, "This financing scheme runs counter to the full-funding principles which guide Federal procurement practice, and thereby it creates a future liability for the Air Force and Congress."

To summarize, then, the Air Force's proposal deviates significantly from the principle of full funding when acquiring new assets. As a result, this proposal would imply that additional funding burdens would fall on future Congresses.

Thank you, and I would be happy to answer any questions.

[The prepared statement of Mr. Marron follows:]

PREPARED STATEMENT BY DONALD B. MARRON

Mr. Chairman, Senator Lieberman, and members of the subcommittee, I am pleased to appear before you today to discuss the Air Force's acquisition strategy for the F–22 fighter program. At your request, the Congressional Budget Office (CBO) has examined the proposal for a multiyear procurement contract for 60 aircraft and has found the following:

- The Air Force proposes to pay for the aircraft through incremental funding. Under that approach, the Air Force would seek appropriations for only

part of the cost of each annual production lot in the year it was ordered and would request the remaining amount in the following year. Thus, the funding provided each year would not be sufficient to complete the aircraft ordered that year, and the Air Force would have to seek additional appropriations in the future to obtain functional aircraft.

• The Air Force would commit to the purchase of 20 aircraft per year for 3 years, with the right to cancel the remainder of the order at the end of each year. But it is not requesting appropriations sufficient to cover the potential cancellation liability. Under that proposal for multiyear procurement, the Air Force would have to seek additional appropriations in the future even if a decision was made to cancel the contract.

• By initially requesting only incremental funding to pay for components of the aircraft and by excluding funding for the cancellation liability, the Air Force reduces the amount of 2007 budget authority needed to initiate its proposed procurement. By the same token, the approach would also increase the amount of future budget authority needed either to complete the purchases or to cancel them.

• Current law prohibits the use of incremental funding in multiyear procurement contracts. The Air Force has requested that legislation exempting the service from that prohibition be included in the National Defense Authorization Act for Fiscal Year 2007.

• Deferring recognition of the full cost of the assets being purchased would understate the nature of the government's obligations, potentially distorting budgetary choices by making the program appear less expensive than it is, and would constrain budgetary flexibility in subsequent years.

FUNDING OF CAPITAL ACQUISITIONS

In general, the Federal budget operates on the principle that appropriations for the full costs of acquiring an asset should be enacted in advance. In that regard, the Office of Management and Budget's Circular A–11, which guides executive branch agencies in the preparation of the budget, states:

> Good budgeting requires that appropriations for the full costs of asset acquisition be enacted in advance to help ensure that all costs and benefits are fully taken into account at the time decisions are made to provide resources. Full funding with regular appropriations in the budget year also leads to tradeoffs within the budget year with spending for other capital assets and with spending for purposes other than capital assets. Full funding increases the opportunity to use performance-based fixed price contracts, allows for more efficient work planning and management of the capital project (or investment), and increases the accountability for the achievement of the baseline goals.[1]

Upfront funding enables Congress to control spending at the time a commitment is made and ensures—or at least increases the likelihood—that a complete and usable asset will be delivered without the need to provide additional appropriations in future years. Very expensive items, however, may be difficult for an agency to budget for if it must have an appropriation for the full cost in the first year. In some instances, the cost of a single item may exceed an agency's annual budget for capital acquisitions. If the cost of an asset represents a large portion of its budget, an agency may have to forgo most other capital acquisitions for that year or otherwise disrupt other ongoing acquisition programs. One solution to that problem would be for the administration to request an appropriation in excess of the annual amount normally provided to an agency for capital acquisitions. But large, temporary increases in budget authority are sometimes difficult to accommodate in the budget process, at least for nonemergency appropriations.

Budgetary constraints have sometimes led agencies to seek to defer recognition of costs until later years—for example, by using incremental funding for capital assets. Congress has approved incremental funding requests for some ships for the Navy and the Coast Guard, water resources projects of the Army Corps of Engineers, construction projects of the Department of Defense (DOD), and space exploration projects of the National Aeronautics and Space Administration (NASA). Agencies argue that through incremental funding authority, they have acquired many useful assets that they could not have funded upfront.

Incremental funding, however, can have several deleterious effects. It may limit visibility and accountability because it does not display the full cost of decisions at

[1] Office of Management and Budget, Preparation and Submission of Budget Estimates, Circular A–11 (July 2005), Appendix J, p. 3.

the time they are made. In the competition for appropriations, it may tilt the playing field in favor of expensive programs that benefit from such a funding arrangement; programs may be selected on the basis of their apparent economy—in their initial stages—relative to other programs that do not have the advantage of such a favorable budgetary treatment. Moreover, incrementally funded projects may be started without adequate scrutiny or a full understanding of the total cost. Incremental funding may even provide a particular incentive to underestimate costs at the outset of a project because later cost increases would not have to be acknowledged as such but could be incorporated in subsequent funding increments.

In cases in which an acknowledgment of the full cost up front could render a program too expensive to consider, both agencies and Congress may end up accepting those higher costs at a later date if the only alternative is to abandon their previous investment in partially completed products. Finally, incremental funding may constrain the funding available for other programs in future years as programs that were partially funded in previous years continue to consume resources.

THE AIR FORCE'S PLAN FOR ACQUIRING F–22S

Through the end of fiscal year 2005, the Air Force had ordered 100 F–22 aircraft. In its budget request for fiscal year 2006, the service proposed purchasing 80 more planes—24 in 2006, 29 in 2007, and 27 in 2008. Congress appropriated $3.7 billion to procure 24 aircraft in fiscal year 2006. To date, funds have been appropriated in advance for the full cost of all of the aircraft ordered.

The fiscal year 2007 budget request seeks authority to buy more aircraft in total but at a slower rate than envisioned a year ago. The Air Force now seeks authority to purchase 60 aircraft at a rate of 20 aircraft per year over the 2007–2009 period using a multiyear procurement approach aimed at mitigating the increase in costs that would otherwise result from the reduction in the production rate. Under its proposed approach, the Air Force would commit to purchasing all 60 aircraft, with the option to cancel the contract at the end of each fiscal year if funds were not appropriated to continue the contract. According to the Air Force, the 60 airplanes would cost about $10.5 billion in total.

The Air Force's proposal differs from the practice of full up-front funding in two ways: it seeks incremental funding for acquiring capital assets, and it provides for a multiyear procurement without funding for possible cancellation costs.

INCREMENTAL FUNDING

The Air Force has requested the authority to budget and to pay for each annual production lot incrementally over a 2-year period rather than obtaining appropriations for the full cost of those aircraft in the year production begins. The Service's approach would reduce the amount of budget authority needed in the first year, although it would increase the amount needed in subsequent years. The first year's funding would cover the cost of producing certain components of the first 20 aircraft; the second year's appropriation would pay for the cost of assembling them. Specifically, the Air Force has asked for appropriations of about $2 billion in 2007 to pay for part of the cost of the aircraft whose production would begin in 2007. Under a multiyear contract without incremental funding, the Air Force would initially need approximately $4 billion to $5 billion to cover its minimum liability.[2]

In each of the past 4 years, Congress has appropriated around $4 billion to procure F–22s. A similar appropriation in 2007 would fully fund 12 to 20 aircraft under a multiyear contract, depending on the amount of the cancellation liability—if such liability was fully covered within that amount.

The Air Force's strategy to incrementally fund production of the F–22 would have the effect of deferring appropriations for commitments already made. At the time it orders the aircraft for each annual production lot, the Air Force would have appropriations sufficient to pay only for certain components, such as engines, electronic systems, and airframe subassemblies. Appropriations for the cost to assemble those components into a usable airplane would be requested in the following year.

Such a process would allow the Air Force to order more aircraft in the first year within a given amount of funding by understating the government's ultimate costs. Therefore, when Congress allocated budget authority to programs in the 2007 DOD appropriations act, the F–22 program would have an advantage over other programs or activities that did not receive that form of funding. In subsequent years, Congress could be left with little choice but to provide additional appropriations to ensure the

[2] The exact amount would depend on the cost of canceling the contract after 2007. On the basis of cancellation liabilities for other multiyear programs, that amount could be between 5 percent and 15 percent of contract costs.

delivery of fully assembled, functional aircraft. Although more aircraft could be ordered in the first year under the incremental funding approach, fewer aircraft could be ordered in subsequent years within any given amount of appropriations. Even if costs increased relative to the Air Force's current estimate, Congress might feel compelled to appropriate funds for aircraft that had already begun production to avoid wasting the funds already invested in the components.

The incremental funding approach could restrain the pace of aircraft production. Because the Air Force would not have sufficient appropriations to pay for the full cost of the aircraft in the first year, it would have to closely monitor the contractor's work to ensure that the pace of production was maintained at a level that would not obligate funds that had not yet been appropriated. Otherwise, production might have to be slowed or halted in the later months of the year.

Congress has approved incremental funding for other DOD programs, such as Navy ships and some military construction projects. For instance, Congress authorized the Navy to incrementally fund the CVN–78 aircraft carrier and the LHD–8 amphibious ship. But incremental funding has rarely been used for aircraft procurement programs. Perhaps because aircraft—even ones as costly as the F–22—are less expensive than Navy ships, dams and levees constructed by the Army Corps of Engineers, and NASA's space station, they are easier to budget for in full. Consequently, budgetary constraints can be accommodated by purchasing fewer aircraft in a given year rather than by funding only a part of the cost of a larger production lot.

THE POTENTIAL BENEFITS OF MULTIYEAR CONTRACTS IN REDUCING ACQUISITION COSTS

Multiyear procurement is a special contracting method authorized in 10 U.S.C. 2306b that permits the government to enter into contracts covering acquisitions for more than 1 year but not more than 5 years, even though the total funds required every year are not appropriated at the time the contracts are awarded. As part of such a contract, the government commits to purchase all items specified at the time the contract is signed, including those to be produced and paid for in subsequent years. Before an agency can enter into such a contract, it must find that multiyear procurement results in substantial savings in comparison with procurement through a series of annual contracts. The Air Force has not yet completed its analysis of whether multiyear procurement is the most cost-effective strategy for purchasing the F–22s.

Because multiyear procurement allows the contractor to plan for more efficient production, such a contract can reduce the cost of an acquisition compared with the cost of buying the items through a series of annual procurement contracts—unless the government decides to cancel the contract partway through it. The savings can come from several sources, such as investments in equipment and facilities, investments in the contractor's workforce, and orders for component parts in economically efficient quantities. For example, given the commitment of a multiyear procurement contract, the contractor may spend time and money on appropriate training or provide financial incentives to retain experienced personnel on the job for the duration of the contract to improve productivity. The contractor may also acquire special tools, manufacturing equipment, or facilities that reduce the time, labor, and materials—and thus the cost—to produce the items. The savings in recurring costs may not be great enough in a single year to recover the cost of the investments, but if production quantities are sufficiently large, the investment costs can be spread out over several years of production.

Similarly, the contractor may also purchase or produce components in advance of need—using an arrangement called economic order quantity procurement—if doing so offers substantial savings by avoiding repeated setup costs.

Contractors are usually willing to enter into multiyear procurement contracts and to spend money up front to reduce production costs because the government, in the event of contract cancellation or termination, promises to pay for incurred costs that would have been recovered over the full term of the contract.

BUDGETING FOR CANCELLATION LIABILITY

Under a multiyear contract, the government may, at the end of each fiscal year, cancel its order for all remaining years of the contract if it notifies the contractor that funds are not available to proceed for the next fiscal year. Thus, cancellation of a multiyear contract occurs between fiscal years if Congress does not provide the additional appropriations needed to continue.

Under a multiyear contract, some nonrecurring costs may be allocated to items expected to be produced in future years. Therefore, if the contract is canceled, the government may owe the contractor more than the amount appropriated for items

produced in the years before the cancellation. The maximum liability for contract cancellation at the end of any given year is usually negotiated up front and included in the terms of the contract.[3]

DOD sometimes chooses not to request budget authority specifically for the cancellation liability because it considers cancellation a contingent liability with only a remote probability of happening.[4] Although the amount of the government's actual liability depends on how the program proceeds, its minimum liability is the sum of the production costs for the items ordered in the first year and the cancellation costs at the end of that year. Regardless of whether the multiyear procurement contract proceeds for the full term or is canceled early, the government's initial obligation to the contractor will exceed the amount required to pay for items ordered in the first year. For example, after the first year of the 3-year contract proposed for the F–22, the Air Force could either cancel the remaining 2 years of production and pay the costs for cancellation, or it could continue production for the second program year and pay for the cost of those aircraft. Under the multiyear contract, the Air Force would not have the option of forgoing future production lots without paying the cancellation charge. Thus, in no case would the government pay only the cost of the aircraft produced in the first year. An appropriation that covered only the cost for each annual production lot as it was manufactured would therefore be insufficient to finance the government's minimum obligations under the multiyear contract.

The Air Force indicates that it may be able to pay contract cancellation costs with funds appropriated for procuring the F–22, which could lead some observers to conclude that there would be sufficient funds to pay both the cost of canceling future production lots and the cost of procuring the aircraft that had been ordered up to that point. In fact, the Air Force would be committing the same appropriations for both purposes simultaneously. But with no funds set aside specifically for cancellation costs, the Air Force would have to terminate orders for some or all of the aircraft that had already entered production if a decision was made to cancel subsequent orders. Thus, if it canceled the remaining years of the multiyear contract at the end of the first year, the government would not only forgo the aircraft to be produced in later years but also would not receive all of the planes it had ordered in the first year—and the taxpayers' investment in those aircraft would be lost. In particular, at the end of the first year, the Air Force would have ordered 20 aircraft. If the government decided to cancel the contract at that point but had not set aside funds specifically for cancellation costs, it would not only forgo the 40 aircraft that had not entered production, but, to free up funds for cancellation costs, it would have to stop work on some of the 20 aircraft that had already been ordered.

Although DOD has requested sufficient appropriations to cover its minimum obligations for some multiyear contracts, it has not allocated resources for cancellation liabilities for many of them. That failure to request funding for cancellation liabilities may distort the resource allocation process by understating the cost of decisions made for the budget year and may require future Congresses to find the resources to pay for decisions made today.

COMBINING MULTIYEAR PROCUREMENT AND INCREMENTAL FUNDING

Even though Congress has authorized and appropriated funds for capital assets on an incremental basis, CBO is unaware of any instances in which Congress has authorized incremental funding of a multiyear procurement contract. In fact, Congress recently disapproved such a proposal by the Air Force. In its fiscal year 2003 budget request, the Air Force proposed to use advance procurement funding—typically used to buy components with significantly longer production time than other system components—for the multiyear procurement of C–17 cargo aircraft. That incremental funding approach would have effectively resulted in progress payments on the aircraft rather than full funding in the initial year of production.

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[3] Contract cancellation differs from contract termination. The government has the right to end any contract early, when doing so is in the government's interest, but must pay the contractor for any authorized work performed before it was notified to cease work. Contract termination is the act of rescinding orders for items for which funds have already been appropriated and on which work has already begun. The cost of terminating an annual procurement contract early should not exceed the available appropriations because an agency should have sufficient appropriations to cover all recurring and nonrecurring costs before it initiates an annual procurement contract.

[4] DOD is authorized by 10 U.S.C. 2306b to pay cancellation costs from funds originally available for performance of the contract concerned, appropriations currently available for procurement of the type of property concerned and not otherwise obligated, or funds appropriated for cancellation payments.

In the National Defense Authorization Act for Fiscal Year 2003, Congress prohibited that approach proposed for the C–17 by amending the statute governing multiyear procurement to allow DOD to obligate funds to procure end items only if they were "complete and usable." Congress also added $586 million to the department's budget request for fiscal year 2003 to fully fund the acquisition of 15 C–17 aircraft entering production that year. The conference report accompanying the Department of Defense Appropriations Act for Fiscal Year 2003 explicitly disapproved the Air Force's proposed approach: "This financing scheme runs counter to the 'full funding' principles which guide Federal Government procurement practice, and thereby creates a future liability for the Air Force and Congress. For this reason, the conferees disapprove the Air Force's C–17 financing proposal." For the F–22 program, the Air Force has proposed a statutory waiver of the 2003 authorization law's prohibition against incrementally funding the purchase of end items under a multiyear contract.

Although the Air Force indicates it may be able to pay cancellation costs from funds appropriated for the F–22's procurement, combining multiyear procurement and incremental funding makes that unlikely. The smaller amount appropriated under the incremental funding approach would be obligated and spent more rapidly than the full amount. CBO estimates that even if orders for aircraft in production were terminated, as little as 10 percent of the initial appropriation would be available to pay cancellation costs at the end of the initial year of incremental funding for each of the three lots. Consequently, cancellation might necessitate taking funding from other aircraft procurement programs or might require Congress to provide additional appropriations to pay those costs.

Employing an incremental funding strategy in conjunction with a multiyear procurement contract introduces the risk that the Air Force might pay for aircraft that would not be completed if the contract was canceled. At the end of each year of the contract except the last one, there would be some aircraft in production that would require appropriations to complete. If Congress declined to provide further funds to continue the contract in the next fiscal year, the Air Force would have to cancel the contract for all subsequent years and terminate orders for aircraft that had not been fully funded. If the contract was canceled after 2007, the Air Force would not receive any completed aircraft. If the contract was canceled after 2008 and no additional funds were provided for 2009, the Air Force would receive the 20 aircraft ordered in 2007 but would receive only components of the aircraft that had been ordered in 2008.

Incremental funding and multiyear procurement are conceptually inconsistent budgetary practices. On the one hand, multiyear procurement contracts suggest a firm and substantial commitment on the part of the government. The contractor is encouraged to make investments promoting efficiency on the basis of the government's commitment to purchase multiple annual production lots or to compensate the contractor for those investments if it chooses to cancel the contract. On the other hand, the amount of budget authority provided under an incremental funding arrangement suggests a very limited government liability—only for the cost of the components that are produced in that year.

Senator MCCAIN. Thank you very much.

Mr. Bolkcom.

STATEMENT OF CHRISTOPHER BOLKCOM, SPECIALIST IN NATIONAL DEFENSE, CONGRESSIONAL RESEARCH SERVICE

Mr. BOLKCOM. Mr. Chairman, Senator Chambliss, thank you very much for inviting me to speak to you today about the F–22 Raptor. As requested, my testimony will address DOD's proposed funding strategy and its plan to proceed with a multiyear procurement of 60 aircraft.

I'd like to make some observations that you'll find treated at greater length in my written statement, which I request be included in the record.

Senator MCCAIN. Without objection.

Mr. BOLKCOM. As part of its fiscal year 2007 budget request, DOD proposes to add $930 million to the program and to incrementally fund F–22 procurement. Aircraft subassemblies will be funded in 1 year, and final assembly will be funded in the second. A

multiyear procurement contract and two economic order quantity purchases are key components of this strategy. DOD leaders say that this proposal is unorthodox, and it may require congressional waivers of statute or standard practice.

At least three aspects of this proposed strategy may present significant issues for DOD and Congress:

First, if the Air Force is allowed to incrementally fund F–22 procurement, future Congresses could be deterred from cutting program funds, in fear of taking delivery of 20 half-assembled aircraft. DOD may argue that the program is stable and mature, which would make budget cuts unlikely. However, the authority to appropriate funds, of course, belongs to Congress, not to DOD.

Second, this strategy appears risky, because many questions about its feasibility remain. For instance, reducing the annual procurement rate could, in Air Force parlance, "create upward cost pressure." The savings from the multiyear procurement contract and the economic order quantity purchases are intended to offset this upward cost pressure, but it is currently unclear if they will save enough. Also, the discovery, in 2005, of a flaw in some of the titanium components may cast doubt on both the F–22's maturity and the Air Force's ability to monitor the program.

The third risk of this strategy is that it may set a precedent. DOD argues that this strategy is a one-time opportunity to save money and to reduce risk. The F–22 is at the end of its production, they argue, and the Air Force will not need to ask for incremental funding a second time. But today's leaders cannot guarantee that future officials won't cite this case as a precedent for some future exception they wish Congress to approve.

It is not clear that the potential benefits of this strategy outweigh the risks just described. The primary benefit that DOD leaders say the strategy will confer is to close the gap between F–22 and JSF production. Air Force Secretary Wynne recently testified that, "it is not in this Nation's interest to terminate this fifth-generation fighter until we get access to another fifth-generation fighter." Being able to manufacture advanced fighter aircraft would be useful, Mr. Wynne said, if we were to encounter a "hot engagement."

This may sound reasonable, but questions could emerge about the value of an F–22 production capability during a crisis. Why? Because it takes 3 to 4 years to build and deliver a lot of F–22s. If the United States found itself unexpectedly drawn into a major conflict, and more Raptors were desired, it appears unlikely that a large number could be rapidly built and delivered. Even if large numbers of aircraft were rapidly produced, pilots and maintenance personnel would need to be trained and organized. Tools, supplies, and spare parts would likely need to be acquired. The most intense and demanding air combat in recent operations has been measured in days and weeks, not in months or years.

A final observation is that under last year's F–22 funding plan, production would end in December 2010. At this point, 21 operationally capable JSFs will have been produced and delivered to DOD. The JSF will not have achieved initial operational capability (IOC) by this point, but the manufacturing lines for the two aircraft clearly overlap by approximately 2 years.

Mr. Chairman, this concludes my remarks. Thanks for the opportunity to appear before you. I look forward to your questions.

[The prepared statement of Mr. Bolkcom follows:]

PREPARED STATEMENT BY CHRISTOPHER BOLKCOM

PROPOSED F–22A RAPTOR FUNDING STRATEGY

Mr. Chairman, distinguished members of the subcommittee, thank you for inviting me to speak to you today about the F–22A. As you requested, my testimony will address the Air Force's proposed new funding strategy for the F–22A, and its plan to proceed with a multiyear procurement of 60 F–22A aircraft.

INTRODUCTION

As part of its fiscal year 2007 budget request, the Department of Defense (DOD) has proposed a change in how it plans to fund its remaining production of the F–22A Raptor, which in its parlance is "nontraditional, but executable."[1] The new strategy is complex, but can be described in a simplified way. DOD proposes to add an additional production lot, and to stretch the funding of its final 60 Raptors over an additional 2-year period (from fiscal year 2008 to fiscal year 2010). This incremental funding will reduce the average annual rate of procurement, and split the funding of annual production over a 2-year period (subassembly activities are funded in the first year, those subassemblies then transition to final assembly to create a complete aircraft in the second year). The Air Force also desires authority to enter into a multiyear procurement (MYP) contract, and a reprogramming of fiscal year 2006 funds to execute an economic order quantity (EOQ) purchase prior to MYP authority. This revised strategy is expected to increase program costs at least $930 million more than the program's cost estimate under the fiscal year 2006 plan.[2]

The DOD expects this plan would enable it to purchase four additional aircraft (for a total of 183), and extend the F–22A production line approximately 1 year, to reduce the gap between F–22A and F–35 production. Secretary of the Air Force Michael Wynne has testified to the full committee that "it is not in our Nation's interest to terminate this fifth-generation fighter [the F–22A] until we get access to another fifth-generation fighter [the JSF]." Mr. Wynne's principal concern was that the United States might get into a "hot engagement" without either the F–22A or the Joint Strike Fighter (JSF) in production.[3]

The DOD cannot pursue this new funding strategy without congressional approval. Specifically, for this plan to move forward, DOD needs Congress to: (1) grant it approval to negotiate an MYP contract with Lockheed Martin for the final three production lots, (2) grant it the authority to reprogram funds to make an EOQ purchase in fiscal year 2006, and (3) approve the plan to incrementally fund the last 60 aircraft.

COMPLICATIONS

A number of factors may complicate DOD's ability to secure congressional approval of its "unorthodox plan" for the F–22A. For example, the F–22A program has experienced noteworthy turbulence between the fiscal year 2005 and fiscal year 2007 budget requests. Total program budget, annual budget requests, total inventory, annual procurement rate, and program duration have all changed. These changes may engender closer scrutiny than is customary of the underlying criteria for MYP authority.

Considering the changes to the F–22A program that have occurred, and changes which are being proposed, some may question the Air Force's ability to comply with some provisions of 10 USC 2306b(a), including provision (2) "That the minimum need for the property to be purchased is expected to remain substantially unchanged during the contemplated contract period in terms of production rate, procurement rate, and total quantities." and (3) "That there is a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation."

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[1] USAF Briefing on F–22A New Funding Strategy and Multiyear Procurement. Provided to CRS on March 2, 2006 by SAF LLW.

[2] Fiscal year 2006 and fiscal year 2007 Budget Estimates. Aircraft Procurement Air Force OPR: SAF/FMB. Volume I. U.S. Air Force.

[3] Hearing of the Senate Armed Services Committee on the National Defense Authorization Request for Fiscal Year 2007 and the Future Years Defense Program. March 2, 2006.

A further complication may be a problem with sections of the F–22A's titanium "forward boom frame" (a series of load–bearing structures within the aircraft's fuselage, located between the engine and the wing) which was discovered by the manufacturer in December 2005. 10 USC 2306b(a)(4) requires that "There is a stable design for the property to be acquired and that the technical risks associated with such property are not excessive." Air Force officials say that the cause of the problem has been identified, and is not expected to affect any aircraft built after Lot 5. Air Force officials say that "Neither a redesign nor a retrofit are expected at this time."[4] However, Air Force officials also note this issue is still being evaluated, so making conclusive statements on potential ramifications may be premature.[5] Further, 91 aircraft were potentially affected by this problem. Inspecting these aircraft and taking corrective action, if any, may require substantial time and effort that was previously unforeseen.

Even if this potential flaw is easily resolved, some may raise questions about how this problem was made public. The Air Force briefed committee and other congressional staff on the F–22A's proposed funding strategy on February 22, 2006 and March 13, 2006, but did not mention the potential flaw in either briefing. Yet the potential flaw was discovered in December 2005. Were Air Force leaders unaware of this potential problem in February and March? Or, on the other hand, were Air Force leaders aware of this problem when they briefed congressional staff, and chose not to mention it? If so, this may suggest a lack of disclosure and transparency on the Air Force's part. Questions may remain on whether other problems associated with F–22A manufacture may emerge.

Another complication for the Air Force is the proposed incremental funding of F–22A procurement. Section 8008 of the fiscal year 2006 Defense Appropriations Act (PL 109–148) states that multiyear procurement must be based on "full funding of units to be procured through the contract." Supporting legislation, such as H.R. 4613 (H. Rept. 108–553 of June 18, 2004) make clear that some appropriators find incremental funding to be incompatible with MYP contracts: "the committee directs these requirements be met before future multiyear production contracts can be entered into: (1) Multiyear contracts must follow full funding policies and not be used as vehicles for incrementally funding procurement. . ." Some Members of Congress have already expressed concern over the proposed F–22A funding strategy, and specifically singled out the incremental funding as objectionable.[6]

Air Force leaders are candid about the unorthodoxy of this proposal, and that it may have a difficult time gaining consensus among all parties involved in this decision. Air Force leaders describe this strategy as a "one time opportunity" to save money and to reduce risk.

ISSUES

The issues associated with this proposed funding strategy lend themselves to a simple cost benefit calculation: what are the potential risks, who is taking the risks, who benefits, and how great are the potential benefits? This proposal may present a number of risks regarding the full funding principle and the question of "tying the hands of future Congresses." For example, incremental funding appears to obligate the government to spend money that has not been appropriated. If Congress were to cancel the F–22A program under annual funding it would have a "useable end item." If it were to terminate the F–22A program at the end of a year when the subassembly of an F–22A production lot were completed, then the U.S. Government would take possession of half-completed aircraft. To get any benefit from these incomplete aircraft, the Government would have to spend more money to complete manufacture.

Air Force officials maintain that the chances of the F–22A encountering production problems at this stage are remote. Over 100 aircraft have been manufactured, and the aircraft's design is mature and stable. Further, they argue that "half-finished" aircraft are not useless. They could be broken into piece parts and used to resupply the F–22A fleet. This may be true, but it is likely that a cost penalty would be incurred by acquiring piece parts in this way. The prime contractor is being paid to build an airplane, not supply parts. Presumably, some of the cost of building these "half-finished" aircraft would be to cover assembly line overhead, and workers'

[4] "Bullet Background Paper on F–22A Forward Boom Heat Treatment Issue." March 16, 2006. U.S. Air Force.

[5] Tony Capaccio. "Lockheed F–22A May Have Flaw Forcing Redesign, Rep. Young Says." Bloomberg News Service. March 15, 2006.

[6] Rep. Duncan Hunter. Opening Statement. Hearing of the Senate Armed Services Committee on the Defense Authorization Request for Fiscal Year 2007 and the Future Years Defense Program. March 2, 2006.

salaries, for example. These costs would be absent from parts purchased directly from a supplier.

Another potential risk is that the potential cost savings from the EOQ purchases and MYP contract (if approved) would not suffice to offset "upward cost pressure" caused by the reduced annual rate of F–22A production. Building 20 aircraft per year is appreciably fewer than the most efficient rate of production, which is estimated to be 32 aircraft per year.[7] The Air Force has not yet calculated how great the "upward cost pressure" will be. Again, it may be that the Air Force will require additional funds in the future to execute this proposed funding plan.

Some would see a more general risk in setting this precedent. The Air Force says that this proposed strategy is a "one time opportunity," to reduce risk and to save money. The F–22A production line is drawing to a close, they say, and the Air Force won't ask for such exceptions again. The F–35 JSF program, however, could potentially be delayed further. In that case, and based on the arguments made by DOD in support of this funding strategy, DOD could plausibly return to Congress in years hence and request more money to extend F–22A production to close the widening gap between it and JSF production. If the Air Force were successful in securing its requested waivers from Congress, the other Services may be motivated to seek similar concessions from Congress on their high priority procurement programs. If approved, this funding strategy may be cited by future DOD leaders as a precedent. Congressman Duncan Hunter, stated that the Air Force is "asking us to approve incremental funding for the F–22A, a precedent in and of itself," and that he wished to understand "how we've arrived at this very unusual, precedent setting funding strategy."[8]

The Air Force does not have a history of requesting incremental funding. This may be its first such request. At one point, requesting incremental funding in the Navy was also unusual. Today it has become common. For example after the Navy's LHD–6 program received incremental funding in fiscal year 1993 and fiscal year 1994, the instances of incremental funding in Navy ship building appeared to accelerate. Since the mid-1990s, the LHD–8, LHA–6, CVN–21 and DD(X) programs have either been incrementally funded, or incremental funding has been proposed. As a final example of how the Services cite precedent to justify unorthodox requests, in 2001, Navy officials requested the use of advance appropriations for Navy ship procurement, noting that this funding approach had been used by several Federal agencies other than DOD.[9]

The primary benefit that Air Force leaders say will result from this unorthodox plan is that by adding a 9th production lot to the F–22A program, the assembly line will remain open for a longer period of time. The Air Force says that this will reduce the potential gap between the end of F–22A production and the beginning of F–35 production. DOD believes that, as Air Force Secretary Wynne testified, it is in the Nation's interests to maintain a continuous production of advanced fighter aircraft in case we encounter a "hot engagement."

This rationale may sound reasonable, but questions persist about how beneficial such continuous production may be, and whether these potential benefits merit the potential risks involved. The need for extending the F–22A production line has already been the subject of congressional scrutiny. At a March 1, 2006, hearing of the House Armed Services Committee, Chairman Duncan Hunter asked:

> If there was a need to have a fifth-generation fighter production line open, why was the decision made last year to cut the F–22 production line and then this year reverse that decision and extend the production, in both cases producing about the same number of aircraft, only now for a billion dollars more in program cost?[10]

It is unclear what immediate value keeping the F–22A production line open would have in a crisis. If, for example, the United States found itself unexpectedly drawn into major conflict and a larger inventory of Raptors was desired, it does not appear likely that the manufacturer could rapidly produce additional aircraft in large numbers. Due to the need to appropriate "long-lead" items, such as titanium, and to procure in advance other aircraft components, it takes 3 to 4 years to build a production lot of F–22As from start to finish.[11] Even if large numbers of aircraft were rap-

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[7] Under the previous funding strategy, the Air Force would have funded procurement of 29 aircraft in fiscal year 2007 and 27 aircraft in fiscal year 2008, closer to the more efficient rate of 32 per year.

[8] Rep. Duncan Hunter. Opening Statement. OpCit.

[9] CRS Report RL32776. Navy Ship Procurement: Alternative Funding Approaches. Ronald O'Rourke.

[10] Rep. Duncan Hunter. Opening Statement. OpCit.

[11] Conversation with SAF/LLW. March 14, 2006.

idly produced, pilots for these aircraft, and maintenance personnel would need to be trained and organized. Tools, supplies, and spare parts would likely need to be acquired. How long does DOD envision such a "hot engagement" to last? The most intense and demanding air combat in recent operations has been measured in days and weeks, not in months or years.

If the F–22A production line were to replace lost capability rather than add to fielded capability, it is unclear what scenario DOD envisions that would result in such heavy attrition of the Raptor. The F–22A has been touted as the only aircraft that can operate in the most threatening wartime environments from "day one." Air Force leaders have stated that the F–22A will be the aircraft that will "kick down the door," by eliminating the most challenging threats and thus enable "persistence" forces like the F–35 JSF and "legacy" forces like the F/A–18E/F to operate safely and effectively. If the Air Force is concerned that the F–22A could suffer such extensive attrition in a near-term conflict (circa 2011), that keeping the production line open is a prudent measure, one might ask whether the Air Force has overestimated the Raptor's capabilities.

Air Force leaders assert that they require 381 Raptors not 183. Consequently, keeping the production line open longer does not reflect a lack of confidence on their part. Instead it simply preserves the option of purchasing more aircraft in the future if budgets and circumstances permit, which would reduce the gap between the number of F–22As the Air Force needs, and the number it can currently afford. Although the Air Force has been consistent in recent years in stating its requirement for 381 F–22As, it could also be said that DOD must be satisfied with the currently planned Raptor inventory, or else it would not have cut $10.5 billion from the F–22A budget.

A final question addresses how effective the proposed F–22A funding strategy may be in facilitating the continuous production of DOD's 5th generation fighter aircraft. Under last year's plan, F–22A production would end in December 2010. According to the JSF Joint Program Office (JPO), 21 JSF aircraft are planned for delivery to DOD by that date.[12] These aircraft would enter production in 2008 to make a 2010 delivery.[13] Thus, it appears that under the old F–22A funding strategy, JSF and F–22A production overlapped by 2 years and that there is no break in the production of fifth-generation fighter aircraft.

Under the new F–22A funding strategy, production would end in December 2011. It appears that the only material difference between the old and proposed plans, in terms of overlapping with JSF production, is that 71 F–35s are expected to be delivered by December 2011; 50 more than under the old plan. In terms of schedule, however, the proposed funding plan would bring F–22A production 1 year closer to the Marine Corps' planed JSF initial operational capability (IOC) in March 2012, and the Navy's and Air Force's planned IOC in 2013.

CONCLUSION

Mr. Chairman, this concludes my remarks on the F–22A. Thank you for the opportunity to appear before you and discuss this important issue. I look forward to addressing any questions you or the committee may have.

Senator MCCAIN. Thank you very much.

General Hoffman.

STATEMENT OF LT. GEN. DONALD J. HOFFMAN, USAF, MILITARY DEPUTY, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION

General HOFFMAN. Mr. Chairman, thank you for very much for the opportunity to be here.

I'm the Military Deputy for Acquisition. As you're aware, we do not have an Assistant Secretary of the Air Force for Acquisition, so my boss is Secretary Wynne. The good news is, we now have a confirmed Secretary, and he is very savvy in the acquisition arena. I have great access to him. So, I really do not feel a significant gap with the fact that we are missing an assistant secretary. We look

[12] E-mail from Office of the Secretary of Defense, Legislative Affairs. March 13, 2006.

[13] Technically, production will begin once advance appropriations for long-lead items is obligated. This is expected to occur by the second quarter of 2006.

forward to sharing the workload with him or her, when they do show up. But we do have a good relationship between the military deputy, who is precluded from a lot of statutory acquisition decisions, and the secretary, who now fulfills that role.

For today's hearing on the F–22, I think there are really two issues. One is multiyear, and one is full, versus split, funding.

If you look at the multiyear discussion, I think it boils down to the first question is: does this Nation want to go forward with 60 additional F–22s? The second question is: do we intend to perhaps change our mind in the next 12 or 24 months? So, if you answer yes to the first question and no to the second question, then multiyear funding is the best value for the taxpayers' dollars. We think, with the right negotiating strategies and the right permissions from Congress and from the Office of the Secretary of Defense (OSD), that we can save the taxpayer about $400 to $500 million by doing multiyear versus three distinct lots. So, we look forward to making the case of why we think we've answered the six criteria for when a multiyear is applicable.

The second question is full funding versus split funding. This is really an independent question of whether you're a multiyear or whether you have discrete annual buys. As the Air Force budget went forward to OSD, this was not part of our budget. But as the budget was evolved throughout the discussions of the QDR in the immense budget pressures that occurred in 2007 and 2008 to fund the global war on terrorism, to do hurricane relief, and other budget pressures, the cash flow within the program was examined, and it was determined that there was sufficient cash flow to continue production as we know it, but to get the actual authorization for the money, and appropriation of the money, in subsequent years. Hence, the construct of the split funding evolved. This is not unusual. It's been done before, as some of the witnesses have mentioned, with Navy programs, with Corps of Engineers programs, and with NASA programs. It's really the first time I think any of us can recollect that this has been applied to an Air Force program or an aircraft program.

So, the benefit of incremental funding is it frees up resources for other uses in the near-years and you pay it back in the out-years. This is not unlike what we did about 8 years ago, when all military members were paid on the first of the month, as opposed to the last day of the month. There was immediately billions of dollars of windfall savings for that particular fiscal year. But you can only do that once. Once you step across the line, you have to buy the whole thing back, or you have to continue that split-funding strategy throughout the rest of the life of the program.

But we look forward to explaining both of these topics with you today.

Thank you.

[The prepared statement of General Hoffman follows:]

PREPARED STATEMENT BY LT. GEN. DONALD HOFFMAN, USAF

Mr. Chairman and distinguished members of the committee, thank you for the opportunity to appear before you today to discuss Air Force acquisition and the modernization and recapitalization plan in the fiscal year 2007 President's budget request. Our joint warriors are the best in the world. However, they can only be as effective as the tools we give them. Within today's fiscal constraints, we must fight

the global war on terror and protect the homeland while transforming the force and maintaining an appropriate level of risk. The Air Force is committed to balancing the health of today's force with the modernization and recapitalization necessary for the capabilities of the future. The Air Force appreciates all the support this committee has provided to the warfighter and ongoing operations around the world.

The Air Force has three priorities: winning the war on terror, developing and caring for our airmen, and maintaining, modernizing, and recapitalizing our aircraft and equipment to meet the Nation's requirements. Our Air Force has been at combat for 15 consecutive years—from the initial Operation Desert Shield deployments in 1990 to our ongoing operations in Iraq and Afghanistan. We have learned a great deal from these operations about our capabilities: Global Strike, global intelligence surveillance and reconnaissance (ISR), global mobility, and information operations and cyberspace. Based on our lessons learned, we must adjust our force structure and recapitalize our Air Force to continue to meet our obligations under the U.S. National Security Strategy. We are operating the oldest inventory of aircraft in our history, while maintaining the intense operations tempo (OPTEMPO) required by the global war on terror, humanitarian crises, and routine requirements. As part of the Air Force transformation roadmap, we need to divest some of our older, less capable, and most costly aircraft to free up funding to acquire newer aircraft with greater capability, increased availability, and lower maintenance requirements/costs.

AIRCRAFT

Our primary fighter modernization and recapitalization program is the F–22A Raptor. The F–22A is a 5th generation fighter aircraft that delivers joint air dominance to counter persistent and emerging national security challenges. Given its vast improvements in every aspect—air-to-air, air-to-ground, all-aspect stealth, and an adaptable architecture—the F–22A is an insurance policy against future threats to joint air dominance and represents a best value capability for the American taxpayer. The F–22A is the only fighter in production that will defeat evolving threats to joint air dominance in anti-access environments over the next 20–30 years. The F–22A is flying today and is in full rate production with 63 aircraft delivered and 44 in production. Its performance continues to meet or exceed key performance parameters and spiral modernization will further enhance its air-to-air and air-to-ground target engagement capability.

In the fiscal year 2007 President's budget (PB), $1.05 billion was added to the Future Year Defense Plan (FYDP) for a total of 183 aircraft. To reduce unit cost, the PB requests multiyear procurement authority from Congress to procure the next 60 aircraft (Lots 7–9) and requests economic order quantity funding of $200 million to achieve the projected Lot 8 and 9 savings. In addition to procuring more F–22s, the multiyear procurement strategy will extend the production to fiscal year 2012 and allow the Department to keep this fifth-generation fighter line "hot" in the event there are delays to the Joint Strike Fighter (JSF) program.

The F–35 JSF, also a fifth-generation fighter aircraft, will complement the tremendous capabilities of the F–22A. The JSF will recapitalize combat capabilities currently provided by the F–16 and A–10. Optimized for all-weather performance, JSF will provide affordable precision engagement. The JSF program will develop and produce a family of affordable, stealthy, multi-role strike fighter aircraft meeting the operational needs of the U.S. Air Force, U.S. Navy, U.S. Marine Corps, and allies.

The fiscal year 2007 PB recommends termination of the F136 engine development program to provide cost savings of $1.8 billion through fiscal year 2011. The Department concluded a single engine supplier provides the best balance of risk and cost based upon recent experience with engine development for the F–22 and F/A–18E/F which indicates sole-source risks were modest and acceptable. The Pratt and Whitney F135 engine continues to meet or exceed stringent JSF performance requirements.

The C–17 continues to be a success story for the joint warfighter, deploying troops and cargo to Iraq and Afghanistan, as well as numerous locations around the world. The Air Force is on schedule for delivery of the next 40 aircraft through 2008—for a total of 180. During the past year, C–17s flew over 63,000 sorties, bringing the total number of Operation Enduring Freedom and Operation Iraqi Freedom missions to over 109,000. Additionally, the C–17 flew over 100 humanitarian and disaster relief missions following Hurricanes Katrina and Rita, as well as the October 2005 earthquake in Pakistan. Since September 11, 2001, C–17s have over flown projected service life hours by 30 percent (approximately 190,000 hours). The C–17, in concert with C–5 modernization programs, is critical to meeting our U.S. intertheater airlift requirements.

The C–5 fleet is a strategic airlift force multiplier as it enables the C–17 to exploit its unique multi-role mission. Born in the 1960s, our 112 C–5s have served us well; however, the size and complexity of the aircraft have always been a challenge to maintainers. The typical C–5 mission capable rate is around 55 percent. To improve the rate, the Air Force plans a two-phase technical refresh, the first is the C–5 Avionics Modernization Program. This program will replace legacy equipment with a glass cockpit and updated avionics that allow navigation through increasingly restrictive airspace as well as modern communications to allow connectivity with the global grid. We are installing this modification now and will complete operational testing next year. The second phase is the C–5 Reliability Enhancement and Re-engining Program. This program will improve reliability by replacing over 70 high failure items, to include the engines. With these two efforts combined, we expect to raise our wartime mission capable rate to at least 75 percent and lower our operating cost significantly, allowing our C–5 fleet to continue service for decades to come.

Today, the current KC–135 fleet of 531 aircraft has an average age of 45 years. The KC–135 was developed during the Eisenhower era with the primary purpose of refueling the B–52 in support of the Single Integrated Operations Plan. The KC–135 role expanded during the Vietnam War to support tactical combat and combat support missions. Now, in the post-Cold War and global war on terror environment, the KC–135 serves as a critical joint force enabler . . . it is key to this Nation's ability to project joint power globally. The aircraft's primary role still supports tactical combat and combat support missions; however, the environment in which it operates and the extent of its mission has changed dramatically with the evolution of technology, both that of our enemies and ours. This change calls for a tanker with greater capabilities.

The tanker replacement program and fiscal year 2007 budget request were based on a notional contract award in fiscal year 2007 with first delivery in fiscal year 2010. This program builds upon fiscal year 2005 and fiscal year 2006 legislation regarding tanker replacement and the stated congressional intent to procure 100 aircraft within 10 years. Presently, the Air Force tanker recapitalization efforts are on pause until the Under Secretary of Defense for Acquisition Technology and Logistics (USD (AT&L)) provides the Air Force direction to resume. When we receive this direction, we will work with the USD (AT&L) to develop the appropriate acquisition strategy and timing. This acquisition strategy will take into account the warfighters' requirements, the recent KC–135 Recapitalization Analysis of Alternatives, the Mobility Capability Study, affordability concerns, and the material condition of the KC–135 fleet. We recognize the funding profile will then need to be refined to reflect this strategy, particularly in light of the current program pause. We remain dedicated to ensuring our warfighters, both present and future, continue to have this critical capability.

To meet continuing intratheater airlift demands, we have a two-pronged approach to modernize our C–130s. First, we are striving to replace our oldest aircraft with new C–130Js. Second, the remaining C–130s are being standardized and modernized via the C–130 Avionics Modernization Program and center-wing box replacement programs. C–130s have been the workhorse for intratheater airlift during numerous contingencies. The new C–130Js have supported global war on terror and humanitarian operations since December 2004 and have proven to be a force enhancer as they deliver more cargo in a shorter time than older C–130s. C–130 modernization, coupled with the wing-box modification, reduces operation and sustainment costs and improves combat capability.

The third strategy for intratheater airlift is direction from the Office of the Secretary of Defense to establish an Army/Air Force Joint Program Office (JPO) for a future cargo aircraft and light cargo aircraft to meet the intratheater airlift capability to reach remote areas with small, unimproved runways. The Air Force is working with the Army to ensure a joint strategy for this program which is now called the Joint Cargo Aircraft (JCA). The Army and Air Force are also developing a memorandum of agreement for the JCA program.

From our heritage to horizon, the Air Force understands that the challenges of the 21st century must be met by continued exploitation of our Nation's technological leadership and by the ability to respond quickly to the demands of a rapidly changing world. Our goal is to field today's technology today, not yesterday's technology tomorrow. Air Force Smart Operations 21 (AFSO 21) will enact process re-engineering throughout the Air Force. Use of commercially-proven methodologies such as Lean, Six Sigma, Continuous Process Improvement and business process re-engineering can yield not only savings for our tight modernization budgets, but also reduce cycle time and provide a better product for the warfighter. The acquisition and sustainment communities have been actively pursuing process change over the past

2 years while emphasizing a "back to the basics" approach in how we do acquisition. We are developing and prototyping flexible management methodologies to more effectively allocate resources and oversight across the acquisition domain. Additionally, there are ongoing efforts to recruit, develop, and retain the right mix of military, civilian, and support contractors with the right skill sets to get the job done. Given that the acquisition community will continue to operate in an environment of constrained resources and high operational activity, we are refining our processes to be more responsive to warfighter needs and operate more efficiently. Our intent is to bring back stability and credibility to our recapitalization and modernization efforts.

Again, I appreciate the support provided by Congress and look forward to working with this committee to best satisfy our warfighter needs in the future.

Senator MCCAIN. Thank you very much, General.

General Hoffman, current law requires that you enter into a multiyear procurement contract, only if doing so results in a substantial savings, right?

General HOFFMAN. Yes, sir.

Senator MCCAIN. Has the Air Force completed a business-case analysis (BCA) yet?

General HOFFMAN. Sir, we are using Institute of Defense Analyses (IDA) to do an independent assessment of the BCA. They have promised their results in May—I think we'll have an earlier peek at those results in April—to make that business case for what we think will be about 5 percent, plus or minus a percent, of savings.

Senator MCCAIN. Mr. Sullivan, have you ever heard of incremental funding for a weapons system such as this?

Mr. SULLIVAN. Only to the extent that I've heard about it in some of the Navy shipbuilding where they've done split funding and things like that. Ships under construction take longer. I don't believe I've ever heard of any multiyear procurement funding that was incrementally funded on any aircraft program. I know that, for example, the F–18 is a multiyear procurement for the procurement of the Es and Fs, and that was fully funded.

Senator MCCAIN. General Hoffman, I am obviously concerned about this precedent-setting kind of proposal, particularly in light of the cost increases and the technical difficulties associated with this new weapons system. I understand that, given the enhanced capabilities and new technologies, that some of that is, historically, probably not precedented. But now you're asking us to approve a proposal that is not in keeping with any standard procedures that we have followed in the past. Are you asking us to proceed on a basis of trust?

General HOFFMAN. Sir, I think we have a good-news story to say in the F–22 program on cost, and when we talk about production cost, it's a firm, fixed-price, negotiated contract. Over the last three lots, we have reduced the flyaway cost of the aircraft by 16 percent, 11 percent, and 14 percent, I believe are the numbers. So, lot by lot by lot, we are negotiating continually lower costs in the cost of the platform.

We think the manufacturing base is stable, and we're ready to move forward to a multiyear construct to reap additional savings.

Now, those cost savings that I described there were with a production rate of around 23 or 24 aircraft per year. As we reduce that rate to 20, obviously costs go up. So, anytime you perturbate one variable in the equation, you perturbate other variables, as well. So, in the multiyear we're talking about 20, 20, 20. I'm not talking

about trying to negotiate a lower cost per aircraft, but we're going to cost avoid the impact of that spike by lowering the production rate.

Senator MCCAIN. So, the cost has gone down, but, now that we're lowering the number of aircraft to be procured, the cost is going up.

General HOFFMAN. Yes, sir. Multiyear will allow us to have it go up less than if we did not have multiyear.

Senator MCCAIN. Mr. Sullivan?

Mr. SULLIVAN. Yes, one of the things that we looked at when we saw the proposal as it is now—and I know that their proposal isn't complete, and it will be completed in May, so we haven't seen the final—but if you compare it to what was in the fiscal year 2006 President's budget, where they were going to buy 4 fewer aircraft, but the funding for the 56 they were going to buy, that was going to be $166 million per aircraft. Under this new multiyear procurement plan for the final 60 aircraft, the unit cost would actually be $179 million, so it goes up by about 8 percent.

Now, in the final analysis, that's because, I think what's really happening here is, they're trying to extend the program for 2 years in order to keep the production line hot for the fifth-generation fighters, and then probably the question is, is that really what needs to be done? But the multiyear procurement is not, by any means, going to reduce costs from what the President's budget was a year ago. In some of the plans that they're working on now, the more optimistic scenarios, it shows only a 5-percent reduction. So, I think that's questionable.

Senator MCCAIN. Mr. Marron? On this issue.

Mr. MARRON. We've seen just the numbers that we got to see yesterday—some of the preliminary figures that have been provided. Obviously, we haven't seen the full BCA yet. It seems that there may be some benefits from doing multiyear procurement. There may be some cost reduction that flows from that. But, again, as hinted, the figures seem to be somewhere in the 5-percent-of-the-total-contract-cost range.

Senator MCCAIN. General Hoffman, isn't it putting the cart before the horse to request this before you've done a BCA?

General HOFFMAN. Sir, we could get all our ducks in a row and do the BCA, answer all the stability and other questions here, and come back next year for a 2-year multiyear, but then you don't have the cost avoidance. So, the sooner you do a multi——

Senator MCCAIN. But how do you know that there's cost avoidance if you haven't done an analysis?

General HOFFMAN. We are going to do that. That's what IDA is doing.

Senator MCCAIN. But how could you decide it before you've done the analysis? You say you are doing it, but you haven't done it.

General HOFFMAN. We don't have the results of it yet, sir, but we do have a rough analysis that shows there are potential savings—we think, in the order of 5 percent—by doing a multiyear versus three discrete, separate buys.

Senator MCCAIN. The reason why we have the requirement for analysis is so that we do an analysis, not because we have a rough analysis. But we require an analysis, and that's by law. It's interesting that OMB Circular A–11 states very clearly, "Good budg-

eting requires that appropriations for the full cost of asset acquisition be enacted in advance to help ensure that all costs and benefits are fully taken into account at the time decisions are made to provide resources. Full funding with regular appropriations in the budget year also leads to tradeoffs within the budget year with spending for other capital assets and with spending for purposes other than capital assets," which brings to mind we obviously need a new tanker—all of us agree with that—for the Air Force. Some tradeoffs are going to have to be made at some time. So, if we lock in this program, where do we get the money for the new tanker?

General HOFFMAN. Mr. Chairman, we've already done, I think, the bow-wave adjustments for all the programs—CSAR–X and many of the other high-ticket items that are in our out-years there—Joint Cargo Aircraft and so forth. We included the appropriate growth wedges in the Future Years Defense Plan (FYDP). Especially on the even years, which would be 2006 and 2008 are where we level that across. In the odd years, a little bit of broken glass, perhaps, accumulates, because the ground rules for doing the odd-year one is, we don't submit new initiatives, and we don't do anything other than fix what has to be fixed in that particular year. These are the OSD rules for the 2-year budgeting cycle that we're on. Then, in the even years, we go out there and make sure that the FYDP is properly balanced and, beyond the FYDP, does not have a growth spike out there that is not digestable by what we have as our projected share of the total obligation authority. So, we think our game plan for F–22, JSF, future tanker replacement, and so forth is disgestable within our share of the Total Obligation Authority (TOA).

Senator MCCAIN. I thank the witnesses.

Senator Chambliss.

Senator CHAMBLISS [presiding]. Thank you, Mr. Chairman.

Mr. Bolkcom, you said that this is unusual, there's no precedent for the Air Force requesting incremental funding. But you would agree, as Mr. Sullivan said, this is quite common in the Navy, in the purchase of weapons of systems, is that correct?

Mr. BOLKCOM. I agree that it is common in shipbuilding, Senator.

Senator CHAMBLISS. Okay. So, this is not some new animal that we are setting sail on here with respect to this.

General Hoffman, some of your F–22A critics regarding incremental funding approach have compared what the Air Force is trying to do with F–22A funding this year to what the Air Force attempted to do with C–17 in 2003. I understand there are some important differences in those cases. Would you care to explain why the F–22A funding is not the same as C–17 proposal years ago?

General HOFFMAN. Yes, Senator.

I think—and I was not around during the C–17 timeframe—but my understanding of what happened there is that we had, in the advanced procurement, excessive amounts of what is traditionally used for advanced procurement. So, there was money in excess of what was needed just for the long-lead items. In addition, the contractor, through efficiencies on the production line and all that, got ahead of his production schedules. The combinations of those events allowed us to start actually getting into aircraft assembly

prior to the authorization for aircraft assembly by Congress. So, we basically outran our permissions with the available funding. We had the money, but we outran our permissions. So, that's the simplistic view I have, as I understand the situation back then.

With the F–22, we're going into this with eyes wide open right from the front, with the dialogue to say, "here's what our intentions are with the money, year-by-year." We have established, and will negotiate with the contractor, very specific control mechanisms that do not allow him to outrun the permissions that have been established by Congress.

Senator CHAMBLISS. Anybody else care to comment on that C–17 comparison?

Mr. BOLKCOM. Sir, I would just offer that, in their own words, the Air Force says, "This is an unorthodox program," whether it's like the C–17 or not. It is unusual. It is contrary to the way they normally do business.

My research led me to believe that the onus is really on the Air Force to present an ironclad case, a really compelling case, for why these risks are justified, what potential benefits we're going to get.

Mr. MARRON. I'd just like to second that——

Senator CHAMBLISS. Sure.

Mr. MARRON.—and to say that, at some level, this is a burden-of-proof argument, in that the default position is that full funding is the way these types of assets ought to be acquired. It's required by law that if you do multiyear procurement, you can't do incremental funding. So, presumably there's a fairly high burden to explain why, in this case, we would deviate.

Senator CHAMBLISS. Part of the argument, as I understand it, is that you get to the end of the road on the current schedule, with the procurement of the F–22, and there's the potential you don't have anything else out there. We're in the middle of a war and we have to have a weapon system that does what the F–22 does, and potentially does what the JSF does. So, I'm inclined to think they've made a pretty good case for that assuming your argument's true.

General HOFFMAN. Senator, if I could, we don't view multiyears as unorthodox at all. That's standard practice for any long-term production run. What is unusual this year is split funding. That is unusual. It's brought about by the need for near-year funding for the DOD that needed, in the numbers of billions of dollars, to pay other bills this year. The F–22 was the program they looked to, because they had those amounts of money, and they could, without perturbating the production flow, harvest those amounts of money and pay them back in later years. Had there been other programs of that magnitude and at that stage of their production maturity, I believe the DOD would have looked at a couple of other programs, as well.

Senator CHAMBLISS. Mr. Bolkcom, Mr. Sullivan, and Mr. Marron, I heard what General Hoffman said, relative to the fact that with a multiyear we're not going to necessarily save any money, but we're going to keep the costs from increasing. I believe you said there's a possibility of some savings. Would you all care to comment on that? Because normally when we think of doing a

multiyear, there are, in some cases, significant savings. Any comment you all have, relative to that?

Mr. SULLIVAN. I would say that when we're looking at this program, this program is at the end of its production run. In fact, in last year's budget, it was to terminate production in 2008. So, it's not a multiyear procurement that's happening near or at the beginning of production where they can really ramp up and get some of those efficiencies. So, in that regard, this is a little different animal.

What we did is—I'll go back to what I said earlier to Senator McCain—we looked at where the program was before they introduced the idea of multiyear procurement, and found that they added a billion dollars to the budget in order to carry out the 3 years of 20 aircraft each under multiyear procurement. So, we see, really, no savings in going in that direction.

In addition to that, I think now that Congress is going to receive a package to have to deliberate over, that justifies multiyear procurement a lot sooner than it was going to in the past, I think that's due in May, and you'll have to deliberate over that quickly, I think, in order for them to pull this off. So, along with the other issues that come up that Mr. Marron discussed, things like tying future Congress' hands, those are issues that concern us.

Senator CHAMBLISS. Yes.

Mr. BOLKCOM. Is 5 percent significant? General Hoffman says he believes the IDA analysis would show that the multiyear procurement will give us about a 5-percent savings. The last time this statute included any hard numbers, it said the requirement was for 10 percent. That's been changed, and the statute says "significant savings." I guess it really depends on if 5 percent is your idea of significant.

General HOFFMAN. It's all a matter of scope, 5 percent of this program is still $400 to $500 million. So, if we don't consider that significant, we don't need to be talking about multiyear.

Senator CHAMBLISS. Buys a lot of body armor.

Mr. Marron, in your written statement you criticized the Air Force and the DOD for not requesting appropriations sufficient to cover a potential cancellation liability relative to F–22A multiyear procurement program. However, later in your statement you mentioned that, in fact, DOD has taken a similar approach regarding budgeting for cancellation liability for many other multiyear contracts. The fact that DOD does this often doesn't necessarily make it right, but it does help us see this issue in a different light.

Mr. Marron and General Hoffman, I'd appreciate your thoughts and comments on this particular issue.

Mr. MARRON. Certainly. It's definitely important to distinguish the incremental funding issue inside a multiyear procurement, which is a unique special case, from the nonfunding of the cancellation liability, which, as you point out, is increasingly commonplace among military acquisitions.

On the civilian side, cancellation liabilities are funded upfront. There is still full funding. Not so much, in practice, on the military side.

From a perfect budgeting point of view, that's problematic. It would be preferable to fully fund all the potential costs up front.

If you don't fund the cancellation liability, there is a chance that you find yourself, at the end of the year, wanting to cancel the program, and not having the resources allocated to do so, and there will be the need to come back to Congress to get additional appropriations, or you'd have to find somewhere else to cut.

So, that is a challenge from the budget process point of view, but I agree with you, it is a less-unique, less-new issue than we have with incremental funding.

Senator CHAMBLISS. General Hoffman.

General HOFFMAN. Senator, I'd like to be a little more precise, perhaps, in the terms here. We use the term "termination liability," and that's a liability that's carried on many programs in case the Government terminates the program before all the funding has transpired. In that case, we'd tell the contractor, "Stop doing what you're doing," but we'd still owe them for what they've already done. So, termination liability covers that, and that's carried within the program. As you fully execute a program, that dwindles down, then, because you'd have less and less that is unfunded. You've covered your hedge, if you will.

The other term is "cancellation ceiling," and that applies only to multiyear contracts. With OSD's permission, that can be carried. That contingent liability for us changing our mind for future years' business can be carried outside the program, with OSD permission.

So, I think we're blending terms here. There's termination liability and there's cancellation ceiling, and the two are independent of each other.

Senator CHAMBLISS. Mr. Marron, in your written statement, you comment that, although the Air Force indicates that it may be able to pay cancellation costs from funds appropriated for the F–22A procurement, combining multiyear procurement and incremental funding makes that unlikely. I believe that what the Air Force has said is that they will be able to cover any termination liability with F–22 funding.

It may sound like I'm mincing words, but "cancellation liability" or "cancellation ceiling" that we just referred to is not the same thing as "termination liability."

My previous question illustrated that, perhaps with most multiyear contracts DOD does not fully budget for cancellation costs. General Hoffman, in this case, the Air Force does plan to cover any termination costs within the current funding for——

General HOFFMAN. Termination liability will be covered within the program. We have enough for 2007. It will be covered by 2008 program objective memorandum (POM) submission to continue to cover that in the future years from within the program.

Senator CHAMBLISS. Okay, and the point is that you never want to get to the point in the program where you're using a line of credit to pay for things.

Mr. Bolkcom, you discussed the justification for the F–22A multiyear contract in your written statement and raised a few concerns relative to consistency in the budget request for the F–22A, as well as issues related to the forward-aft boom. Regarding your first concern, I believe the QDR sustained the requirement for continued F–22A production and funding through at least 2010, and program budget decision (PBD) 720 enacts this plan in the fiscal

year 2007 President's budget. Regarding your second issue, DOD recognized the maturity of F–22A production processes a year ago, in April 2005, when they approved the program for full-rate production.

I know that some have claimed that this forward boom titanium heat-treating issue indicates a design stability problem. Rather, all the facts we have on this situation indicate that the design is completely stable, and instead, this is an issue of a contractor, which the prime contractor is no longer using, by the way, not following the stated design, rather than there being a problem with the design.

Now, it is clear that this is not a structural-integrity or safety-of-flight issue. Does anybody have any disagreement with that or wish to comment on that?

Mr. BOLKCOM. If I may, sir, thank you for your question.

Senator CHAMBLISS. Sure.

Mr. BOLKCOM. The point I was trying to convey in the first point is that this plan is quite a turnabout from what we saw just last year. PBD 753 cut $10 billion from the program. So, I guess you could argue it either way. But I do see some recent changes in the direction of the program.

On the second point, I would not argue that it is a design stability issue. I think many things suggest the design is stable. My point is, it's premature to say what it is or what it isn't, because the Air Force itself has said, "We're still evaluating this problem." In fact, they do have to inspect a number of airplanes, some of which will require invasive evaluations.

So, my point is that it's a little premature to say what it is and what it isn't.

Senator CHAMBLISS. General Hoffman.

General HOFFMAN. Senator, on the requirements side, I think we do have stable requirements. On the funding streams, I think we have been all over the map here, as we've seen in PBD 753 and the cuts to it, and the increases we have this year. So there's a difference here between whether the requirements are going up and down, or whether the funding to support those requirements are going up and down. I will acknowledge that our support of the program has gone up and down, but I don't think the requirements have.

As far as the boom, this gets confusing. When you hear a "boom," people don't know what we're talking about. I think we do have some pictures here. I think we may have some to pass out. But this is the article we're talking about, right here. These two lugs, right here, are the part of the article that's in question. When this is put in a furnace to heat treat it, the heat treating is designed to rearrange the molecular structure of the metal to make it more resistant to crack propagation. Whether a crack forms in the first place or not, and whether being heat treated or not heat treated properly has any impact on the initiation of a crack, we don't know. The logic is that if you heat treat it, it'll prevent the propagation of a crack. When these irons are put in an oven, they're brought up to the proper temperature and stuff, but as this form was placed in the oven, it was held in place by some supports, and so the heat didn't propagate properly into that portion of the forging.

Just like in the old days of TV dinners, when you left the tin foil on a certain part, and you peel the back on a different part, you get different heating properties in your dinner. The same thing happened here, and the heat didn't get all the way into this part. Now, whether or not that has an effect on the long-term sustainment of the aircraft, we don't know. We have some engineering studies going on right now. We don't believe it's a safety issue. We have not restricted the aircraft in any way. They're out there flying right now and as we open these aircraft up for other maintenance activities that we'd have to go into this area, because the wings have to come off to get into this particular area, over time, we'll continue to study and monitor any issues that may occur with this.

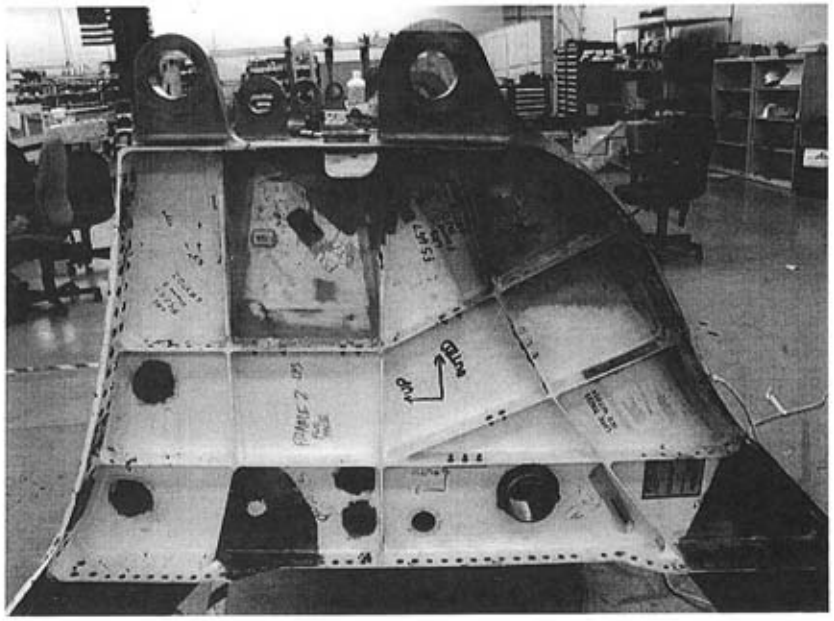
But right now we believe this certainly is not a stability of manufacturing or a design flaw. It's perhaps an application of a standard to a particular subvendor.

Senator CHAMBLISS. Let's include this, "Frame 2, lower lug bore, four sheets" here to the record.

[The information referred to follows:]

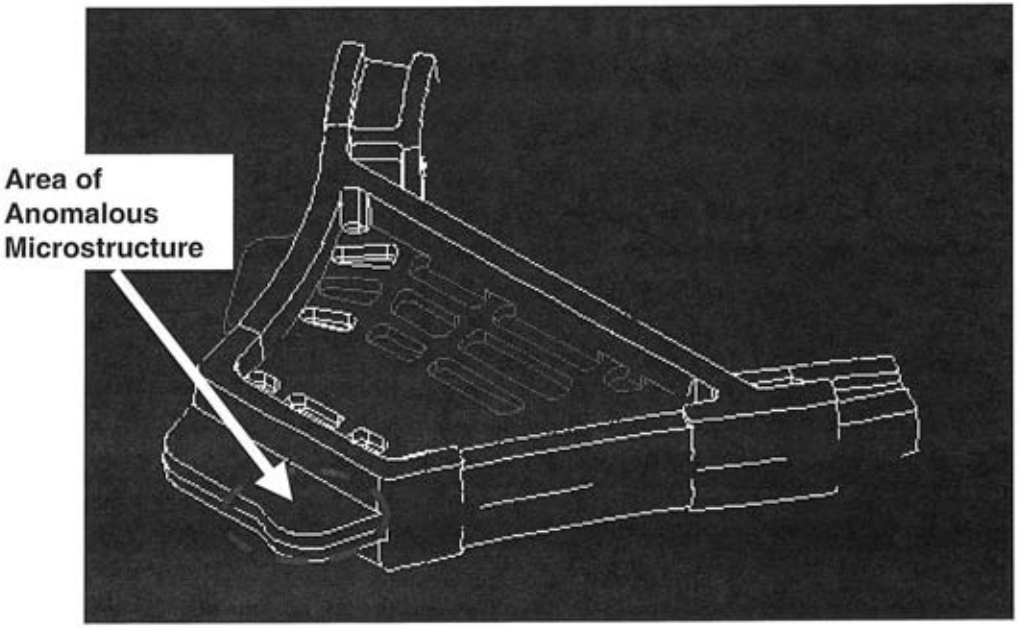
Frame 2, Lower Lug Bore

First Look, First Shot, First Kill!



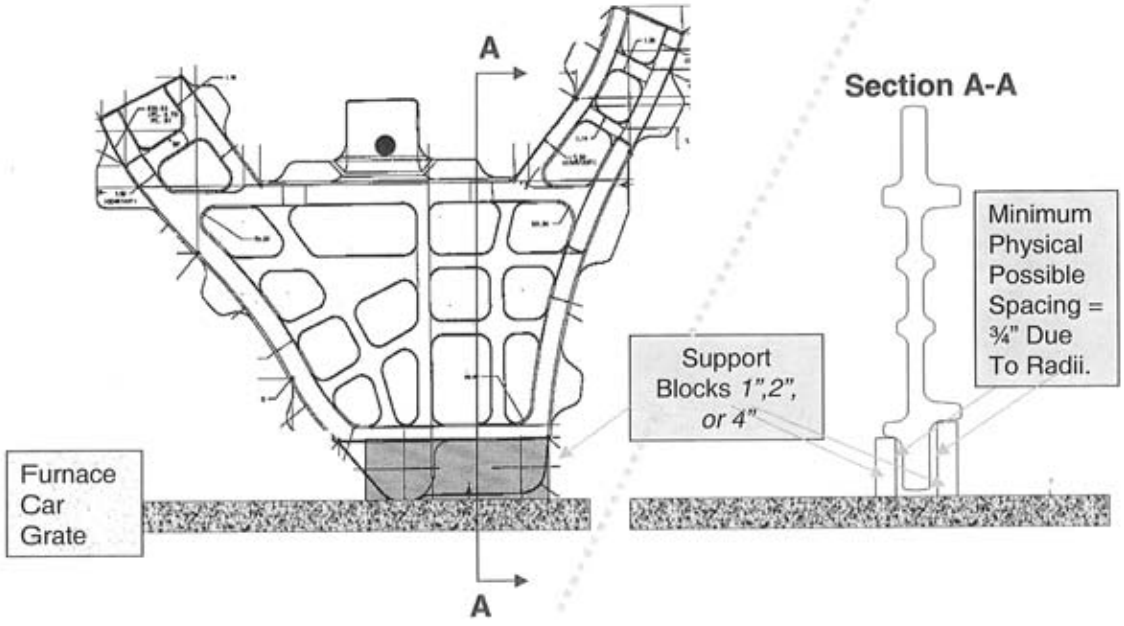
Frame 2, Lower Lug Bore

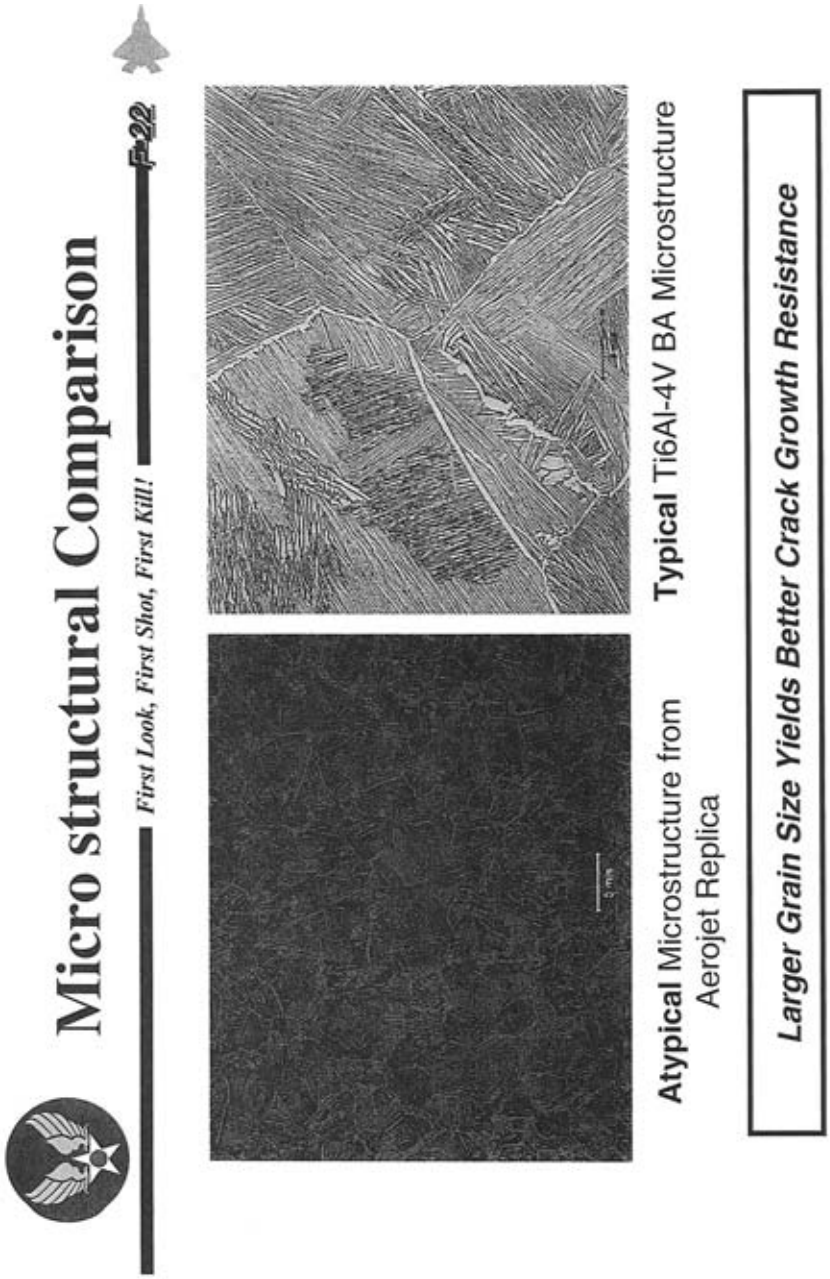
First Look, First Shot, First Kill! F-22



Frame 2, Lower Lug Bore

First Look, First Shot, First Kill! F-22





Senator CHAMBLISS. General Hoffman, the criteria for a multiyear contract are pretty clear and relate to having a stable requirement, configuration, and funding; realistic cost estimates; preserving the defense industrial base; and saving money. Another

perhaps more subjective argument that Secretary Rumsfeld made in the QDR dealt with preserving a fifth-generation fighter production line until the next fifth-generation fighter is in stable production. None of us know exactly what's going to happen with the JSF program, but it is certainly not going to begin delivering any earlier than currently planned, which, at this point, is 2010.

I'm a big supporter of the JSF, but, to me, keeping the F–22A line open at least until JSF production is mature and stable makes sense and adds some additional rationale for an F–22A multiyear, which the formal multiyear criteria does not necessarily capture. Would you care to comment on that?

General HOFFMAN. I think that argument lends itself to continuing production of the F–22. Whether we do it multiyear or in three or more discrete buys, I think, is independent of the argument about the industrial base and preserving our fifth-generation fighter capability. We could do this year by year by year and achieve those same objectives. There's more stability to the workforce, and there's potential savings to the taxpayers if we go the multiyear route.

Senator CHAMBLISS. Okay, gentlemen, thank you all very much. I appreciate your being here.

We'll ask our second panel to come forward, which I believe is a couple of gentlemen we already have sitting here, Mr. Sullivan and Mr. Bolkcom. We would also ask Rear Admiral Thomas Kilcline and Rear Admiral Steven Enewold.

Okay, gentlemen. Now that we've solved all the problems with the Air Force's tactical air (TACAIR) issues, we'll move to the Navy's TACAIR issues. We'll start with again Mr. Sullivan, if you kick off any opening statement relative to Navy TACAIR, we'll be glad to hear from you.

Mr. SULLIVAN. The opening statement I made at the beginning of the first panel consumed what I would say on JSF.

Senator CHAMBLISS. All right. Mr. Bolkcom, anything additional from you?

Mr. BOLKCOM. Yes, Senator Chambliss. I have a brief statement.

Senator CHAMBLISS. Sure.

Mr. BOLKCOM. Thank you for inviting me to stay for the second panel and discuss the F136 alternate engine program. As requested, my testimony will address the program and the analysis recommending its termination.

Again, I request that my more complete written statement be included in the record.

Senator CHAMBLISS. Without objection.

Mr. BOLKCOM. Thank you.

DOD's fiscal year 2007 budget request proposes to cancel the F136 engine, a program initiated by, and consistently supported by, Congress. The reason given for this decision is that it would save $1.8 billion and entail little operational risk. However, Air Force leaders such as Michael Wynne have expressed concern over potential industrial-base problems resulting from this termination. Also, by terminating the F136, DOD may lose an effective tool for promoting accountability and cost control in the acquisition process.

Deputy Secretary of Defense England has written and testified that, "the Department's analysis concluded that a second engine

source would not yield program cost savings." However, it appears that DOD's cost analysis is incomplete and makes a number of assumptions that are open to debate. For example, DOD appears to amortize F136 costs over a production run of only 3,000 engines, rather than the approximately 8,500 engines current JSF partners will require. Further, the DOD analysis does not consider the potential savings from competition during the operation and support of these engines over the JSF's 20- to 30-year life. When these variables are included, projections of cost savings appear to easily pay for the cost of a second JSF engine.

DOD argues that canceling the alternate engine would incur little operational risk. Again, DOD's analysis appears to be incomplete and to contain a number of assertions that are open to debate.

First, DOD notes that the JSF's primary engine, the F135, and its predecessor, the F119, are operating well, and that the F119 has successfully amassed 18,000 test-flight hours. These facts, however, do not guarantee that future problems will not emerge. Engines that have accumulated millions of operating hours still have required upgrades and modifications to address performance and reliability issues.

Second, the DOD analysis does not appear to consider a number of factors that will increase risk or the consequences of relying on a sole JSF engine type. For example, the JSF will be a single-engine aircraft, unlike the twin engine F–22 and F/A–18. Also, one of the JSF variants will field a complex and new type of short take-off, vertical landing (STOVL) engine.

Finally, unlike past experience, the JSF will be DOD's only fighter aircraft. If the JSF engine develops a problem, no similar aircraft will exist to satisfy the mission.

Some are concerned that terminating the F136 will lead to a weakening of the fighter aircraft engine industrial base. A definitive response to this concern is elusive, but, arguably, the longer the F135 exists as the sole JSF engine, the more difficult it would be for others to enter a competition.

Another industrial issue is whether terminating the F136 might hurt JSF export. Pratt & Whitney and General Electric (GE) currently compete against each other to supply engines for foreign sales of F–15s and F–16s. This competition makes the aircraft attractive to potential buyers. Some fear that if the JSF can only offer a single engine type, sales may not live up to expectations.

A final issue about terminating the F136 is that, by doing so, DOD may weaken its leverage over industry in the acquisition process. The last time they succeeded in fostering an alternate engine, Air Force leaders say that the resulting competition conferred benefits that today's acquisition officials would have a difficult time replicating. These benefits included fixed-price contracts from the very first production lot, engine improvements well in advance of what had been promised prior to the competition, and dual sources and separate prices for critical parts that allowed the Government to reprocure spare parts from sources other than the prime contractors.

Mr. Chairman, Senator Chambliss, this concludes my remarks on the F136. Thank you for the opportunity to appear before you.

[The prepared statement of Mr. Bolkcom follows:]

PREPARED STATEMENT BY CHRISTOPHER BOLKCOM

CANCELLATION OF F136 ALTERNATE ENGINE FOR F–35 JOINT STRIKE FIGHTER

Mr. Chairman, distinguished members of the subcommittee, thank you for inviting me to speak to you today about the F136 Alternative Engine Program. As you requested, my testimony will address the F136 program and the Air Force's analysis and conclusions recommending its termination.

Introduction

The Department of Defense's (DOD) fiscal year 2007 budget proposes to cancel the F136 alternate engine for the F–35 Joint Strike Fighter (JSF), a program which was initiated by Congress in the National Defense Authorization Act for Fiscal Year 1996, and which has received consistent congressional support since its inception. The reason cited for this proposed cancellation was that it would save $1.8 billion over the Future Years Defense Plan (FYDP), yet entail little operational risk.

Some DOD leaders, however, have expressed mixed feelings about this decision. On February 16, 2006 Secretary of Defense Rumsfeld testified that the merits of terminating the F136 were "clearly debatable."[14] On March 1, 2006, Air Force Secretary Michael Wynne testified that he was worried about the "downstream effects" of this decision.[15] These statements may suggest that there is a lack of consensus within DOD regarding this course of action, or it may simply presage the congressional scrutiny to follow.

Background

In fiscal year 1996, defense authorization conferees (H. Rept. 104–450, Sec. 213) expressed their concern over a lack of engine competition in the JSF program and directed DOD to ensure that the program "provides for adequate engine competition." (p.706)[16] In fiscal year 1998, authorization conferees (H. Rept. 105–340, Sec. 213) directed DOD to certify that "the Joint Strike Fighter Program contains sufficient funding to carry out an alternate engine development program that includes flight qualification of an alternate engine in a joint strike fighter airframe." (p.33)

Congress' interest in establishing and funding an alternate engine to the JSF's primary engine—the Pratt & Whitney (PW) F135—may have been informed by what has become known as "The Great Engine War" that ran from 1984 to 1994. The Great Engine War describes the competition between PW and General Electric (GE) to produce engines (the F100 and F110 respectively) to power the Air Force's F–16 Falcon and F–15 Eagle fighter aircraft. This competition was held annually between 1984 and 1994 to produce and maintain these engines for the Air Force. After 1994, PW and GE continued to compete for engine business among foreign air forces that operated the F–16 and F–15. At the time, this acquisition strategy was unprecedented, and controversial. Many extolled the advantages of competition and the benefits it conferred to DOD and the taxpayer.

The Great Engine War's roots extend well before 1984. Most observers credit Congress with initiating this competition by providing funds in fiscal year 1976 and fiscal year 1979 to develop a new engine that might serve to power the Navy's F–14 Tomcat, or the Air Force's F–15 and F–16. Ultimately, DOD spent over $376 million to develop the F110 to compete with the F100, and $600 million to improve the F100's durability and reliability to make it a stronger competitor. Proponents believe that the annual competition during the Great Engine War produced better engines, on better terms, for less money than would purchasing from a single company facing no competition. Recently, contrary opinions have emerged, and critics say that "There is no evidence that the F–16 engine competition saved money."[17]

Some have criticized DOD as being "penny wise and pound foolish" in its proposal to terminate the F136. Critics argue that this decision appears driven more by immediate budget pressures on the department rather than long term pros and cons of the F136 program. For example, Secretary of the Air Force Michael Wynne reportedly said that the idea of cancelling the F136 "came up during the Quadrennial Defense Review (QDR), in the course of attempts to identify ways to save costs at

[14] Michael Bruno. "House defense appropriators push back on JSF engine." Aerospace Daily & Defense Report. February 17, 2006.

[15] CONGRESSIONAL TRANSCRIPTS. Reuters. Congressional Hearings. March 1, 2006. House Armed Services Committee Holds Hearing on Fiscal Year 2007 Budget: Air Force.

[16] At that time, the JSF program was The Joint Advanced Strike Technology Program (JAST).

[17] "Joint Strike Fighter—Engine Development," (JSF Talk-3) Talking Points. Pratt & Whitney. February 23, 2006.

the Pentagon."[18] Others applaud this decision, and say that single source engine production contracts are the norm, not the exception. Long-term engine affordabilty, they claim, is best achieved by procuring engines through multiyear contracts from a single source.

It is not clear if the decision to terminate F136 was based on its merits or if it was the result of tradeoffs in a budget cutting process. However, the program is clearly handicapped in budget considerations by the fact that its benefits won't be realized for a decade, while much of its costs are immediate.

Issues

As DOD has noted, cancelling the F136 poses questions on operational risk and potential cost and savings. Additional issues include the potential impact this termination could have on the U.S. defense industrial base, and on U.S. relations with key allied countries. Finally, eliminating competitive market forces for DOD business worth billions of dollars may concern those who wish to reform DOD's acquisition system and conform to higher standards of accountability.

This testimony addresses these issues in detail, except the potential impact on relations with key allied countries. However, it is worth briefly noting that friction currently exists between DOD and many foreign partners in the JSF program. Denmark, Italy, the Netherlands, Norway, and Turkey have expressed dissatisfaction with the quality and quantity of the work their companies have been awarded on the F–35.[19] These countries have threatened to reduce their participation in the program, or purchase the Eurofighter Typhoon instead of the F–35. The governments of Italy and the United Kingdom have both lobbied for F–35 assembly facilities to be established in their countries. Canceling the F136 would likely mean a considerable loss of revenue for GE's U.K.-based partner, Rolls-Royce. Although Rolls-Royce has established business relations with PW, this business appears to be far short of the 40 percent partnership Rolls enjoys with GE. As the full committee has recently heard, the U.K. has warned that it may cancel its participation in the JSF if its concerns are not satisfactorily addressed.

Operational Risk

DOD officials argue that terminating the F136 poses little operational risk. The decision to pursue an alternate engine for F–14s, F–15, and F–16s, they say, came at a time when the Services were dissatisfied with the performance of existing engines (TF30 and F100). During the "Great Engine War," DOD pursued alternate engines not only for cost savings, but to improve engine performance, reliability, and to reduce operational risk. DOD argues that these same conditions do not exist today.

In a briefing provided to Congress,[20] the DOD Office of Program Analysis and Evaluation (PA&E) states that the F135 engine produced by PW for the F–35 is performing well. The first F135 aircraft engine was delivered December 2005. Current F135 testing is "on track and successful," PA&E notes, and is 33 percent complete as of February 2006. Further, PA&E states that the F119 engine that PW produced for the F–22A Raptor, which served as the basis of the F135, is also performing well. It asserts that the F119 has performed well after roughly 18,000 flight hours, PA&E notes, and will achieve 100,000 flight hours by 2009. This briefing also notes that the F–22A Raptor and the F/A–18E/F Super Hornet rely on sole source engine suppliers (the PW F119 and GE F414 respectively), implying that the F–35 can likewise rely on a single engine manufacturer.

DOD also argues that industry advances in engine design tools such as computational fluid design for airflow prediction, and advanced software for prognostic health monitoring, further reduce the risk of powering the F–35 with a single type of engine. Presumably, using these tools will result in better-made engines that would encounter fewer problems during their lives, and will also provide the means of predicting or detecting engine problems before they occur. DOD and industry witnesses before the full committee have noted that aircraft engines are more reliable today than they were in the past. (Some may argue that today's engines are more reliable than in the past due to the competitive pressures experienced by engine

[18] Richard Mullen. "Cutting JSF Engine Was Navy Idea: Wynne." Defense Today Instant Update. March 2, 2006.

[19] "Norway Signs Industrial Partnership with Eurofighter Consortium," Defense Daily, Jan. 29, 2003. Joris Janssen Lok, "Frustration Mounts Among JSF Partners," Jane's Defense Weekly. Mar. 24, 2004. Thomas Dodd, "Danish Companies Consider Quitting JSF Programme," Jane's Defence Weekly, Jan. 9, 2004. Tom Kingston, "Unsatisfied Italy May Cut JSF Participation," Defense News, May 10,2004. Lale Sariibrahimoglu, "Turkey may withdraw from JSF program," Jane's Defence Weekly, Nov. 10, 2004.

[20] "JSF Alternate Engine Decision" Briefing. OSD/PA&E. February 27, 2006.

manufacturers in the 1984–1995 timeframe.) As one yardstick, witnesses have noted that the Class A mishap rates for the single-engine F–16 as one example, have dropped from 10 per 100,000 hours to 1 per 100,000 hours.

Others who support DOD's decision to terminate the F136 argue that an alternate engine will not help mitigate risk. They say that there are no instances in the historical record of a fighter aircraft fleet being grounded by an engine defect. Engine problems, they say, are typically limited to a specific model, or engine series, or to a particular airfield or base.

A number of observations can be made regarding these arguments. First, the comparison between the F–22A and the F/A–18E/F and the F–35 may not be apt. Both the Raptor and the Super Hornet are equipped with two engines. The F–35 will have one engine. A single engine aircraft is inherently subject to higher risk than a two-engine aircraft, as the consequences of engine problems in the F–35 will be worse than for the F–22A or F/A–18E/F. As one simple datum to consider, between fiscal year 1990 and fiscal year 2004, the single-engine F–16 suffered 80 Class A engine-related mishaps for a rate of 1.31 per 100,000 flight hours. The twin-engine F–15 suffered 21 engine related Class A engine-related mishaps for a rate of .64 per 100,000 flight hours.[21] Mishap statistics must be used cautiously, however, when trying to support arguments about aircraft engine reliability. Many different factors contribute to military aviation safety and the improvements described in previous testimony. Because mishap rates have improved does not necessarily mean that improved engine reliability was the cause. Most safety experts attribute improvements in mishap rates over the past 30 years to the implementation of improved safety awareness techniques such as Operational Risk Management (ORM). Similarly, it is not clear that the F–15's two engines are the primary reason this aircraft has a mishap rate one-half that of the F–16. Interviews with safety professionals and military pilots, however, indicate a large majority believes two engines to be safer than one engine.[22]

Unlike the Raptor and Super Hornet, one of the F–35 variants will be powered by an engine capable of vertical/short takeoff and landings (VSTOL). The VSTOL engine will be more complex than the conventional engines and will be subject to different operational stresses and conditions. The AV–8B Harrier, the Marine Corps short takeoff, vertical landing (STOVL) fighter aircraft has one of the highest mishap rates of all military aircraft. Importantly, unlike most aircraft-types which are subject to mishaps most frequently through human error, two-thirds of AV–8B's mishaps are related to the aircraft materiel failures.[23] Further, the four primary material problems related to AV–8B mishaps reportedly are engine, flaps controller, nose wheel steering, and ejection system.[24] It is to be hoped that the VSTOL JSF will improve upon the AV–8Bs safety record and engine problems. However, it appears optimistic to contend that engines generally, and VSTOL engine in particular, do not contribute to safety concerns.

A second point that might be made regarding DOD's risk assessment is that the experience with the F119 and F135 engines is still relatively modest. By the time the decision was made to divide engine production contracts between GE and PW in 1984, the PW F100 engine had accumulated 2,000,000 hours of operational service. Even with this extensive experience with the engine, over the following 25 years PW and the Air Force made numerous improvements to the engine as it competed for business with GE. By comparison, the 18,000 hours of testing appears to be a modest foundation to make projections of the F119's future performance.

It does not appear that there are any overt performance or reliability problems with today's fighter aircraft engines that an alternate engine would be required to remedy. However, it may be worth noting, that in the future, the JSF will be the only fighter aircraft in service. If any engine problems are encountered, the entire fighter aircraft fleet may be affected, not just one model of aircraft. In 1984 when the decision was made to award engine production contracts to both contractors, the Air Force, Navy, and Marine Corps flew roughly 11 different models of combat air-

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[21] Fighter/Attack Aircraft. Engine-Related Class A Mishaps. USAF Safety Center. http://afsafety.af.mil/stats/e—stats—2.asp.

[22] CRS Report for Congress RL31571. Military Aviation Safety. Christopher Bolkcom.

[23] Sandra Ervin. "Navy Aims to Curtail Aviation Mishaps Caused by Crew Error." National Defense. October 2000. First annual report of the Harrier Review Panel (HaRP). USMC. 30 September 1998 Executive Summary. Chaired by Deputy Chief of Staff (Aviation), Lt.Gen. T. Dake. Since its introduction the AV–8B has outpaced all aircraft types with 68 (Now 77) Class A mishaps for a cumulative rate of 12.1 per 100,000 flight hours. The Class A mishap rate for the first model of the Harrier, the AV–8A, was 31.77 mishaps per 100,000 hours.

[24] Alan C. Miller and Kevin Sack. "The Widow Maker." Los Angeles Times. December 15, 2002.

craft.[25] While DOD was experiencing problems with some combat aircraft engines, it also had sufficient aircraft diversity that an F–4, for example, might be able to perform a mission if an F–14 or F–18 were grounded due to engine problems. DOD will not have this diversity in the future, so consequences of potential engine problems again appear to be more troubling than in the past.

DOD's statements about grounding aircraft may be incomplete. A number of aircraft has been grounded over the past 5 years, including the KC–135, C–130, and B–1B, and none of these groundings was for engine-related problems. However, aircraft have been grounded for engine-related problems. The Marine Corps, for example, grounded 106 AV–8B Harriers in July 2000 after a faulty engine bearing was cited as the cause of a crash.[26] Further, aircraft groundings whether or not for engine-related problems may not occur often because as a matter of policy, the Services try not to ground aircraft. If aircraft are grounded, a positive action or finding must take place before the aircraft return to service. Instead, the Services try to (stand down(aircraft when safety is a concern. These stand downs are typically for a defined period of time and are either anticipatory, or in response to some general concerns. As one example, on March 6, 2006, the commander of Naval Air Forces directed a mandatory, half-day safety stand down for all naval aviation squadrons and detachments. Although safety stand downs for individual wings or squadrons take place more frequently, this was the first service-wide stand-down in 4 years.[27]

One issue that pertains to operational risk that has not been discussed by DOD is that of reduced fleet readiness due to, for example, a lack of spare parts. Two manufacturers would maintain two supply chains, and perhaps additional suppliers for critical parts. Eliminating one manufacturer could lead to fewer suppliers and potentially leave the remaining supply chain more vulnerable to disruptions caused by labor disagreements, foreign takeovers, terrorist attacks, or natural disasters.

Finally, it may be noted that DOD statements on the potential risk of operating the F–35 with a single engine-type appear to be inconsistent, or potentially contradictory. For example, DOD's Office of Program Analysis & Evaluation (PA&E) claims that "Relying on a single engine supplier incurs minimum operational risk." In the same document, PA&E notes that the JSF alternate engine offers "significant benefits" in readiness, reliability, availability, and protection from fleet grounding.[28] Logic suggests that if a course of action offers "significant benefit," the elimination of that course of action would elicit a negative or harmful effect. During a March 1, 2006 hearing, Secretary of the Air Force Michael Wynne discussed the potential cost and risk of having one engine supplier versus two. Secretary Wynne said that the decision to terminate the F136 was "a very tough call because it involves the industrial base and involves long-term reliability statistics and involves economics." In the context of reliability and risk, Secretary Wynne continued with the statement that "I don't like to see our industrial base go to a single supplier."[29]

Cost and Savings[30]

Many believe that estimating cost lends itself to quantitative analysis more than estimating risk. However, this may not be the case. The time lines involved in these estimates are long, the variables are numerous, and cost estimating tools are imperfect.[31] Like any quantitative assessment, assumptions made about the variables measured can influence significantly the analyses' output. When calculating the amount of competition-generated savings required to recoup the costs of developing the F136 engine, two variables can sway the analysis considerably: the amount of

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[25] Air Force: A–7D, A–10, F–4, F–15, F–16. Navy: A–6E, A–7E, F–4, F–14. Marine Corps: A–4M, A–6E, AV–8C, F–4N, F–18.

[26] Mark Oliva. "Pilots defend Harrier jet." Stars and Stripes. (Pacific Edition). January 19, 2003.

[27] "CNAF Directs Half-Day Stand-Down." Naval Safety Center. U.S.Navy. http://www.safetycenter.navy.mil/articles/a–m/CNAF—directs—standdown.htm.

[28] "JSF Alternate Engine Decision" Briefing. OSD/PA&E. February 27, 2006.

[29] Congressional Transcripts. Reuters. Congressional Hearings. March 1, 2006. House Armed Services Committee Holds Hearing on Fiscal Year 2007 Budget: Air Force.

[30] To date, $1.07 billion has been obligated to the F136 program. A $2.4 billion contract awarded in August 2005 would have funded the program's system development and demonstration phase, slated to run until September 2013. DOD estimates that if it cancels the F136 it could incur between $50–$70 million in termination costs and an increase of approximately $100 million in the F135 program due to the need for additional flight test assets. Source: "Information Paper." Department of Defense. February 27, 2006. Provided to CRS by SAF LLW.

[31] Military Jet Engine Acquisition: Technology Basics and Cost-Estimating Methodology. RAND. Santa Monica, CA. 2002 and Factors Affecting the Use of Competition in Weapon System Acquisition. RAND (Santa Monica, CA) February 1981. p.53 which noted that "the existing body of analysis has not provided an adequate set of management tools for estimating the benefits or the costs of competitive reprocurement."

money being amortized over the life of the F–35, and the number of engines to be purchased. Additional assumptions and assertions can also affect the analysis. Therefore, costs and savings estimates by parties on both sides of the F136 debate may be matters of some subjectivity.[32]

Deputy Secretary of Defense Gordon England has written that "The Department's analysis concluded that a second (engine) source would not yield program cost savings."[33] Mr. England has also reiterated this position in recent testimony. The analysis that DOD shared with Congress and Congressional Research Service (CRS) on JSF alternate engine cost issues contained a single chart that depicts the output from its analysis, and a number of anecdotes and historical examples that DOD maintains support its analysis.

DOD's "Break Even Analysis" chart is meant to show the percentage of savings required to "break even" (i.e. recoup F136 costs) over a 16-year period in which DOD purchases 3,036 JSF engines. If competition in the production of these engines were to result in 25 percent cost savings, DOD would recoup the F136 $2.8 billion System Development and Demonstration (SDD) costs in fiscal year 2019 when the 2,259th engine is purchased. If 20 percent savings occurs, DOD will break even in fiscal year 2021. Fifteen percent savings will come close to $2.8 billion (approximately $2.6 billion) by the end of the production run, never fully recouping F136 SDD costs by DOD's calculations. Thus, DOD argues that to fund an alternate engine for the F–35, must generate at least 15 percent cost savings to justify itself on a cost basis.

DOD states that this much cost savings is unlikely because of its experience during the "Great Engine War," and the competition between GE and PW for the Navy's F404 business in the late 1980s,[34] indicate that engine competition generates only "minimum cost benefit."[35] Cost benefit is minimized DOD asserts because "Splitting the buy between two competitors can make production and support costs increase." DOD cites reduced "learning curve effect," decreased buying power for each source, and amortizing fixed costs over fewer units for each source, as specific cost pressures.[36]

On its "Break Even Analysis" chart, DOD expresses these projected cost increases as $700 million that is added to the $2.8 billion in SDD costs that must be recouped. To recoup the SDD costs and make up for this "loss of learning" caused by a second competitor, DOD argues that 25 percent savings will be required to break even by fiscal year 2021, and that 20 percent savings generated by competition will almost break even by the end of the production run in fiscal year 2026 (approximately $3.4 billion).

PW has offered a similar analysis, but using a slightly different methodology and different assumptions. PW estimates that the amount of money needed to be recouped through competition generated savings is $3.5 billion, apparently including the $1.07 billion spent on the F136 prior to SDD. PW estimates that 4,000 JSF engines will be purchased, but amortizes the $3.5 billion over only the engines that GE might win in a competition. A 50 percent win rate, or 2,000 engines, is assumed for the analysis. By this methodology, GE would have to generate over $1.7 million worth of savings per engine to pay for the cost of development. It is unreasonable to expect, PW argues, $1.7 million worth of savings on a $6 million engine.[37] During recent testimony before the full committee, a PW witness also made the point that engine life cycle costs such as component improvement, and mid-life upgrades would be doubled if a second engine were to be funded. Any potential savings from competition would need to defray these additional costs to justify a second engine on a cost basis.

There are a number of observations that can be made regarding DOD's cost estimating methodology, and its underlying arguments. Perhaps the most important observation is on some of the assumptions made in DOD's and PW's analyses. In both analyses it appears that the number of engines over which the SDD costs is amor-

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[32] The Navy's F404 engine competition may serve as an example of the difficulties involved in estimating cost savings resulting from competition. A press account stated that "Although Navy officials were able to identify the direct costs of establishing a second source for the F404, they could not estimate the total cost of keeping two production lines open. (emphasis added)" "Navy Spent At Least $58.6 Million To Set Up Second F404 Line." Aerospace Daily. August 30, 1989.

[33] Cover letter. JSF Alternate Engine Decision" Briefing. OSD/PA&E. February 27, 2006.

[34] The Navy awarded PW approximately $59 million starting in 1985 to initiate a competition between it and GE (the incumbent) for production of different F404 engine variants for the F/A–18 and other Navy aircraft.

[35] "JSF Alternate Engine Decision" Briefing. OSD/PA&E. February 27, 2006.

[36] Ibid

[37] "Joint Strike Fighter—Engine Development," (JSF Talk-3) Talking Points. Pratt & Whitney. February 23, 2006.

tized may be too small, based on historical experience. Further, it can be argued that the $3.5 billion figure cited by both studies as the F136 costs to be amortized, is too high. Individually, the assumptions made on the number of engines, and the amount of money to be recouped, make competition appear to be less cost effective. Together, these assumptions may lead to the conclusion that competition is without financial merit in this case.

DOD's estimate of 3,036 JSF engines over which the SDD costs would be amortized appears to be too low because many more engines are typically purchased than the total number of aircraft. DOD currently plans to purchase a total of 2,443 F–35s, and international partners plan to purchase 733 for a combined purchase of 3,716 aircraft. Over the 20–30 year lifetime of a fighter aircraft, more engines and many spare parts will be purchased. DOD recognizes this, so it plans to purchase initial spare engines at 15 percent of the fleet for a total (366 for DOD, 110 for partners). More engines, however, will be needed.

A conservative and illustrative planning factor is that a single aircraft will require 2.5 engine equivalents (either whole engines, or piece parts) over its lifetime.[38] If this planning factor is applied to the JSF program, one can expect a total of 6,474 engines purchased for DOD and 8,417 engines total, not including additional potential future international sales. PW's figure of 2,000 engines appears to be low for similar reasons, but also because competition should decrease the cost of both engines, not just the alternate engine. So, SDD costs would be recouped by the cumulative cost savings of all engines produced, not just those awarded to GE.

A key assumption implicit in both DOD's and PW's analysis is that SDD costs are only amortized over engine production. PW and GE would annually compete to produce the F–35's engines, and also to support the engines over the 20–30 year life of the aircraft. A larger fraction of an aircraft engine's life cycle cost is attributed to support activities than to production. Therefore, it appears that both the DOD and the PW analyses ignore a considerable body of potential work over which the contractors would compete and potentially generate savings which could help defray upfront SDD costs. Air Force officials who participated in the "Great Engine War" believe that cost savings from competition during operations and support (O&S) were considerably greater than cost savings from competition during engine production.[39]

It can be argued that PW's inclusion of $1.07 billion in F136 costs to be recouped during competition is inappropriate because these are "sunk costs." No decision made today, or next year, will recoup them. If DOD were to cancel the F136 program, it could recoup all of the $2.8 billion awarded for SDD, minus termination liability. Thus, the savings from terminating the program can be weighed against the potential costs and savings of keeping it. It is noteworthy that DOD does not include this $1.07 billion in its cost analysis.

DOD's assertion that costs to DOD increase by $700 million when it funds a second engine producer because of a "loss of learning" appears to be central to DOD's claim that a second manufacturer does not save money. Yet, it is unclear how this "loss of learning" has been quantified, and whether this figure is offset by the competitive forces that can increase learning, productivity, and innovation. Similarly, DOD's argument that "splitting the buy between two competitors can make production and support costs increase" has not been substantiated in documents provided to Congress.

To support it's "Break Even Analysis," DOD's states that it experienced only "minimum cost benefit from engine competition," during the Great Engine War. This assertion is at odds with statements made earlier by senior Air Force officials. Several sources estimate that through competition, the Air Force saved 21 percent ($4 billion of an $18.8 billion program) over the 20-year life cycle of the improved F100 and F110 engines compared to operating legacy F100 engines over the same period of time.[40] It should be noted that the Air Force's estimate of $4 billion in savings

[38] Rough estimates of the number of engine equivalents will be required per aircraft over its lifetime were provided by PW and GE. One set of estimates was calculated by adding the value of initial engine spares to the value of forecasted replenishment spares , divided by the unit recurring flyaway (URF) cost of the propulsion system. In the case of the JSF engines, this equation leads to rough planning factors of 2.44 engines for the Navy variant, 2.17 for the Air Force variant, and 2.59 for the Marine Corps variant. Clearly, assumptions on spares will affect the analyses results. A planning factor of 1.5 engine equivalents, for example, per aircraft will result in a smaller total purchase, and a planning factor of 3.0 will result in a larger total engine purchase.

[39] Telephone interview with Col. James Nelson (Ret.) Former Deputy for Propulsion, Aeronautical Systems Division, Air Force Systems Command. March 5, 2006.

[40] Prepared Statement of Hon. Thomas Cooper. U.S. Congress, House, Committee on Armed Services, Air Force Alternative Fighter Engine, Hearings before the Subcommittee on Procure-

does not appear to account for all of the F110 development costs.[41] If these costs are also considered, the $4 billion in savings due to competition may be closer to $3.5 billion.

Also, the Navy's aborted F404 engine competition may not be the best cost analogy to today's potential JSF engine competition, because it reportedly was not pursued to save money. Navy spokespersons stated that Secretary of the Navy Lehman "opted to open the second F404 line to ensure that an adequate industrial mobilization base existed to meet the national defense needs and to promote competition. It was not based on projected cost savings."[42] Evaluating the F404 competition is complicated because PW reportedly was found guilty of illegally obtaining GE's confidential pricing data, and conspiring with Navy officials to defraud the Government.[43] This may have played a more significant role in DOD's decision to terminate the competition than cost savings estimates.

Industrial base

As noted earlier, DOD officials have expressed concern over the potential impact of this proposed termination on the industrial base. Further, DOD analyses acknowledge that the F136 alternate engine provides "significant" industrial base benefits.[44] Therefore, it is reasonable to assume that the decision to terminate the F136 may have negative consequences on the industrial base. The debate focuses on how significant these negative consequences may be.

The industrial base issues discussed and debated in hearings and other public fora have focused on whether a single supplier of fighter aircraft engine will result in costlier engines over time and whether reliable access to engines and spare parts might be jeopardized. The root of this question is what effect canceling the F136 engine will have on GE's ability to continue to compete in the high performance fighter aircraft engine business. Currently, the only U.S. manufacturers of fighter aircraft engines are PW and GE.

GE is a dominant player in the large, commercial aircraft engine market. By most estimates, GE has captured approximately 50 percent of this market. GE's current business in building and supporting high thrust, high performance, fighter aircraft engines is more modest. Currently, GE builds and maintains engines (F400 series) for the Navy's planned inventory of 462 F/A–18E/F Super Hornets. It is expected to also build engines for the Navy's planned inventory of 90 EA–18G Growlers. GE supports the F110 series of engines for domestic and international clients. Finally, GE may be competitive in engine competitions for large unmanned aerial vehicles (UAVs).

It appears that if the F136 were cancelled, GE's fighter aircraft design and manufacturing capabilities would not peter out immediately. The business outlined above likely is sufficient to maintain GE's design teams, engineers, and assembly line workers, and much technology and expertise might be extracted from the commercial business lines. GE's own experience during the Great Engine War shows that a company on the periphery of a business area can "catch up," and beat an incumbent in head-to-head competition, even if that incumbent had been producing a particular type of engines for a decade.

If the F136 program were canceled today, and in, say 10 years time, DOD requested GE to design and build an alternate to the F135, GE might face noteworthy challenges. It already trails PW by 3 years of development, for example, and PW's lead would grow with each year GE was out of this business. GE's successful competition with PW in the Great Engine War was expedited by GE already having an engine (the F101) in the same thrust class as the PW F100. GE was developing the F101 for the B–1B bomber, and this work gave the F110 program considerable leverage.

GE does not have another engine in the same thrust class (40,000 lbs.) as the F136, and no other high performance fighter aircraft programs after the JSF appear to be in DOD plans. The F110 and F400 series engines that GE maintains are in a different class than the F136 and are the focus of maintenance and upgrade ef-

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ment and Military Nuclear systems, 98th Cong. 2nd Sess., March 8, 1984. Point Paper on Air Force Alternate Fighter Engine (AFE) Competition. Aeronautical Systems Division. Directorate of Development and Production, DCS/Research, Development and Acquisition. February 18, 1987.

[41] Donald L. Pilling. Competition in Defense Procurement. Brookings (Washington, DC) 1989. Telephone and e-mail exchanges with GE representatives March 22, 2006.

[42] Statement by Naval Air Systems Command (NAVAIR) August 23, 1989, as cited in "Navy Spent At Least $58.6 Million To Set Up Second F404 Line." Aerospace Daily. August 30, 1989.

[43] "United Technologies Admits "Ill Wind' Role, Will Pay Fine." Aviation Week & Space Technology. September 7, 1992.

[44] "JSF Alternate Engine Decision" Briefing. OSD/PA&E. February 27, 2006.

forts, not design efforts. The leverage that GE's commercial engine business might offer to developing a new 40,000 lb. thrust engine is unclear. Commercial engines share some qualities with fighter aircraft engines, but they are also very different. Commercial engines do not employ afterburners, or thrust vectoring, for example, and they are designed to meet fuel efficiency goals, not performance goals like fighter aircraft engines.

Additional industrial base issues have not yet been widely debated, but may also inform decisions on the future of the F136. One issue concerns export and competitiveness. The JSF is a centerpiece of the Federal Government's fighter aircraft policy. Since the program's beginning, the desire to produce a cost-effective, multi-role aircraft appears to have been shaped by consideration of what the international market would bear.[45] The F–35 is designed as an export aircraft, and one that is hoped to leverage the international success of the F–16 Falcon (another cost effective, single engine, multi-role fighter) to perpetuate U.S. dominance in this market. Foreign participation in the JSF program was sought to defray development costs, but also to "prime the pump" for export.[46]

A key question appears to be whether the JSF will achieve the same export success with one engine-type as it might with two. Some argue that the F–16's export success is directly attributable to having two engine types: "The F–16 became a much more exportable aircraft when GE and Pratt were killing each other in the international market. So, if you are selling these JSF's and you have one engine . . . that reduces the attractiveness to these international customers . . ."[47] Singapore and South Korea have both selected the GE F110 engine to power their F–15 Eagles, and Saudi Arabia is giving serious consideration to re-engining its F–15s with GE engines. These decisions contrast with U.S. Air Force decisions to power its Eagles with PW engines. Further, while GE engines power a large fraction of USAF F–16 Falcons, PW engine sales to international F–16 customers have dominated GE sales. This background lends credence to the suggestion that competition in engine selection can enhance U.S. fighter aircraft export success.

Would cancelling the F136 and the attendant competition with the F135 adversely affect potential future advances in engine performance, reliability, and maintainability? If so, might this be at the expense of U.S. competitiveness? Many of those who participated in, or studied the "Great Engine War" assert that the competition between GE and PW made both companies better and "proved invaluable to future engine development."[48]

The economic stakes in international fighter engine competition appear to be high. U.S. companies face competition from France, Sweden, Russia, and a European consortium of companies, and it is argued that some of these governments heavily subsidize their aerospace industries. Aerospace is an important export for the United States. Despite this competition, aerospace has at times provided the U.S. economy with its highest trade surplus.[49] Many observers project that the size of the international market for fighter aircraft will remain high for the next decade, after which it may peak and then decline.[50] Thus, the importance of maintaining the competitiveness of the U.S. fighter aircraft engine industry may grow, if U.S. fighter aircraft manufacturers are to "make hay while the sun shines."

Acquisition Reform and Accountability

The final point one can make about the potential termination of the F136 pertains to acquisition reform, or (good government). This committee has recently held mul-

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[45] See for instance John Tirpak. "World Market Forces Improved Military Exports." Aviation Week & Space Technology. February 14, 1994. John Morrocco. "No JAST Prototypes to Fly Until After 2000." Aviation Week & Space Technology. December 13, 1993, and "Brits Visit JAST to Position for Next Round of Contracts." Aerospace Daily. June 1, 1994.

[46] "Australia, Belgium Enter Joint Strike Fighter Program as EMD Partners," Inside the Air Force, April 21, 2000.

[47] Carlo Munoz. "Congress, Defense Department Square Off Over Second JSF Engine." Inside the Air Force. March 3, 2006.

[48] Maj. John Nix and Maj. Riley Shelnutt. "Behind the Alternate Fighter Engine Competition." Aerospace America. May 1984.

[49] "The trade surplus generated by aerospace foreign trade in 2005 totaled $37 billion. With an $8.4 billion increase in exports and $2 billion rise in imports, the industry's trade surplus expanded $6.4 billion. The aerospace trade balance, before its sharp rise this year and last, had fallen $14 billion from its $41 billion peak in 1998 due to $12 billion fewer exports and $2 billion more imports. In 2004, the latest year of comparative data, the U.S. aerospace industry posted the highest trade balance of all industry categories. (emphasis added)." 2005 Year-End Review and 2006 Forecast—An Analysis. David H. Napier, Director, Aerospace Research Center. Aerospace Industries Association.

[50] "Market Overview: Fighter/Attack Aircraft." World Military & Civil Aircraft Briefing. Teal Group Inc. (Fairfax, VA) February 2006.

tiple hearings on defense acquisition reform, and members have consistently expressed concern about perceived shortcomings in the current acquisition system, or a lack of personal accountability in acquisition decisions. As this committee has tried to determine and correct the root causes of growing weapon system cost growth it has heard from witnesses a litany of problems such as funding instability, unrealistic requirements, poorly structured contractor incentives, too much reliance on lead system integrators, and the improper use of commercial contracts to purchase military items.

In this context, it may be worth noting that the competition during the "Great Engine War" appears to have conferred a number of benefits to government that today's acquisition officials would have a difficult time duplicating. For example, prior to the first contract award, the Air Force demanded that GE and PW provide 6 years of cost projections to include the production of engines, but also the price of support equipment, spare engines, technical data and dual sourcing data and second sourcing data for operations and support. The contractors were held to these cost projections for 6 years: the Air Force let 6 years of firm-fixed price, or "not-to-exceed" contracts from the first production lot. Prior to the "Great Engine War," Government had succeeded in negotiating firm-fixed price contracts only after the engine had been operating in the field for several years, and contractors were not compelled to provide cost projections years into the future.[51]

By requiring GE and PW to compete for annual production and O&S work, DOD may have reaped a number of benefits such as better contract terms and conditions, better warranties to assure engine quality, consistency, and long-term stability of support.[52] Further, after competition was introduced, the incumbent (PW) offered "engine improvements to the Air Force earlier than the Air Force had been led to expect without the competition."[53] To avoid potential disruptions in production, and to protect itself against price gouging, DOD "required (each contractor) to provide his plan for providing dual sources of critical parts. These separately priced options in the proposals would allow the Government to reprocure spare parts from sources other than the prime contractors."[54]

An often cited study on competition during defense procurement—the "Pilling Study"—notes that ". . . the benefits of competition do not accrue simply by holding a competition" and "starting up a second source is no guarantee that performance, schedule, or cost problems will be eliminated."[55] Competition between manufacturers must be effectively managed. It is unclear whether DOD's leadership today would be able to exploit the JSF Alternate Engine competition as effectively as Air Force leaders orchestrated the Great Engine War in the mid-1980s. It appears clear however, that the very large production run of JSF engines required to make competition between to producers cost effective, is unlikely to be replicated in future aircraft programs.

CONCLUSION

Mr. Chairman, this concludes my remarks on the F136. Thank you for the opportunity to appear before you and discuss this important issue. I look forward to addressing any questions you or the committee may have.

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[51] Telephone interview with Col. James Nelson (Ret.) OpCit.

[52] U.S. Congress, House, Committee on Armed Services, Air Force Alternative Fighter Engine, Hearings before the Subcommittee on Procurement and Military Nuclear systems, 98th Cong. 2nd Sess., March 8, 1984.

[53] Robert W. Drewes. The Air Force and the Great Engine War. NDU Press (Washington, DC) 1987.

[54] Prepared Statement of Hon. Thomas Cooper. Air Force Alternative Fighter Engine, Hearings OpCit.

[55] Donald L. Pilling. Competition in Defense Procurement. Brookings (Washington, DC) 1989.

Senator CHAMBLISS. Admiral Kilcline.

STATEMENT OF RADM THOMAS J. KILCLINE, JR., USN, DIRECTOR, AIR WARFARE DIVISION, UNITED STATES NAVY

Admiral KILCLINE. Thank you, Senator Chambliss. It's a privilege for me, as a Navy lead on aviation requirements, to appear before you today and discuss naval aviation programs in the recently submitted 2007 President's budget.

I request that my written testimony be presented before this committee.

Senator CHAMBLISS. Without objection.

Admiral KILCLINE. In the interest of time, I'd like to ask Admiral Enewold if he'd like to talk, as the program manager for the JSF, about the JSF.

[The prepared statement of Admiral Kilcline follows:]

PREPARED STATEMENT BY RADM THOMAS J. KILCLINE, USN

Mr. Chairman, distinguished members of the subcommittee, thank you for this opportunity to appear before you to discuss the Department of the Navy's (DON) fiscal year 2007 tactical aviation programs.

Your naval aviation team continues to play a major role in providing credible power to help shape our strategic landscape and in prosecuting the global war on terrorism with significant involvement in Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF). These efforts are reflective of the substantive return on your investment in our combat readiness, our people, and our unique maritime warfighting capabilities. These investments clearly demonstrate the latest technologies in surveillance, command and control and persistent strike as our forces operate from sovereign U.S. territory and exploit the vast maneuver space provided by the sea.

The Navy's tactical air (TACAIR) programs are comprised of both platforms and weapons in direct support to the Sea Strike, Sea Shield, Sea Basing, and ForceNet pillars. The fiscal year 2007 President's naval aviation TACAIR budget request balances continued recapitalization while simultaneously sustaining the legacy fleet aircraft that are performing magnificently in current operations. The Department's fiscal year 2007 naval aviation TACAIR budget request continues multiyear procurement (MYP) arrangements for the F/A–18E/F (both airframe and engine), the E–2C, and MH–60S. Our proposed plan will procure 44 tactical, fixed-wing aircraft (30 F/A–18E/F aircraft, 12 EA–18G low rate initial production (LRIP) aircraft, and 2 E–2C aircraft. This plan also continues the development of the Joint Strike Fighter (JSF), the E–2D Advanced Hawkeye, and the EA–18G.

The global war on terrorism, OEF, and OIF continue to demonstrate the enormous contributions that naval aviation makes to the effectiveness of joint and coalition forces. The naval aviation systems we are pursuing in our Naval Power 21 vision will greatly enhance our warfighting concepts and capabilities.

Our recapitalization plan includes the JSF, a stealthy, multi-role fighter aircraft designed jointly (domestically and internationally) to be an enabler for Naval Power 21. The JSF will enhance precision strike capability with unprecedented stealth, range, sensor fusion, improved radar performance, combat identification, and electronic attack capabilities compared to legacy platforms. The carrier variant JSF complements the F/A–18E/F and EA–18G in providing long-range strike capability and much improved persistence over the battlefield. The short takeoff and vertical landing (STOVL) JSF combines the multi-role versatility of the F/A–18 and the basing flexibility of the AV–8B. The commonality designed into the JSF program will reduce acquisition and operating costs of Navy and Marine Corps tactical aircraft, and allow enhanced interoperability with our allies and sister Services. The DON's fiscal year 2007 naval aviation TACAIR budget request contains $2.0 billion research, development, test, and evaluation (RDT&E) for continuation of systems development demonstration (SDD) of the JSF and $245 million aircraft procurement, Navy for long lead requirements for the initial lot of DON LRIP aircraft.

The JSF has completed its fourth year of SDD, and the program continues working to translate concept designs to three producible variants. Manufacture and assembly of the first flight test aircraft, a conventional takeoff and landing (CTOL) variant, is well underway, with assembly times much less than planned and excep-

tional quality demonstrated in fabrication, assembly and mating. Over 4,100 engine test hours have been completed through mid-January 2006 and engine performance is meeting expectations. Detailed design work continues for the CTOL and STOVL variants and first flight (CTOL aircraft) is planned later this year. The JSF program has aggressively addressed earlier performance issues associated with weight and airframe design. The November 2005 actual weight of 7,600 delivered components for the first test aircraft was within 1 percent of predicted JSF weight.

While the first test aircraft lacks some future design changes, demonstrated manufacturing processes and outcomes justify high confidence in design and weight predictions for all variants due to commonality of design, tools and manufacturing methods. The JSF acquisition strategy, including software development, continues to reflect a spiral acquisition approach. The Air System Critical Design Reviews for the STOVL and production CTOL configurations were held this February to evaluate design maturity and performance against requirements and the overall consensus was that the designs display appropriate maturity, but moderate level risks still exist. All three variants are projected to meet key performance parameter requirements. The JSF program is executing to the approved replan that commenced 2 years ago.

The F/A–18E/F continues to transition into the fleet, improving the survivability and strike capability of the carrier air wing. The Super Hornet provides a 40 percent increase in combat radius, 50 percent increase in endurance, and 25 percent increase in weapons payload over our older Hornets. Over 350 F/A–18E/Fs will be procured through fiscal year 2006, and the program is on track to complete procurement of the program of record (462 aircraft) in 2011. The fiscal year 2007 naval aviation TACAIR budget requests $2.34 billion for 30 F/A–18E/F aircraft for the third year of the 5-year MYP contract (fiscal years 2005 to 2009). The Super Hornet uses a spiral development approach to incorporate new technologies, such as the Joint Helmet Mounted Cueing System, Advanced Targeting Forward-Looking Infrared Radar (FLIR), Shared Reconnaissance Pod System, and Multifunctional Information Distribution System data link. The first F/A–18F with the LRIP Advanced Electronically Scanned Antenna (AESA) radar system has been delivered to the fleet and the AESA radar system will undergo operational testing this year to support a full rate production decision in 2007.

The E/A–18G continues development as the Navy's replacement for the EA–6B Airborne Electronic Attack (AEA) aircraft. The EA–18G will replace carrier-based Navy EA–6B aircraft by 2012. The fiscal year 2007 naval aviation TACAIR budget request reflects $372 million for research and development and $905 million for the procurement of the first 12 LRIP aircraft. The Navy is using the F/A–18E/F MYP contract to buy 12 aircraft in fiscal year 2007. These aircraft will support EA–18G fleet replacement squadron stand-up and allow the Department to deliver the next generation (AEA) capability at reduced cost and in the shortest possible timeframe. The SDD continues on schedule with construction well underway of the two development aircraft. First flight continues on schedule for the fourth quarter of fiscal year 2006. A total quantity of 30 systems will be procured in LRIP with a planned fiscal year 2009 initial operational capability (IOC) and fiscal year 2012 final operational capability.

The fiscal year 2007 naval aviation TACAIR budget request contains $389.7 million for the continuation of the systems upgrade programs for the F/A–18A–F platforms. As the F/A–18 program transitions to the F/A–18E/F, the existing inventory of over 600 F/A–18A/B/C/Ds will continue to comprise half of the strike aircraft assigned to a carrier air wing until 2012. Included in this request is the continued procurement of recently fielded systems such as Joint Helmet Mounted Cueing System, Advanced Targeting FLIR, Multi-Function Information Distribution System, and Digital Communications System. These upgrades ensure that our F/A–18s remain viable and relevant in support of TACAIR integration and expeditionary maneuver warfare. The fiscal year 2007 naval aviation TACAIR budget request also includes procurement of Center Barrel Replacements to extend the service life of F/A–18A/C/Ds by 7 years to meet fleet inventory requirements until 2022.

The fiscal year 2007 naval aviation TACAIR budget request of $49.0 million reflects continuing EA–6B upgrades and readiness improvements which increase the operational availability of this low density high demand aircraft and reduce operating costs. This includes installation of four Improved Capability (ICAP) III aircraft systems and four Multifunction Information Distribution System kits, which will provide dramatically improved emitter identification and location information as well as Link-16 connectivity to share the information. It also allows for the procurement of three Low Band Transmitters to provide new jamming capability as well as replace inadequate quantities of aging transmitters, which are in near continuous use in Iraq and Afghanistan today in support of our troops on the ground. The naval

aviation TACAIR budget also provides for Operational Safety Improvement Program procurements for avionics and structural equipment. The EA–6B has been in ever-increasing demand as DOD's only tactical electronic attack aircraft that also engages in communications jamming and information operations. Program priorities are current readiness, successful first deployments of ICAP III aircraft, which are currently at sea with two squadrons, and continued procurement of the Low Band Transmitter.

The E–2D Advanced Hawkeye is a critical enabler of transformational intelligence, surveillance, and reconnaissance, providing a robust overland capability against current and future cruise missile-type targets. The Advanced Hawkeye program will modernize the E–2 platform by replacing the current radar and other system components to maintain open ocean capability while adding transformational surveillance as well as theater air and missile defense capabilities. First flight of the E–2D will be in the fourth quarter of fiscal year 2007. The fiscal year 2007 naval aviation TACAIR budget requests $204 million to procure two E–2Cs in the last year of a 4-year MYP. This effort will keep the production line viable while the AHE continues spiral development toward an IOC of fiscal year 2011.

UNMANNED AIRCRAFT SYSTEMS (UAS)

The fiscal year 2007 naval aviation TACAIR budget request contains, $239 million in RDT&E funding to establish a Navy Unmanned Combat Aircraft System (UCAS) program to develop and mature technologies for carrier operation of a low-observable unmanned combat air system. The 2005 Quadrennial Defense Review (QDR) recommended terminating the Joint Unmanned Combat Air Systems (J–UCAS) capability demonstration program. The QDR allocated limited resources to the DOD's overall joint capabilities portfolio to support future military operations by joint air forces. PDM–III subsequently cancelled J–UCAS and allocated resources to DON to develop and demonstrate technologies for carrier operation suitability of a low-observable UCAS with the goal of fielding a carrier based persistent intelligence, surveillance, and reconnaisance (ISR) capability. Navy UCAS is part of the naval strategy for a family of unmanned aircraft systems that will provide persistent surveillance, penetrating surveillance, and tactical ISR to support the warfighter. The Navy UCAS program will heavily leverage the work, accomplishments, and technology of the terminated J–UCAS program.

Additionally, the Broad Area Maritime Surveillance UAS is integral to the Navy's ISR recapitalization strategy and will provide a persistent, maritime ISR capability for fleet commander maritime dominance, mobility, decision superiority and precision strike support. IOC for this platform is scheduled to occur in 2013.

WEAPONS

The fiscal year 2007 TACAIR budget provides for affordable precision-guided weapons programs to support that vision and ensure that America is secure at home; sea and air lanes are open for peaceful, productive commerce; and the capability developed and delivered is large enough, agile enough, and lethal enough to deter threats or defeat foes in support of joint and coalition forces.

The combat proven JSOW family of joint Navy and Air Force air-to-ground weapons continues on the highly successful path broadened in 2005 when the JSOW system hit a milestone of 400 successful combat employments; won the highly competitive 'Packard-Award' for acquisition excellence; and conducted the first and very successful JSOW Block II test flight on October 11, 2005. We continue to implement lean initiatives, innovative processes, and engineering changes in this program that will be leveraged for future enhanced capabilities. The fiscal year 2007 naval aviation TACAIR budget requests $125.6 million to procure 397 JSOW–Cs, a highly lethal precision weapon that employs an Imaging Infrared Seeker, Global Positioning System/Intertial Navigation System (GPS/INS), and an augmenting charge with a follow-through penetrator bomb for use against hardened targets. Production of other JSOW variants remain deferred as we continue to work with the Office of the Secretary of Defense and our sister Services to resolve unexploded battlefield ordnance issues that are of a concern to the Department and our allies.

The Navy is requesting upgrade of surface-launched Harpoon cruise missiles to provide the all-weather, anti-surface warfare capability needed to operate with 'improved selectivity' in the cluttered environment of the littoral battlespace. Under the Harpoon BLK III program, we plan on upgrading this very capable system to improve selectivity and enhance our standoff operations via integration of a two-way data-link for use under stringent rules of engagement. The fiscal year 2007 naval aviation TACAIR budget requests $36.3 million in RDT&E to develop this capability

and $55.5 million in weapons procurement in the out years to procure and install 197 weapon upgrade kits and associated systems.

Dual-Mode Direct Attack Weapons

Based on an urgent needs statement and feedback from the combatant commanders in Iraq and Afghanistan directly engaged in the global war on terrorism, the Navy determined that improved responsiveness and flexibility was required for close air support missions in support of Marine and Army ground forces. To address these shortcomings, the Department leveraged congressionally-directed funding in the research of dual-mode laser-guided weapons and successfully competed laser-guided bomb manufacturers to develop and integrate GPS/INS and laser guided technologies into a single direct-attack weapon. This capability will be integrated on F/A–18A–D and AV–8B aircraft to reduce the number of sorties needed to destroy intended targets, while providing the warfighter with increased flexibility in adverse weather against time-sensitive targets. The fiscal year 2007 naval aviation TACAIR budget requests $23 million to modify 2,272 single-mode Laser-Guided Bombs (LGB) into Dual-Mode LGB Weapons. Further, with fiscal year 2006 congressional language, the Navy will also conduct nonrecurring efforts and testing of a non-developmental laser kit for the Joint Direct Attack Munition.

Advanced Anti-Radiation Guided Missile (AARGM)

The fiscal year 2007 naval aviation TACAIR budget requests $97.3 million for the continuation of the development of the AARGM. AARGM upgrades legacy High-Speed Anti-Radiation Missiles and leverages the Department's highly successful investment and partnership with the European Combatant Commander on the 'Quick-Bolt' advanced concept technology demonstration program. Further, we are pleased to announce that AARGM is now also an international cooperative program as formal agreement with the Italian Air Force was signed during the first quarter of fiscal year 2006. The AARGM development program is on cost and schedule to deliver a supersonic fly-out, multi-spectral targeting capability to destroy sophisticated enemy air defenses and time sensitive strike targets. The system will also utilize our networks and is scheduled to be deployed in fiscal year 2009 on the F/A–18 Hornet and Super Hornet, and fiscal year 2010 on the EA–18G Growler. The fiscal year 2007 funding request will continue development of an AARGM derivative to further expand the target set. This software upgrade to AARGM is on track for fleet deployment in fiscal year 2011.

Advanced Medium-Range Air-to-Air Missile (AMRAAM) AIM–120

AMRAAM is a Joint Navy/Air Force (Air Force led) advanced, medium range missile that counters existing aircraft and cruise missile threats having advanced electronic attack capabilities operating at high/low altitudes from both beyond visual range and within visual range. AMRAAM provides an air-to-air first look, first shot, first kill capability working within a networked environment in support of Sea Power 21's Theater Air and Missile Defense Mission Area. We plan to complete the AIM–120D missile SDD during the next year. The fiscal year 2007 naval aviation TACAIR budget requests $6.7 million in RDT&E to complete development efforts and $98.7 million for production of 150 all-up rounds and associated hardware to equip our strike fighter squadrons.

Sidewinder AIM–9X Air-to-Air Missile

The Joint Navy/Air Force (Navy led) Sidewinder missile is the only short-range infrared air-to-air missile integrated on U.S. Navy/U.S. Air Force strike-fighter aircraft. The AIM–9X is the newest variant in the Sidewinder family. This fifth-generation air-to-air weapon incorporates high off-bore sight acquisition capability and thrust vectoring to achieve superior maneuverability and provides increased sensitivity through an imaging infrared focal plane array seeker and advanced processing. The fiscal year 2007 naval aviation TACAIR budget requests $40.4 million for production of 174 all-up rounds and associated hardware to equip our strike fighter squadrons.

SELF PROTECTION SYSTEM

Integrated Defensive Electronic Countermeasures (IDECM)

The fiscal year 2007 naval aviation TACAIR budget reflects $5.4 million in RDT&E for completion of integrated test and evaluation of IDECM Block III (ALQ–214 combined with the ALE–55 Fiber Optic Towed Decoy) that began in fiscal year 2006. Additionally, $35.2 million in aircraft procurement funding is included for the procurement of 16 ALQ–214 systems. There is also $18.5 million in ammunition procurement funding for 480 ALE–55 decoys, pending a full-rate production decision.

SUMMARY

Mr. Chairman, and distinguished members of this subcommittee, on behalf of the men and women of Navy TACAIR, I thank you for your commitment, service, and continued support of the Armed Forces as we continue to execute the war on terror and continue challenging operations in critical areas overseas. Navy TACAIR forces are at a high level of combat readiness today and the current plan extends that same high level of readiness—balanced with other naval aviation TACAIR budget priorities—throughout the 5-year defense plan. Our naval aviation TACAIR budget plan makes sound investments and is a firm foundation for current and future readiness. Thank you again for this opportunity to appear today. I am happy to answer any questions you may have.

Senator CHAMBLISS. Admiral Enewold.

STATEMENT OF RADM STEVEN L. ENEWOLD, USN, PROGRAM EXECUTIVE OFFICER, JOINT STRIKE FIGHTER PROGRAM

Admiral ENEWOLD. Good afternoon. Thank you too for allowing me to be here, Senator.

In addition to General Hoffman's written testimony, which he submitted for the record, I thought I'd add some amplifying comments just to make sure everybody is on the same page.

As you heard in the prior panel and many times before, there's general agreement that there needs to be a recapitalization of the strike fighter forces and I think there's general agreement that the F–35 could, and will, meet those requirements.

JSF has completed 4½ years of development out of a 12-year development program. We continue to mature the design of all three variants, to make them produceable, reliable, and lethal as a system. We have completed the manufacture assembly of the first test airplane. We fueled it 3 weeks ago without leaks, thank goodness. We are currently shaking it, doing ground vibration testings, in preparation for first flight later this year.

We also, in February, completed critical design reviews at the air system level for the STOVL design, and the conventional airplane, and there was unanimity on the engineering side of the house that the design meets the maturity requirements to complete a critical design review.

There are still risks. We've identified several that we're putting mitigation plans in place to capture and make sure that we don't repeat lessons of the past. Where there is general disagreement among people is in the overall acquisition strategy.

The Department strongly supports the approved acquisition strategy we put in place a year ago, and they agree that the OSD policy for risk-managed and knowledged-based acquisition is met by our strategy. Others disagree.

By design, the JSF program is unique in many respects, sir. It's a joint tri-level, or three-service program with international participation. It has new management approaches that I don't think anybody has seen before. We could talk about that if you like. We have a strong focus on the life-cycle cost of the airplanes, not just the development or production or the operating and support costs later on. We have to try to accommodate all those. Those unique elements make the program more complex and more stable, surprisingly.

The strategy's built on leveraging the large cost efficiencies of high volumes, commonality, and learning in the design and test,

and use of risk-managed decisionmaking. I've reviewed and analyzed many scenarios for changing the acquisition strategy. In every scenario, I see some risk of increasing cost and operational impacts.

For the F136, in particular, I wasn't going to rehash the hearings from last week, but, in that case, in particular, the Department feels that it is low risk, from both a cost and an operational perspective, to cancel the F136, starting in fiscal year 2007.

My recommendation: to try to regress the program back into a more classical acquisition approach would either slow the development, slow the production ramp rates, or delay transition to a modern support system. Any of these three would dramatically change the business case that we've talked about, increase the cost, and generate schedule delays.

No program has zero risk. The key is to capitalize on the benefits of speed and commonality, and avoid the consequences of speeding, which we are working at.

So far, our successes have been mixed. The initial designs from 2½ years ago would not have yielded a design that met the STOVL key performance parameters, and probably wouldn't have met the key performance parameters for the Carrier-based Variant (CV) or Conventional Take off and Landing (CTOL). The redesign efforts and costs associated with them were really arduous, but successful. We now project all variants to meet their key performance parameters aerodynamically.

On the positive side, I know that no other strategy that would produce our first flight-test aircraft for ground test, parts, and assembly for 5 more airplanes that are being put together right now, 9 ground-test engines in 2 different configurations, 2 conventional engines for flight test, 3 radars, 3 optical missile warning systems, 52 integrated core processors, 3 electronic warfare (EW) countermeasure suites, 9 electronic surveillance measuring units, a whole bunch of flightworthy subsystems, 33 man-in-the-loop simulators, 62 avionics test stations, and 5 million lines of code.

We'll have issues. But I don't think they'll be the same as everybody else. I think we've learned a lot from other programs, and we are committed not to re-learn those lessons. We should not revert to old business practices and create a system where we incur cost increases and schedule delays.

So, thank you for the opportunity to talk today, and I'm hopeful I can answer your questions.

Senator CHAMBLISS. Admiral, when are the test flights of this airplane supposed to begin?

Admiral ENEWOLD. We are measuring ourself against a 28 August first flight date. My assessment right now is, we are 2 months late. So, we're going to fly probably in October this year.

Senator CHAMBLISS. Where does the Navy test its planes?

Admiral ENEWOLD. Navy tests will be conducted at Patuxent River, Maryland, and Air Force tests at Edwards Air Force Base.

Senator CHAMBLISS. That's right. Now, you mention that there are no unusual risks here. I've never known a weapons system to go through the development/production stage and get to this point without having some problems. So, are you saying that sure, you expect there'll be some problems, but you're ready to address them?

Admiral ENEWOLD. We've already taken on a huge challenge in the issue we had on weight. We took, in the STOVL variant, in particular, about 10 percent of the empty weight of the airplane out in the redesign, which I don't think any other tactical airplane has ever done. Frankly, the STOVL configuration is the most mature of our designs right now. The weight continues to stay below where it has to be. So, that's the first challenge that we met. It was painful, but we think we successfully met that one.

Senator CHAMBLISS. Mr. Sullivan, you've stated that the JSF acquisition program can reduce cost and schedule risks by adopting a new knowledge-based business case, and that the JSF program should delay production until the aircraft design has been proven to work in flight testing. You further state that capabilities that demand technological advances which are not yet demonstrated should be part of future increments that are funded and managed separately, once demonstrated.

The program office projects the JSF will enter service for the Marine Corps in 2012. The Air Force and Navy variants will enter service the following year. How long do you propose that the program be delayed? Do you believe that the Department's current acquisition strategy will allow it to achieve the JSF program objectives?

Mr. SULLIVAN. The current strategy, we believe, is still very high risk for achieving the cost and schedule objectives they have. There are a couple of technologies. One of them is the prognostics and health maintenance technologies that they need on the aircraft, which, in fact, are some of the technologies they're using to be able to forecast significant total ownership cost savings in the future. There are still rather immature technologies, that will be immature for some time. It won't be demonstrated, I think, until sometime after 2010. There are a lot of the mission capabilities, a lot of the offboard sensor fusion capabilities that they're going to need, to become interoperable and things like that, that have not yet been demonstrated, and will take a while to be demonstrated.

Right now, the first flight that I think the program is referring to now is not a production representative aircraft. It's an aircraft that was an overweight version. It was a version of the aircraft that they were working on when they discovered significant weight problems on the aircraft. That was, I think, maybe 2 years ago, when, at that time, to the program and the Department's credit, they stopped the program and solved that weight problem with a lot of very intensive design reviews and things. It seems like they have the weight under control now. But the aircraft that's going to fly later on this year is an overweight aircraft. The first production representative-type aircraft that they're going to fly, they won't start flying until, I think, 2009—much later than this one that's going to fly now. As I said in my oral statement, the first really fully integrated JSF, with all the capabilities that they plan to procure, will not fly until 2011. At that time, they plan to have actually purchased hundreds of aircraft. So, that's why we think there's risk.

You've heard of "break it big early," "fly before you buy," phrases like that, that people like Norm Augustine have talked about. That's what we're talking about with this program. This program,

I think, still has an opportunity to slow down the ramp-up to production and discover what they're going to discover during flight tests, and maybe take a little more time up front to save time later. Or it can become a program that goes down the same kind of road that the B–2 bomber went down, that we saw happen to the F–22 program, the Comanche helicopter, the Crusader, many of these major weapons systems that we believe had immature technologies and ramped to production before they fully tested.

Senator CHAMBLISS. So, again, what is the projected delay schedule in your recommendation?

Mr. SULLIVAN. What we are recommending in the report we issued is that they should not spend procurement dollars on the JSF until they have tested the aircraft to a point where they believe the risk has been reduced to acceptable levels. That's something that the Department and the Services can determine. But when you're entering into procurement contracts using cost-plus arrangements with the contractor for possibly hundreds of aircraft, that's a clear sign that there's still significant risk to the unit cost of what those aircraft are going to cost.

So, we should delay sometime at least until the fully-integrated production representative prototype should be out there flying, at least. They should be starting to close off some of the performance envelope a little more than what they have planned right now. They have procurement dollars spent in 2007.

Senator CHAMBLISS. So, you're suggesting 2009?

Mr. SULLIVAN. I'm not in a position right now to be specific about that. But I would say that they're too early to be spending procurement dollars right now.

Senator CHAMBLISS. Okay.

Mr. SULLIVAN. There should be more flight testing completed.

Senator CHAMBLISS. I stole one of your questions, Mr. Chairman.

Senator MCCAIN. Any more?

Senator CHAMBLISS. I'd be happy to turn it back to you.

Senator MCCAIN [presiding]. Thank you very much, Senator Chambliss.

I welcome the witnesses. I apologize, I had to go to the floor to make a forgettable statement. [Laughter.]

Admiral Enewold, going sole source on the engine, has the decision been made already?

Admiral ENEWOLD. The Department has proposed that in the budget, yes, sir.

Senator MCCAIN. How do you keep costs down if there's no competition?

Admiral ENEWOLD. We currently have two or three mechanisms for doing that.

Senator MCCAIN. Do you have a fixed-cost contract?

Admiral ENEWOLD. We do not have a fixed-price contract yet. What we have in the development——

Senator MCCAIN. Could you get one?

Admiral ENEWOLD. We intend to get one in the Low Rate Initial Production (LRIP) process, probably at LRIP–4 or –5.

Senator MCCAIN. When would that be?

Admiral ENEWOLD. In 2011 or so.

Senator MCCAIN. In other words, they could have a cost-plus contract, sole-source, until 2011?

Admiral ENEWOLD. That's correct. Year-by-year lot.

Senator MCCAIN. Do you think that's smart?

Admiral ENEWOLD. I don't see risk to it right now. Here is why. The acquisition strategy for the engine, and the airplane, for that matter, are both set up to incentivize both cost and schedule. So, there are going to be cost and schedule incentives in both contracts for delivery of the airplane at the targeted cost. Even more than that, in the development——

Senator MCCAIN. Why not just have a fixed-cost contract, Admiral Enewold, if there's no competition?

Why worry about an incentive contract? Just do what we did during the 1980s, and let's just have a fixed cost and say, "You meet that or you pay a penalty."

Admiral ENEWOLD. Senator, I believe our experience with fixed price has not been good.

Senator MCCAIN. I think, if you look back in the 1980s, they came forward with products and weapons systems that met costs and met schedules. We don't anymore. Nine of the 11 major weapons systems have been over cost and behind schedule, in the case of the Future Combat Systems, it's gone from $90 billion to $130 billion. How can you make a case that fixed-cost contracts don't work?

Admiral ENEWOLD. I think our view of it is right now is that the price that we pay under a firm fixed price would have to include the risk that the contractor would have to assume to put a fixed-price contract in place. I don't think that we could afford a fixed-priced contract at that price with those risk dollars in there.

Senator MCCAIN. Maybe you could compete for the contract and we could find a contractor that could.

Admiral ENEWOLD. No matter what, even if we kept F136, we would not be in a position to compete F136 until about 2011 or 2012. So, we're going to be in a sole-source environment for F135, no matter what, until 2011 or 2012.

Senator MCCAIN. Mr. Sullivan, Mr. Bolkcom—can we start with Mr. Bolkcom, and then we'll go to Mr. Sullivan?

Mr. BOLKCOM. Thank you, Mr. Chairman.

If I could make only one point about the alternate engine program today, it would be that DOD has really shared no analysis with Congress justifying its position. They have provided a very brief briefing. But after reading it very closely, considering the magnitude of this problem, the analysis, as they call it, really does not appear to be robust and comprehensive. My only point is, if we are to pursue this strategy of going sole-source, it would, I think, be prudent to be based on a robust analysis.

Senator MCCAIN. Do you want to respond to that, Admiral Enewold?

Admiral Enewold, may I say, I have the greatest respect for you and Admiral Kilcline, and I'm not trying to be in any way offensive here. We're trying to, obviously, share the same goal that you do and get the best product for the lowest cost. But I think you—I hope you can understand, for example, the statement by Mr. Bolkcom that we have serious questions.

Would you like to respond to the statement that there really has been no in-depth analysis?

Admiral ENEWOLD. I guess, first of all, I'd like to say that the analysis and decisions were done outside the program. They were done as part of the QDR. As the Deputy Secretary said last week, they were based on the assessment by he and the Vice Chiefs, that, based on the risk they saw in the program, both from a cost and operational perspective, they thought it was the best course forward for the Department.

As far as the analysis that was done, and what was provided, frankly, I don't know.

Senator MCCAIN. I thank you, Admiral.

Admiral Kilcline, did you want to say anything about that?

Admiral KILCLINE. No, sir. I'll leave it at that.

Senator MCCAIN. Good idea. [Laughter.]

Mr. Sullivan.

Mr. SULLIVAN. I would just like to add that, in fact, the Senate Armed Services Committee and Congress have asked us to take a look at this and get back to them very quickly. We've seen a lot of, I think, the briefing slides and everything that has been referred to here. But I think we have a date of September 12 where we're going to try to review what analysis has been done and determine how substantive that has been, and get back to your committee.

Senator MCCAIN. Good, and I think, Admiral Enewold and Admiral Kilcline, you would both agree that usually in the production of an aircraft—in an acquisition of a new aircraft, almost always the major problem is with the engine, either time and schedule for development or problems that arise. Obviously, it's the most complicated kind of engineering. Would you agree with that, from your experience, Admiral Enewold?

Admiral ENEWOLD. I would have thought so, until 2 years ago. My experience with F135, and as I look back on F119 development, and even F414 development, I haven't seen that recently. So, my feel, from history, is exactly yours, Senator, that the engine was something you want to make sure you get right, early—break it early, whatever. But that has not been my experience on the F135.

Admiral KILCLINE. Senator McCain, from my experience, in looking back at the engine—and I'll talk specifically about the F404 and F414—the F414 is the E and F engine. When that engine was looked at, it came from the core of the F404. We found we've had some extraordinary success with that motor, in bringing it online. We looked at the F119 as a core, and some of the things it had done, realizing that the thousands of hours that are on it were indicative of what we thought the F135 would do. Then looking at what the F135 had done on reliability in the limited testing that had gone on so far, part of the decision, I believe, was made on reliability. Would this engine be, as you've already mentioned, something we could count on as we went forward into the future? I believe, from what I've seen in the F404, going to F414, that the technology we have today in our core is pretty phenomenal.

Senator MCCAIN. I certainly take your word. But I'm not sure that's sufficient and compelling evidence to abandon the funda-

mental precept that we functioned under, and that was "fly before you buy." So, it seems to me we're taking——

Admiral ENEWOLD. Well, let me make——

Senator MCCAIN. Go ahead.

Admiral ENEWOLD.—that "fly before you buy" discussion—

Senator MCCAIN. Sure.

Admiral ENEWOLD.—because I want to make sure it's characterized correctly.

Specifically on the engine, we're going to fly, this year. The engine, unlike the mission systems and other things we've talked about, is a production-representative engine. There'll be some changes that we make as we learn through the test program, but we think the F135 that we're going to fly in the test airplane this year is, if not production, very close to production representative or production configuration. By the time we get to full rate, or even "reasonable" rate, we will have made what we call a final release, which will be the production engine for the airplane. So, we don't see major changes over the engine we've already delivered to Fort Worth. We envision flying that engine this fall.

Senator MCCAIN. In your experience, Mr. Sullivan, haven't we generally had an alternate engine for most of these major aircraft procurements, at least for a period of time?

Mr. SULLIVAN. We've had a—yes, there was tremendous success—I guess, I kind of go back to the engine wars that happened when the F–16, for example, had competition in their engines, and had a significant amount of cost savings and risk reduction as a result. There are many other examples, as well, where competition really has over the—some of the things that we're interested in looking at are some of the sustainment issues, not just the initial spares that go with buying the aircraft, but also the equivalent engines over a 30- or 40-year lifetime of an aircraft, and the improvements that can be made to reliability and quality if competition is present.

Senator MCCAIN. Mr. Bolkcom, do you recall how much the British are investing in the JSF?

Mr. BOLKCOM. Mr. Chairman, it's a 40-percent partnership with GE. I can tell you that.

Senator MCCAIN. Mr. Sullivan, I think it's $4 billion, or something like that?

Mr. SULLIVAN. Overall, I think research, development, testing, and evaluation (RDT&E)—you might know better than I—but it's about, I think, $4 billion.

Admiral ENEWOLD. The U.K. is a level-one partner. They are investing $2.2 billion in direct support of the overall system design and development (SDD) program.

Senator MCCAIN. Having had conversations with our friends from the U.K., they are quite disturbed about this decision—not only that the decision was made, but, in their stated view they were not consulted. That puts at risk at least some of that development. I think part of that's understandable. Is that your impression, Mr. Sullivan?

Mr. SULLIVAN. On their feelings right now? Yes, there's been an awful lot in the press, not only with the engine, but other things, as well, yes.

Senator MCCAIN. Senator Chambliss?

Senator CHAMBLISS. Is there any explanation for why we didn't talk to the Brits about this?

Admiral ENEWOLD. Like I said, sir, it happened as part of the QDR, and I didn't have any insight into that, so I don't know.

Senator CHAMBLISS. I don't have anything further, Mr. Chairman.

Mr. Chairman, I just would say this is what is so frustrating to me, that we're sitting here and I know these guys are experts, and they're doing exactly what they've been charged to do. But why we can't sit here today with an airplane that's in this developed a stage and look at doing a multiyear, where we can save money, is really what's frustrating to me, from a policy standpoint. I don't know whether this is a program that we can do some of the things that you and I have talked about before relative to reforming our procurement process, but maybe there is something here we can do.

Senator MCCAIN. I hope so. We are looking at the whole issue with a lot of assistance from our friends at GAO and CBO, and we're appreciative that you're here today. Admirals, we're appreciative of the job that you're doing. I recognize that you're carrying out orders, and you're doing it very well. I understand that some of these questions like decisions that were made in the QDR are difficult for you to respond to. So, we thank you for your good work. I know you'd much rather be at sea. But this is the price you pay. [Laughter.]

Thanks very much. This hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

DEFINITION OF "SUBSTANTIAL SAVINGS"

1. Senator MCCAIN. Mr. Bolkcom, General Hoffman testified that the Air Force expects its multiyear procurement proposal to be about 5 percent less expensive than the total anticipated cost of carrying out the program through a series of annual contracts. In your opinion, does that 5 percent constitute "substantial savings" within the meaning of 10 U.S.C. 2306b section (a)(1)? What is the basis of your opinion?

Mr. BOLKCOM. To address this question in a meaningful way, it must be placed in the proper context. The Air Force's proposed acquisition plan for the F–22A would add $1.05 billion to the budget and slow down the annual production rate, to 20 aircraft per year, which will likely lead to additional cost increases. The goal of a multiyear procurement (MYP) would be to defray the known and unknown cost increases that the Air Force is proposing to the F–22A program. Within this context, it is accurate to say that the MYP will not save money. It may avoid additional cost increases.

There may be several reasons why a projected 5-percent savings from MYP versus annual procurement may not constitute "substantial savings." First, although 10 U.S.C. 2306b section (a)(1) no longer requires a 10-percent cost savings, this historic benchmark suggests a level of savings that can be achieved, and could be pursued. It can be counter-argued that replacing the 10 percent cost criterion with "substantial savings" corroborates the acceptability of lesser savings.

Second, Congress has expressed dissatisfaction with, and rejected, proposed MYP contracts with anticipated savings of 5 percent over annual procurement. For example, during negotiations on fiscal year 1996 supplemental appropriations, House appropriators insisted that an MYP contract for 80 C–17 aircraft achieve "closer to the historical average of 10 percent compared with buying the program by lot." Responding to congressional pressure, Department of Defense (DOD) re-engaged the C–17 prime contractor and was able to negotiate an MYP contract that promised 7-percent savings rather than the 5-percent previously projected.

Third, other MYP contracts for military aircraft have achieved greater savings than the 5 percent projected for the F–22A. The two MYP contracts that the Navy

has used to procure the F/A–18E/F have achieved savings of 7.4 percent and 10.95 percent when compared to annual procurement. The most recent MYP contract for the C–130J program achieved a savings of 10.9 percent over annual procurement. The second MYP contract under which 60 C–17s were produced is to have achieved savings of 8.7 percent.

Fourth, projections of MYP savings are not always fully realized. For example, in April 2002 when the Marine Corps and Air Force decided to jointly procure C–130J aircraft under an MYP contract, the projected savings over annual procurement was 13.3 percent. As mentioned above, the actual savings is now estimated to be 10.9 percent, 2.4 percent less than anticipated. Also, in June 1996, Under Secretary of Defense for Acquisition Paul Kaminski estimated that the first C–17 MYP contract would result in a total of $1.025 billion in savings. This figure, based on a contract value estimated at $14.2 billion would have represented roughly 7 percent savings over annual procurement. However, the first C–17 MYP contract ultimately cost $19.9 billion, and final MYP savings appear to be closer to 4.4 percent over annual procurement.

Neither the Air Force nor Boeing were able to provide estimated MYP savings as a percent of what annual procurement would cost. The Air Force estimates that the second C–17 MYP resulted in savings of $1.309 billion on the $13.8 billion contract. Lacking precise data, CRS calculated the 8.7 percent savings using these figures. 8.7 percent is likely a rough approximation of actual MYP savings, which could be higher or lower than this figure. The 4.4 percent savings was derived using the same methodology.

PRECEDENT

2. Senator MCCAIN. Mr. Bolkcom, the Air Force previously argued in favor of the KC–767 tanker lease by saying that it was following the precedent set by the long term lease of four 737 aircraft. Do you think that incrementally funding F–22A production may similarly set a precedent that we may come to regret? Please explain.

Mr. BOLKCOM. Whether something is or is not a precedent is subject to interpretation. In the case you mention, the Air Force did cite the lease of four 737 aircraft as a precedent for leasing 100 KC–767s. However, I think it is fair to say that a number in Congress did not find this argument persuasive. I know of no other example of Congress granting the Air Force permission to incrementally fund aircraft procurement. Therefore, many may see incrementally funding the F–22 as precedent setting. Congressman Duncan Hunter, for one, has stated in a recent House Armed Services Committee hearing that he believed it to be precedent setting. I can't say whether you or Congress may come to regret setting a precedent for incrementally funding aircraft procurement. It is fair to say, however, that once something becomes common practice, such as incremental funding for shipbuilding, it becomes more difficult to deny such requests.

ECONOMIC ORDER QUANTITY

3. Senator MCCAIN. Mr. Bolkcom, the Air Force is requesting that Congress authorize an economic order quantity (EOQ) procurement before it has been determined whether a multiyear procurement will result in "substantial savings" over a series of annual contracts. What are your thoughts regarding this issue?

Mr. BOLKCOM. The reprogramming of funds to make an EOQ purchase outside an MYP contract is unconventional, and controversial. This proposal's compliance with statute is a matter of debate among legislative, Air Force, and DOD counsel. As I mentioned in my verbal statement, the Air Force's proposal presents risk. If the EOQ purchase is denied, additional risk of production cost increases will be incurred. If the EOQ purchase is approved, it is hoped it will mitigate the risk of F–22 production costs growing due to a reduction in procurement rate. However, an EOQ purchase outside of an MYP could add to other factors that might deter some in future Congresses from potentially reducing or canceling the F–22 program; essentially "tying their hands." This is because a future reduction in funding or a cancellation of the program could eliminate the use for which items purchased under the EOQ were intended.

F–22A

4. Senator MCCAIN. Mr. Sullivan, in your opinion, does the F–22A possess a "stable design" within the meaning of 10 U.S.C. 2306b section (a)(4)? Please explain.

Mr. SULLIVAN. The baseline F–22A aircraft, designed primarily for the air superiority role, has successfully completed development and initial operational testing and its design is stable for that particular mission. However, the Air Force has stated that to be effective in the future a more robust ground attack capability is needed for the F–22A. It plans to spend several billion additional dollars to add this ground attack capability. A key to the success of this effort is the development and integration of a new radar. The Air Force expects to take delivery of the first aircraft with the new radar in November 2006 but the software needed to provide the robust ground attack capability will not be completed until 2010. According to a representative of the Director, Operational Test and Evaluation (DOT&E), the key to achieving a more robust ground attack capability will center on the integration of this new radar. A December 2005 report issued by the Defense Contract Management Agency stated that problems encountered during the test and integration of the new radar have added risk to the development program. Until software and integration testing in the F–22A have been successfully completed, we consider the design unstable creating the potential for significant cost overruns and schedule delays.

5. Senator MCCAIN. Mr. Sullivan, in your opinion, are the "technical risks" associated with the program "not excessive" within the meaning of 10 U.S.C. 2306b section (a)(4)? Please explain.

Mr. SULLIVAN. See the answer to question 4 as technical risk is linked to design stability.

6. Senator MCCAIN. Mr. Sullivan, in your statement you conclude that DOD does not have an executable business case for buying the F–22A. How do you define this business case?

Mr. SULLIVAN. A critical first step to success in acquiring new weapons systems is formulating a comprehensive business case that justifies the investment decision to begin development. The business case should validate warfighter needs and match product requirements to available resources, including proven technologies, sufficient engineering capabilities, adequate time, and adequate funds. Several basic factors are critical to establishing a sound business case for undertaking a new product development. First, the users' needs must be accurately defined, alternative approaches to satisfying these needs properly analyzed, and quantities needed for the chosen system must be well understood. The developed product must be producible at a cost that matches the users' expectations and budgetary resources. Finally, the developer must have the resources to design and deliver the product with the features that the customer wants and to deliver it when it is needed.

Once established, the business case should be revisited and revised as appropriate if the program or external circumstances substantially changes. If the financial, material, and intellectual resources to develop the product are not available, a program is at substantial risk in moving forward.

The Air Force's business case for the F–22A program is unexecutable as planned because there is a significant mismatch between the Air Force's stated need for the F–22A aircraft and the resources OSD is willing to commit. According to Air Force officials, a minimum of 381 F–22A aircraft are needed to satisfy today's national security requirements yet OSD states it can only afford to buy 183 F–22A aircraft. This results in a 198-aircraft gap in capability. Additionally, the Air Force now states a need for greater ground attack and intelligence-gathering capabilities, not included in the existing business case, that will require an extensive modernization program. The value of this planned investment in modernization is questionable until a new business case resolves the gap between requirements and affordability.

7. Senator MCCAIN. Mr. Sullivan, what are the prerequisites for developing and executing a successful business case?

Mr. SULLIVAN. See the response to question 6 as it discusses the elements of a business case.

8. Senator MCCAIN. Mr. Sullivan, what concerns do you have with the Air Force's incremental funding approach for the F–22A?

Mr. SULLIVAN. The Air Force has proposed using incremental funding to pay for the multiyear contract. Instead of fully funding the buy for each fiscal year, it plans four funding increments—economic order quantity, advanced buy, subsystem, and final assembly. Incremental funding for multiyear procurement is neither permitted

by the annual DOD appropriations act,[1] nor the multiyear authorizing statute which requires that funds only be obligated under a multiyear contract "for procurement of a complete and usable end item."[2] However, the Air Force is seeking an exception to these requirements in its request to Congress for statutory authorization for the multiyear contract. The Air Force's proposed F–22A multiyear strategy includes an increment of funding in each fiscal year to begin manufacturing subsystems, not considered a complete and usable end item. For example, the fiscal year 2007 budget request includes $1.5 billion for subassemblies. It would not be until fiscal year 2008 that the final assembly would be fully funded.

9. Senator MCCAIN. Mr. Sullivan, do you believe the Air Force's MYP proposal for the F–22A meets the criteria as delineated in title 10? What concerns do you have in regard to their plan?

Mr. SULLIVAN. The Air Force is proposing to buy the remaining 60 F–22As over a 3-year period with a multiyear contract and plans to submit its justification to Congress on May 15, 2006.[3] To enter into a multiyear contract the Air Force must first meet the statutory criteria listed in 10 U.S.C. § 2306b(a). Table 1 shows the six criteria that must be satisfied before entering into a multiyear contract and our observations on issues that could affect the Air Force's ability to satisfy several of the criteria.

TABLE 1: OBSERVATIONS OF F–22A MULTIYEAR CONTRACT CRITERIA AS OF APRIL 2006

Multiyear criteria	GAO observations
Contract will result in substantial savings	The Air Force has not completed an estimate of savings but its preliminary indications are a maximum of 5 percent savings. However, when the unit procurement costs for the planned multiyear approach is compared to how the Air Force had previously planned to buy the remaining aircraft, the unit procurement costs increase under multiyear.
Minimum need expected to remain substantially unchanged during contract period in terms of production rates and total quantities.	Quantities have continually been in a state of flux in the F–22A program including changes in the last two budget submissions.
Reasonable expectation agency head will request funding at required level to avoid contract cancellation.	The Air Force has indicated that its multiyear budget is currently under funded by $400 million. Further, it is proposing to use incremental funding rather than fully funding each aircraft lot.
There is stable design, and technical risks are not excessive.	While the design for the baseline F–22A aircraft, designed primarily for an air superiority role, is stable, the design for the ground attack capability to be added has not been demonstrated and thus cannot be considered "stable."
Estimates of contract cost and cost avoidance are realistic.	The Air Force has not completed its analysis of contract cost or cost avoidance at this time.
Use of contract will promote national security of the United States.	No observation since the contract vehicle has not been determined.

Source: GAO Analysis and 10 U.S.C. 2306b.

INCREMENTAL FUNDING

10. Senator MCCAIN. Mr. Marron, under the Air Force's proposed MYP and incremental funding approach, what liabilities will go unfunded?

Mr. MARRON. Under a multiyear contract without incremental funding, the Air Force would initially need approximately $4 billion to $5 billion to cover its minimum liability, rather than the $2 billion included in the Air Force's budget request. That total liability includes about $3.5 billion for the direct acquisition costs and between $0.5 billion and $1.5 billion in cancellation liability for the contract.

The Air Force's budget request does not include funding to cover its liability if it cancels the multiyear contract after the first year. Under the multiyear contract, some nonrecurring costs may be allocated to aircraft that would begin production in 2008 and 2009. Therefore, if the contract is canceled before completion, the Air Force may owe the contractor more than the amount appropriated for items pro-

[1] Section 8008 of the fiscal years 2005 and 2006 Department of Defense Appropriations Acts (Public Laws 108–287 and 109–148, respectively) require full funding of units to be procured.

[2] 10 U.S.C. § 2306b(i)(4)(A). This restriction was added by section 820 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107–314).

[3] The Air Force needs statutory authorization for its proposed multiyear contract under 10 U.S.C. § 2306b and the annual DOD appropriations act.

duced in the years before the cancellation. The Air Force has not requested budget authority to fund those liabilities.

The Air Force has requested permission to budget and to pay for each annual production lot incrementally over a 2-year period rather than obtaining appropriations for the full cost of those aircraft in the year production begins. For example, funding in the first year would cover the cost of producing certain components of the first 20 aircraft; funding in the second year would pay for the cost of assembling them. Thus, the Air Force's request does not cover the full costs of the aircraft at the time they are ordered or the time they enter production.

11. Senator MCCAIN. Mr. Marron, from a budgetary standpoint, is it responsible to fund only the subassembly of aircraft and require Congress to grant additional, future resources in order to procure a complete, usable product? Why or why not?

Mr. MARRON. The Air Force's incremental funding strategy may distort budgetary choices this year, and compel Congress to provide additional appropriations in subsequent years. If the Air Force's incremental budgeting approach is approved, when Congress allocates budget authority to programs in the 2007 defense appropriations act, the F–22 program would have an advantage over other programs or activities that did not receive that budgetary treatment. In subsequent years, Congress could be left with little choice but to provide additional appropriations to ensure the delivery of fully assembled, functional aircraft. Although more aircraft could be ordered in the first year under the incremental funding approach, fewer aircraft could be ordered in subsequent years within any given appropriations amount. Even if costs increased relative to the Air Force's current estimate, Congress might feel compelled to appropriate funds for aircraft that had already begun production to avoid wasting the funds already invested in the components.

12. Senator MCCAIN. Mr. Marron, does this approach restrict the ability of Congress to exercise meaningful oversight on the program? Why or why not?

Mr. MARRON. The Air Force's incremental funding strategy could hamper congressional oversight of the program by distorting budget choices this year, and making it necessary to provide additional appropriations in subsequent years.

13. Senator MCCAIN. Mr. Marron, does this approach limit visibility and accountability? Why or why not?

Mr. MARRON. Incremental budgeting reduces visibility over the cost of the program by deferring the recognition of budget authority to subsequent years. For any given lot of aircraft, an increase in cost relative to the budget estimate could be obscured by combining that cost growth with the cost of the subsequent funding increments. Even if it were apparent that costs had increased relative to the Air Force's estimate, Congress might feel compelled to appropriate funds for aircraft that had already begun production to avoid wasting the funds already invested in the components.

14. Senator MCCAIN. Mr. Marron, under its current proposal how does the Air Force fund termination liability and what future action, if any, would be required of Congress to terminate the contract?

Mr. MARRON. Contract termination differs from contract cancellation. The Government has the right to end any contract early when doing so is in the Government's interest, but must pay the contractor for any authorized work performed before it was notified to cease work. Contract termination is the act of rescinding orders for items for which funds have already been appropriated and on which work has already begun. The cost of terminating an annual procurement contract early should not exceed the available appropriations because an agency should have sufficient appropriations to cover all recurring and nonrecurring costs before it initiates an annual procurement contract.

Because the Air Force will not have sufficient budget authority to pay for the full cost of each plane at the time it enters production, there could be an unfunded liability if the Service terminates the contract for those planes before funding for the full cost of those planes has been provided. If, in the course of building the aircraft, the contractor incurs costs that exceed the first increment of funding provided for that production lot, and the Air Force terminated the contract before it received appropriations for the second increment, additional funding would be required to pay those termination costs.

Contract cancellation—unique to multiyear contracts—is the act of rescinding orders for items that were scheduled for production in subsequent years of a multiyear procurement contract and for which funding has not been provided. The Air Force budget request does not included specific amounts for the cancellation liability for

the F–22 procurement contract. Under a multiyear contract, some nonrecurring costs may be allocated to items expected to be produced in future years. Therefore, if the contract is canceled, the Government may owe the contractor more than the amount appropriated for items produced in the years before the cancellation. Thus, if the Air Force cancels the multiyear contract, additional amounts will be required to pay for that unfunded liability.

In the case of both termination and cancellation, the Air Force would have to take funding from other aircraft procurement programs or request that Congress provide additional appropriations to pay those unfunded liabilities.

15. Senator MCCAIN. Mr. Marron, what are the pros and cons for incremental funding of aircraft and how does it compare to funding ships or military construction projects in that manner?

Mr. MARRON. The full costs of acquiring any Federal asset should be funded in advance to help ensure that all costs and benefits are fully considered at the time decisions are made to provide resources. Upfront funding enables Congress to control spending at the time a commitment is made and ensures—or at least increases the likelihood—that a complete and usable asset will be delivered without the need to provide additional appropriations in future years. These principles hold true regardless of the type of asset the Government acquires.

Agencies have resorted to incremental funding because it can be difficult to budget for certain very expensive items if it must have an appropriation for the full cost in the first year. In some instances, the cost of a single item may exceed an agency's annual budget for capital acquisitions. If the cost of an asset represents a large portion of its budget, an agency may have to forego most other capital acquisitions for that year or otherwise disrupt other ongoing acquisition programs.

Incremental funding, however, can have several deleterious effects. It may limit visibility and accountability because it obscures the full cost of decisions at the time they are made. In the competition for appropriations, it may tilt the playing field in favor of expensive programs that benefit from such a funding arrangement; programs may be selected on the basis of their apparent economy—in their initial stages—relative to other programs that do not have the advantage of such favorable budgetary treatment. Moreover, incrementally funded projects may be started without adequate scrutiny or a full understanding of the total cost. Incremental funding may provide an incentive to underestimate costs at the outset of a project because later cost increases would not have to be acknowledged as such but could be incorporated in subsequent funding increments.

In cases in which an acknowledgment of the full cost upfront could render a program too expensive to consider, both agencies and Congress may end up accepting those higher costs at a later date if the only alternative is to abandon their previous investment in partially completed products. Finally, incremental funding may constrain the funding available for other programs in future years as programs that were partially funded in previous years continue to consume resources.

Incremental funding has rarely been used for aircraft procurement programs. Perhaps because aircraft—even ones as costly as the F–22—are less expensive than Navy ships, dams, and levees constructed by the Army Corps of Engineers, and NASA's space station, they are easier to budget for in full. Consequently, budgetary constraints can be accommodated by purchasing fewer aircraft in a given year rather than by funding only a part of the cost of a larger production lot.

16. Senator MCCAIN. Mr. Marron, has there been any instance where Congress has authorized and appropriated incremental funding of a multiyear procurement?

Mr. MARRON. CBO is not aware of any instance where Congress has authorized incremental funding of a multiyear procurement program. In fact, Congress recently disapproved such a proposal by the Air Force. In its fiscal year 2003 budget request, the Air Force proposed to use advance procurement funding—typically used to buy components with significantly longer production time than other system components—for the multiyear procurement of C–17 cargo aircraft. That incremental funding approach would have effectively resulted in progress payments on the aircraft rather than full funding in the initial year of production.

In the National Defense Authorization Act for Fiscal Year 2003, Congress prohibited that approach proposed for the C–17 by amending the statute governing multiyear procurement to allow DOD to obligate funds to procure end items only if they were "complete and usable." Congress also added $586 million to the Department's budget request for fiscal year 2003 to fully fund the acquisition of 15 C–17 aircraft entering production that year. The conference report accompanying the Department of Defense Appropriations Act for Fiscal Year 2003 explicitly disapproved the Air Force's proposed approach: "This financing scheme runs counter to the 'full

funding' principles which guide Federal Government procurement practice, and thereby creates a future liability for the Air Force and Congress. For this reason, the conferees disapprove the Air Force's C–17 financing proposal."

17. Senator MCCAIN. Mr. Marron, why would Congress be advised to start now?

Mr. MARRON. CBO does not believe that the Air Force has made a compelling case for authorizing incremental funding of a multiyear procurement contract for the F–22 fighter.

Incremental funding of any program, including multiyear procurement programs, could distort budgetary choices by making a program appear less expensive than it is, and would constrain budgetary flexibility in subsequent years.

Incremental funding and multiyear procurement are conceptually inconsistent budgetary practices. Multiyear procurement contracts suggest a firm and substantial commitment on the part of the Government. The contractor is encouraged to make investments promoting efficiency on the basis of the Government's commitment to purchase multiple annual production lots or to compensate the contractor for those investments if it chooses to cancel the contract. In contrast, however, the amount of budget authority provided under an incremental funding arrangement suggests a very limited Government liability—only for the cost of the components that are produced in that year.

18. Senator MCCAIN. General Hoffman, why is the Air Force pursuing an incremental funding strategy for the remaining F–22s?

General HOFFMAN. The split funding strategy proposed for F–22 production represents a win-win solution between competing priorities. Fiscal constraints faced by the Department in fiscal year 2007 and fiscal year 2008 drove significant budget challenges for the Air Force. Taking advantage of the mature F–22 production line, the Department was able to stretch procurement funding over 2 years for each production lot without impacting aircraft production or delaying deliveries. This decision freed over $2.3 billion of funds in fiscal year 2007 and approximately $1.0 billion in fiscal year 2008. The funding strategy also adds an additional lot of F–22 production, extending America's only fifth-generation fighter aircraft production capability 1 year, providing added stability to the F–22 supplier base and preserving the opportunity to add production lots in the future.

19. Senator MCCAIN. General Hoffman, why would the Air Force not fully fund the purchase of whole aircraft as you have done in the past?

General HOFFMAN. The split funding strategy proposed for F–22 production represents a win-win solution between competing priorities. Fiscal constraints faced by the Department in fiscal year 2007 and fiscal year 2008 drove significant budget challenges for the Air Force. Taking advantage of the mature F–22 production line, the Department was able to stretch procurement funding over 2 years for each production lot without impacting aircraft production or delaying deliveries. This decision freed over $2.3 billion of funds in fiscal year 2007 and approximately $1.0 billion in fiscal year 2008. The funding strategy also adds an additional lot of F–22 production, extending America's only fifth-generation fighter aircraft production capability 1 year, providing added stability to the F–22 supplier base and preserving the opportunity to add production lots in the future.

20. Senator MCCAIN. General Hoffman, please explain exactly why Congress should authorize an approach to procuring F–22As that Congress has never authorized in the past (i.e., incremental funding for a multiyear procurement).

General HOFFMAN. The Department was faced with a tightly constrained fiscal environment in fiscal year 2007. Many priorities competed for the constrained funding, including tactical fighter aircraft recapitalization, natural disaster relief, and the global war on terror. The decision to use split funding for F–22 procurement allowed the Department to balance these priorities effectively and to ensure that the Nation maintains the capability to manufacture fifth-generation tactical fighter aircraft. This decision freed over $2.3 billion of funds in fiscal year 2007 and approximately $1.0 billion in fiscal year 2008. Further, the funding strategy adds an additional lot of F–22 production, extending America's only fifth-generation fighter aircraft production capability 1 year, providing added stability to the F–22 supplier base and preserving the opportunity to add future production lots.

21. Senator MCCAIN. General Hoffman, given the historical background for F–22A with regard to technical problems, delays, and enormous price increases, why should Congress give deference to this new proposal from the Air Force?

General HOFFMAN. The F–22 program is delivering high quality, operational aircraft per the contractual production schedule and aircraft flyaway costs have decreased with each of the last three production lots. Over the past 2 years, the F–22 production program has made great strides and has matured into a world-class aircraft production line. From August 2004 through January 2006, the program delivered 37 aircraft, meeting its congressional commitment. In fact, during the last 6-month period, the program delivered 14 aircraft, proving it could produce at a rate of at least 28 aircraft per year. This effort has erased the lag in the delivery schedule and has put F–22 production deliveries back on track. Efficiencies in F–22 production have resulted in reduced flyaway costs of 16, 11, and 13 percent, respectively, in the last three F–22 lots. In December 2005, the Air Force stood up its first operational squadron of F–22s. During day-to-day training, practice deployments, and operational missions, the F–22 has proven to be an overwhelmingly effective combination of stealth, speed, maneuverability, and integrated avionics. The F–22's ability to penetrate denied enemy airspace and execute a multirole mission is unmatched in the world.

The new proposal extends F–22 production by 1 year, extending America's only fifth-generation fighter aircraft production capability, providing added stability to the fifth-generation supplier base, and preserving the opportunity to add future production lots.

22. Senator MCCAIN. General Hoffman, given the precedent-setting incremental funding scheme in this multiyear procurement proposal, one would expect the case for this atypical military procurement of F–22 would need to be overwhelming and the cost-savings significant. What is your overwhelming case?

General HOFFMAN. The overwhelming case is built on a combination of industrial capability and cost savings. The Institute for Defense Analyses (IDA) is currently building a business case analysis (BCA) for the F0922 multiyear. Preliminary analysis from IDA predicts the F–22 proposal will save approximately 2.2 percent over lots 7, 8, and 9, translating into a savings of over $231 million. Additionally, the multiyear procurement will allow the Department to deliver required fifth-generation fighter capability efficiently and cost effectively (both air vehicle and engine) while providing an industrial base bridge to complementary capability in the Joint Strike Fighter (JSF). The JSF's reliance on Lockheed Martin's facilities in Palmdale, CA and Fort Worth, TX and many vendors common to the F–22, raises concerns about sustaining an experienced stealth aircraft industry. For example, BAE, Northrop Grumman, and Lockheed Martin in Palmdale, CA, perform work for both the F–22 assembled at Lockheed Martin in Marietta, GA, and the JSF assembled at Lockheed Martin in Fort Worth, TX, resulting in an estimated 1- to 3-percent decrease in the flyaway cost of both weapon systems. As such, F–22 production termination before JSF production maturity will translate into higher JSF costs. The transition from F–22 to JSF production requires an integrated approach to keep aircraft production open and to control risk and cost of the JSF program and reduce operational risk to the combatant commanders. It is imperative that the United States maintain production of advanced aircraft to meet national defense requirements in an uncertain world. The F–22's procurement strategy works toward that end.

23. Senator MCCAIN. General Hoffman, what evidence, comparable to a BCA, can the Air Force give at this time to satisfy the current law which requires that entering into a multiyear procurement contract will result in substantial savings compared with a procurement through a series of annual contracts?

General HOFFMAN. IDA is currently building a BCA for the F–22 multiyear. Preliminary analysis from IDA predicts the F–22 proposal will save approximately $233 million (2.2 percent) over lots 7, 8, and 9. The final BCA results will be delivered to Congress in mid-May.

24. Senator MCCAIN. General Hoffman, without a completed analysis of whether a multiyear procurement of the F–22A will result in "substantial savings" over a series of annual contracts, on what basis should Congress grant authority for an EOQ procurement?

General HOFFMAN. Based on an updated opinion from the DOD General Counsel, the Air Force will not execute an EOQ procurement until multiyear procurement authority is received from Congress. Not funding a $100 million EOQ in 2006, however, will decrease the expected savings of the multiyear procurement. The Air Force plans to partially mitigate the lost savings potential by requesting a $100 million increase to the $200 million fiscal year 2007 EOQ for a total fiscal year 2007 EOQ of $300 million. The Air Force will submit the final estimate of savings to Con-

gress in mid-May once the BCA being prepared by IDA is complete. Preliminary data released by IDA on April 14, 2006 estimated savings of 2.2 percent, still a savings to the taxpayer of over $230 million. This compares to the 5 percent number I gave in testimony which was based on starting EOQ in fiscal year 2006.

F–22A STRUCTURE FLAW

25. Senator MCCAIN. General Hoffman, a March 15, 2006 Bloomberg article reported a structural flaw with regard to a titanium engine casing on the F–22A. When did the Air Force learn of this problem?

General HOFFMAN. The Air Force learned in December 2005 that F–22 forward boom frames might have been improperly heat-treated. Upon further investigation it became clear that this issue is not the result of an improper design, but an issue with one supplier's manufacturing process. Subsequently, the Air Force tested improperly heat treated forward boom frames and determined that they do not affect safety of flight. Consequently, no restrictions have been put on F–22 flight operations.

The heat-treat process enhances the boom frame's structural properties by holding the frames at a high temperature long enough to achieve the desired grain structure. A section of the forward boom frames under investigation may not have been held at this temperature long enough to completely achieve the desired grain structure. A series of material tests confirm that the atypical grain structure does not affect aircraft structural integrity, although, additional tests are underway to determine any long-term impact of the affected parts on aircraft service life. The Air Force expects the results of these tests by the end of May.

This heat-treat issue potentially affects aircraft 4017 through 4107 (aircraft through Lot 5 production). The supplier of these frames no longer manufactures F–22 forward boom frames, therefore, aircraft manufactured after 4107 are not affected by this heat-treat issue.

26. Senator MCCAIN. General Hoffman, why did the Air Force not inform Congress, specifically the Senate Armed Services Committee, of this issue prior to the Bloomberg article?

General HOFFMAN. This issue was briefed as part of Air Force staffer day briefings to all four committees. The House Appropriations Committee, Subcommittee on Defense, was briefed on 21 February 2006, the House Armed Services Committee was briefed on 24 February 2006, the Senate Appropriations Committee, Subcommittee on Defense, was briefed on 27 February, and the Senate Armed Services Committee (SASC) was briefed on 21 March 2006. The Bloomberg article was dated 16 March 2006, after the Air Force had begun briefing Congress on this issue.

27. Senator MCCAIN. General Hoffman, in prior meetings, Air Force officials stated that any cost associated with this problem would be covered by the contractor. In a subsequent written response, it was stated that this problem is not a warranty item and that any cost discovered in the future would have to be negotiated with the contractor. What is the true story and why is this not a warranty item?

General HOFFMAN. It is the Government position that this issue is the result of a deficiency in material and workmanship that could not have been discovered by reasonable inspection and therefore is considered a latent defect. To that end, once the magnitude of the problem is understood, the contractor will be responsible to make any necessary changes at no additional cost to the Government and negotiate a compensation considered fair and reasonable to both parties. There is no warranty on the F–22.

INCOMPLETE PLANNING

28. Senator MCCAIN. General Hoffman, in your statement you highlight a "back to basics" approach to how the Air Force does acquisition. The current multiyear procurement proposal for F–22A is significantly different from last year's plan. It requires numerous waivers and exclusions from Congress. It is undetermined whether there will be a problem meeting annual termination liability requirements, as well as whether the savings from the multiyear procurement contract will be sufficient to offset the increased costs by stretching out production. This plan sounds like it isn't fully developed. How do you respond?

General HOFFMAN. In fiscal year 2007 the Department was faced with very tough fiscal constraints driven by many competing priorities. The fiscal year 2007 President's budget funding plan for the F–22 is unique, but it offers the opportunity to

fund many of those priorities, including natural disaster relief and the war on terrorism, while continuing to produce F–22 aircraft without interruption to the production flow. It also adds one lot of F–22 aircraft, extending the Nation's fifth-generation tactical fighter aircraft manufacturing capability. The multiyear procurement request offers the benefit of stabilizing the fifth-generation production supplier base and helps mitigate the cost increases expected from stretching production and decreasing lot quantities. IDA is developing the business case that will detail the expected benefits of the multiyear approach. This business case will be delivered to Congress by mid-May. Additional legislative language will also be required to allow split funding within a multiyear procurement. The Air Force is actively engaged with Congress to execute the strategy with transparency.

29. Senator McCAIN. General Hoffman, will you please provide a copy of the BCA once it has been completed?

General HOFFMAN. Yes. The preliminary IDA F–22 multiyear procurement BCA was forwarded to the SASC on 18 April 2006. The final BCA will be delivered to Congress as soon as IDA submits their report to the Department in mid-May.

JOINT STRIKE FIGHTER LIFE CYCLE

30. Senator McCAIN. Admiral Enewold, what is the expected life cycle in years for the JSF?

Admiral ENEWOLD. Current DOD force structure planning includes procurement of JSFs from fiscal year 2007 until fiscal year 2027. Based on expected JSF aircraft service life of 8,000 hours and legacy aircraft experience, JSFs could be in service inventories for at least 40 years.

31. Senator McCAIN. Admiral Enewold, how many JSF aircraft do we expect to build for the United States, the U.K., and the rest of our international allies and friends?

Admiral ENEWOLD. DOD plans to procure 2,443 JSF aircraft, 1,763 for the Air Force, and 680 for the Department of Navy. JSF partners have not yet formally committed to production quantities. A minimum of 650 aircraft is a conservative planning estimate for the U.K. and 7 other JSF system development and demonstration phase partners.

32. Senator McCAIN. Admiral Enewold, how many total JSF engines will be purchased over the life cycle of the program?

Admiral ENEWOLD. Current planning reflects procurement of approximately 3,000 engines, including spares, for the total planned DOD quantity of 2,443 aircraft.

SOLE-SOURCE ENGINE CHALLENGES

33. Senator McCAIN. Admiral Enewold, at some point, the JSF will be the only fighter aircraft for the military. What would happen if the sole supplier of JSF engines encountered unforeseen disruptions in either engine production or the ability to support those engines (e.g., labor dispute, terrorism, natural disaster, etc.)?

Admiral ENEWOLD. Department leadership have concluded that relying on a single engine supplier incurs minimal operational risk, and that, while there are indeed benefits to having a second engine source, the benefits are not commensurate with the increased cost.

34. Senator McCAIN. Admiral Enewold, how will you motivate a sole-source supplier to control production and support costs, or to spend his own money to make performance and other improvements to the engine?

Admiral ENEWOLD. Several mechanisms for motivating sole-source suppliers exist. Contract cost and schedule incentives will be used for procurement. For performance based logistics, contractors are incentivized to improve the performance and reliability of their products to increase "time on wing."

35. Senator McCAIN. Admiral Enewold, if Congress were to go along with the Department's recommendation to terminate the General Electric (GE)/Rolls-Royce F136 engine, how would the Department ensure cost controls on the Pratt & Whitney engine in the development, production, and sustainment phases of the program without competition?

Admiral ENEWOLD. Cost accounting standards enable the Government to track cost elements for the program for completeness. DOD negotiates and approves for-

ward pricing rates for labor for each company. Contract fee structures are established to incentivize cost and schedule performance. Once cost profiles are established, fixed-price and multiyear procurement contracts incentivize contractor performance and long-term price stability.

36. Senator McCAIN. Admiral Enewold, why is there a discrepancy between the total number of engines to be purchased and the number that was used for determining cancellation of the alternate engine?

Admiral ENEWOLD. All analyses and business cases make assumptions, and I do not have insight into the ones used in the analysis you reference. Reliability projections, sparing models, and support concepts are key factors that influence the projected procurement numbers.

37. Senator McCAIN. Admiral Enewold, is there DOD guidance for conducting cost analysis that requires the total life cycle cost of the system to be considered?

Admiral ENEWOLD. DOD acquisition policy requires consideration of program life cycle cost at major acquisition decision milestones.

38. Senator McCAIN. Admiral Enewold, do you believe that if the 20–30 year life-cycle costs were included in the DOD analysis, as they should have been, the Department might have made a different conclusion? Why or why not?

Admiral ENEWOLD. Further analysis would be required to estimate any additional effects for the 20–30 year in-service phase of the life cycle. At a minimum, the costs of supporting two turbomachinery configurations, including spares inventories, technical manuals, fault and failure analyses, and personnel training would need analysis.

39. Senator McCAIN. Admiral Enewold, the JSF program manager's advisory group (PMAG) met in 1998 and 2002. At both of those meetings the recommendation was the same—continue the JSF competitive engine program. Why has the DOD made a decision that is contrary to the PMAG's recommendations?

Admiral ENEWOLD. Both PMAGs concluded that it was beneficial to continue both engine efforts, but the recommendation specifically stated: "Proceed with the JSF F136 engine program as currently planned. This recommendation is made independent of the Services' affordability issues which were beyond the scope of the analysis." Department leadership stated that their decision to cancel the F136 alternate engine program is based on affordability, providing the Department the best balance of risk and cost.

40. Senator McCAIN. Admiral Enewold, will the JSF program experience a Nunn-McCurdy breach this year? If so, why?

Admiral ENEWOLD. Yes. The major portion of this breach is due to historical increases previously reported in the F–35 December 2003 Selected Acquisition Report (SAR), i.e., 26.2 percent and 21.7 percent for Program Acquisition Unit Cost (PAUC) and Average Procurement Unit Cost (APUC), respectively, including programmatic changes. Details of the breach, which is against the Milestone B baseline, will be provided in the Department's December 2005 F–35 SAR, due to Congress in early April 2006.

41. Senator McCAIN. Admiral Enewold, the DOD says that cancelling the GE/Rolls-Royce F136 engine entails little operational risk, but former Assistant Secretary of the Navy, John Douglas, in a March 1998 Defense Daily article said "The alternate engine for the Joint Strike Fighter addresses the single biggest risk issue. . . . I would not recommend we go forward without the alternate engine. . . . I want to state again unequivocally my support for the alternate engine." How do you account for the dramatic change within the Department on the JSF alternate engine program?

Admiral ENEWOLD. The F135 is now 8 years more mature in its development and is on track to meet the operational requirements for JSF. The F119 engine, from which F135 is derived, has successfully accumulated thousands of flight hours. Department leadership have stated that their decision to cancel the F136 alternate engine program is based on affordability, providing the Department the best balance of risk and cost.

42. Senator McCAIN. Admiral Enewold, why does the Department believe that the dynamics that created significant savings in the first "Great Engine War" no longer apply to the JSF program?

Admiral ENEWOLD. The JSF Program Office was not involved in the Department's decision to cancel the F136 Program, and also was not involved in the related supporting analysis. I, therefore, do not have insight on details of the Department's analysis. My understanding is the Great Engine War resulted from both a desire to develop competition and regain the aerodynamic performance of the F–16. Clearly, the second motivation does not exist for JSF. Department leadership made it clear that their decision considered the benefits of competition balanced against affordability and operational risk assessments.

43. Senator MCCAIN. Admiral Enewold, if the JSF program does not meet the key performance parameter (KPP) requirement of interoperability, what impact, if any, will this have on the warfighter? Please fully explain your response.

Admiral ENEWOLD. The major reason for not meeting the JSF interoperability KPP is complexities of evolving DOD standards and application across platforms. If current issues remained unresolved, JSF would still have more communications interoperability than any existing fighter.

The JSF interoperability KPP is an end-to-end assessment of the JSF design that reflects both (1) projected JSF performance against selected standards, which the air system is being designed to, and (2) performance against those same standards by a set of systems that represent all the external systems the JSF interoperates with. The actual measurement of performance is satisfaction of 67 critical information exchange requirements (IERs) that comprise the performance threshold. The current KPP shortfall primarily results from (1) variations across platforms in implementation of the Variable Message Format (VMF) tactical data link standards and (2) JSF's inability to meet the specified beyond-line-of-sight (BLOS) requirements. Approximately half of the 67 critical IERs are associated with VMF standards that primarily support air-to-ground operations (e.g., close air support). JSF is implementing the latest versions of the three VMF standards, and is projected to be 100 percent interoperable with the two ground systems that support forward air control (FAC). Legacy aircraft and helicopters participating in airborne FAC operations are updating to the current standards on differing schedules.

JSF is the first fighter to integrate satellite communications (SATCOM), and legacy fighters successfully operated without it. JSF and all other platforms face the fundamental challenge of predicting the U.S. ultra-high frequency (UHF) SATCOM migration so we can avoid or minimize building to interim standards. Multiple assessments related to SATCOM migration are ongoing. The collective DOD JSF stakeholders have defined a path forward that aligns JSF planned capability fielding with the DOD objective SATCOM architecture. A variety of options exist that can mitigate the impact if the objective architecture is delayed. A planned operational requirements document change will address this issue.

44. Senator MCCAIN. Mr. Bolkcom, the competition between Pratt & Whitney and GE to produce F–15 and F–16 engines for the military lasted only 10 years. But the competition to support those aircraft engines lasted at least another 20 years. What are the pros and cons of holding such a competition for the JSF engine?

Mr. BOLKCOM. If DOD were to structure the engine competition as it did during the Great Engine War, the annual contract for which the two companies would compete would be to produce and support those engines over their lifetimes. If there is competition for engine production, then there would logically be competition for engine support work as part of a single, annual contract. The two companies also competed against each other for many years, in fact they still compete today, to sell and support engines to those countries that import the F–16 and F–15. This rivalry likely made the F–15 and F–16 more competitive in the international marketplace. The great export success the F–16, in particular, has achieved has been valuable in funding continued improvement of the aircraft, which might then be applied to U.S. aircraft.

45. Senator MCCAIN. Mr. Bolkcom, does competition provide cost-savings? Please explain your answer.

Mr. BOLKCOM. Competition during weapon system production can provide cost savings over relying on a sole supplier. Competition can also lead to more effective weapon systems, more responsiveness from the contractors, and better contract terms and conditions for the Government. However, competition does not automatically confer these benefits. The number of units to be produced must be large enough to recoup the initial investment in two producers. Further, the Government must plan and actively monitor and manage the competition if it is to realize the maximum benefit. In other words, DOD must be a "smart buyer."

46. Senator MCCAIN. Mr. Bolkcom, does the use of a sole source contractor tend to limit the degree of responsiveness if a problem arises? Please explain your answer.

Mr. BOLKCOM. That has been the case in the past. For example, Pratt & Whitney was widely excoriated by the Air Force for not satisfactorily responding to shortcomings in the F100 engine. But of course, there are examples of sole source contractors that are very responsive to their DOD customers. I don't believe the issue is one of causality. Relying on a sole source supplier does not necessarily lead the supplier to be unresponsive. On the other hand, forcing two or more companies to compete for business can lead to more responsive suppliers.

47. Senator MCCAIN. Mr. Bolkcom, how many JSF engines do you think will be purchased over the total life of the program and how did you come to that conclusion?

Mr. BOLKCOM. Each JSF aircraft is likely to consume 2.5 engines or engine equivalents of parts over its lifetime. Representatives of both GE and Pratt & Whitney, and many Service members whom I've interviewed agree on this planning factor. Considering this ratio of aircraft to engines, a conservative estimate of the number of engines to be purchased is at least 8,400 engines over the JSF program's lifetime. This number does not include the large number of engines that may be produced for foreign buyers of the JSF.

48. Senator MCCAIN. Mr. Bolkcom, why is it important that life cycle costs be considered when making a decision of this magnitude?

Mr. BOLKCOM. It can be difficult to think of a multi-million dollar aircraft engine as "cheap." But procurement of the engine is cheap compared to the cost of supporting and maintaining the engine over its lifetime. Operations and support costs range from 50 percent to 70 percent of the total weapon system life cycle cost. Any analysis of the potential cost savings from competition that does not consider the engine's operations and support phase is incomplete.

JOINT STRIKE FIGHTER DELAY

49. Senator MCCAIN. Mr. Sullivan, in your prepared remarks, you state that the JSF program can reduce cost and schedule risks by adopting a new, knowledge-based business case, and that the JSF program should delay production until the aircraft design has been proven to work in flight testing. How long do you propose the JSF program should be delayed?

Mr. SULLIVAN. A delay should not be based on a particular time but on demonstrating certain knowledge has been attained and risks reduced. In the case of the JSF, DOD should delay its investment in production aircraft until sufficient testing has at least demonstrated the basic airframe design of each JSF variant in important parts of the flight envelope and limit production quantities until a fully integrated aircraft demonstrates through flight testing the required capabilities. The program plans to enter production with only 1 percent of its flight tests completed and more than 2 years before all three JSF variants have completed some flight testing of the aircraft's basic design and 4 years before a fully configured and integrated aircraft is expected to be flight tested. This delay would allow the program time to gain much needed knowledge, reducing risks, and providing a greater opportunity for a more successful program outcome. The financial risk of moving into production for the JSF is significant. DOD plans to increase spending from about $100 million a month for production in 2007 to over $500 million a month just 2 years later. By the time a fully integrated aircraft has flown, DOD will have potentially signed procurement contracts for over 190 aircraft valued at $26 billion.

It is important to note that we are not recommending a delay in development. Development work needs to take place to demonstrate that the aircraft will work as intended. At this time, the program is less than one-half of the way through its development program.

50. Senator MCCAIN. Mr. Sullivan, do you believe the current acquisition strategy of the DOD will allow it to achieve the JSF program objectives?

Mr. SULLIVAN. We believe there is a high probability that the JSF program will not achieve its current cost, schedule, and performance objectives. The JSF acquisition strategy currently plans a single-step approach to deliver a quantum leap in tactical fighter capability by 2013 and has already felt the negative cost and schedule impacts from executing this approach. The length and scope of the remaining effort in the JSF program make it even more difficult to accurately estimate cost

and delivery schedules. The JSF's approach is a clear departure from DOD policy that calls for adopting an evolutionary approach to acquisitions. Past single-step programs, such as the F–22A fighter, B–2 bomber, Crusader artillery vehicle, and Comanche helicopter have experienced skyrocketing costs, substantially reduced production quantities, or cancellation of the program. The JSF funding profile—which requires an average of $11 billion annually for the next 2 decades—is also at risk to increase if costs continue to grow or schedules are further delayed to develop the ultimate JSF capabilities.

With more than 90 percent of the JSF investment remaining, DOD officials have an opportunity to adopt an alternative acquisition strategy, such as the one used by the F–16 program, that sequences capabilities over time based on proven technologies and design. This would reduce risk and deliver aircraft sooner. This alternative evolutionary approach is actually the preferred approach in DOD's acquisition policy for acquiring new systems for more rapid delivery of incremental capabilities to the warfighter. An evolutionary strategy would reduce risk and deliver aircraft sooner by allowing the program to develop and evolve a product through small, time-phased development increments based on proven technologies and design. This approach would allow aircraft to be delivered in sequence that could first meet DOD's need to recapitalize its aging fleet of aircraft and then evolve aircraft to eventually achieve improved capabilities in future system development increments. In the case of JSF, capabilities that demand as yet undemonstrated technologies, such as advanced mission systems, prognostics, and advanced software, would be deferred to future aircraft increments as technologies are demonstrated and the resources become available. Each subsequent increment would be managed as a separate development program.

FA–18 CHALLENGES

51. Senator McCain. Admiral Kilcline, what are the current FA–18 maintenance problems with regard to service life and availability of the aircraft?

Admiral Kilcline. Service life issues fall into three categories: cat/trap/landing (CTL), flight hours (FH), and unknowns. CTL inspections endeavor to extend CTL limits to 12,300 landings and 2,600 catapults/traps. These inspections revealed unpredicted support structure cracks that resulted in numerous air frame bulletins that call for regular inspections. We expect this trend to continue as the airframes age.

FH inspections have extended the airframe life from 6,000 to 8,000 hours and there is currently a service life assessment program (SLAP) study underway to further extend the airframe to 10,000 hours. The results of the SLAP study will not be known until December 2007 and will be followed by engineering change proposals (ECPs) in late 2008.

Lastly there are the unknowns best exemplified by inner wing spar cracks that are induced by stress corrosion regardless of airframe hours. All these parameters are being monitored as closely as possible in our effort to maximize airframe usage and availability.

52. Senator McCain. Admiral Kilcline, what is the projected shortfall of FA–18s?

Admiral Kilcline. The current projections predict a 50-plane F/A–18A+/C shortfall in the 2018 timeframe. These projections are predicated on legacy Hornets achieving 10,000 flight hours, 12,300 landings and 2,600 catapults/traps and assumes Program Objective Memorandum (POM) 2006 Program of Record (POR) for the JSF.

53. Senator McCain. Admiral Kilcline, does the projected shortfall assume a service life extension to 10,000 flight hours on the FA–18?

Admiral Kilcline. Yes, the model assumes the F/A–18 will fly to 10,000 FHs and JSF acquisition will follow the POM 2006 POR. Additionally, the two other parameters used in the model are 12,300 landings and 2,600 catapults/traps for the F/A–18A+/C.

54. Senator McCain. Admiral Kilcline, what is the current flight hour limit of the FA–18 and what is the proposed extension to the flight hour limit?

Admiral Kilcline. F/A–18A+/C aircraft are currently limited to 8,000 flight hours. Engineering efforts are currently underway to determine if the F/A–18A+/C can fly beyond this current limit with the desire to achieve a 10,000-flight hour limit.

55. Senator McCAIN. Admiral Kilcline, what studies support extending the service life of the FA–18 significantly past its design limits?

Admiral KILCLINE. The Navy has contracted with Boeing for a SLAP to determine potential service life of the F/A–18A–D. This study has been broken up into two phases: SLAP I, focusing on ground events, incorporates requirements for CTL extensions. This phase is complete, and effort is now underway to develop inspection bulletins and ECPs to effect repairs for areas identified. SLAP II focused on flight events, and assesses the potential to incorporate requirements for FH extensions. The study should be complete in December 2007, until then, the service life remains 8,000 flight hours.

56. Senator McCAIN. Admiral Kilcline, what is the estimated FA–18 shortfall if the Navy elects not to extend the flight hour limit of the FA–18?

Admiral KILCLINE. Current projections indicate a shortfall of 166 aircraft in 2018 if the service life of the F/A–18A+/C is not extended beyond 8,000 flight hours.

57. Senator McCAIN. Admiral Kilcline, what effect would a delay of 1 year for JSF have on the FA–18 projected shortfall?

Admiral KILCLINE. Current projections indicate the 50-plane shortfall in F/A–18A+/C aircraft in 2018 would increase by 28, for a total shortfall of 78 aircraft.

T–45

58. Senator McCAIN. Admiral Kilcline, how many T–45 Goshawks are currently in the Navy inventory?

Admiral KILCLINE. As of March 31, 2006, we have 178 T–45 Goshawks in naval inventory. To date, 189 aircraft have been delivered, but 11 have been stricken. The Navy has procured an additional 22 aircraft between fiscal year 2004 and fiscal year 2006 which are still in production.

59. Senator McCAIN. Admiral Kilcline, what is the total number of T–45s required by the Navy?

Admiral KILCLINE. The fiscal year 2007 President's budget T–45 inventory requirement is 223 aircraft (207 for pilot training and 16 for undergraduate military flight officer (UMFO) training). An inventory objective of 223 enables Chief of Naval Air Training (CNATRA) to make pilot and UMFO training requirements with the current syllabi through 2028. This date can be achieved if the currently defined pilot and UMFO training requirements remain constant and the airframe can achieve a 21,600 flight hour service life.

On the Chief Of Naval Operations (CNO) Unfunded Priority List, the Navy has requested an additional six T–45 aircraft. These additional aircraft provide for an expansion of both the undergraduate pilot and UMFO syllabi while maintaining a T–45 service life to 2028.

The new UMFO training program will use a combination of the T–6 aircraft, a high fidelity ground based training system and the T–45 with Virtual Mission Training System (synthetic radar). This revolutionary training system will allow the Navy to retire the T–39 and T–2 aircraft while capitalizing on advances in simulation. Additionally, these aircraft will afford CNATRA the opportunity to download training flight hours from higher cost per flight hour platforms (F/A–18), save Operation and Maintenance, Navy (O&M,N) funding in the out years across the naval aviation continuum and help conserve life expectancy on F/A–18 aircraft.

CVN–21

60. Senator McCAIN. Admiral Kilcline, what is the Navy's current cost projection for acquisition of CVN–21 and how was that estimate determined?

Admiral KILCLINE. The nonrecurring investment for design and development of the CVN 21-class of aircraft carriers is $5.6 billion. This is comprised of $3.2 billion in RDT&E (then-year dollars ($TY)) and $2.4 billion ($TY) in shipbuilding and conversion, Navy (SCN). RDT&E funds are being used to develop the technologies needed to meet program requirements, while the SCN funding is being used to develop the detail design for the entire ship class.

The total cost to construct the lead ship is $8.1 billion SCN ($TY). Navy expects to award the contract for construction of the lead ship of the class, CVN 78, in fiscal year 2008. The President's budget for fiscal year 2007 split funds CVN 78 between fiscal year 2008 and fiscal year 2009.

CVN 21 projected costs are based on estimates conducted by the Navy and Office of the Secretary of Defense (OSD) cost analysis improvement group (CAIG) in support of the Milestone B approval decision reached in April 2004. The Navy estimate was updated in 2005 supporting the President's budget for fiscal year 2006 decision to delay the CVN 21 program by 1 year.

QUESTIONS SUBMITTED BY SENATOR SAXBY CHAMBLISS

FORWARD BOOM TITANIUM HEAT-TREATING

61. Senator CHAMBLISS. General Hoffman, the Congressional Budget Office (CBO) witness, Donald B. Marron, discusses the justification for the F–22A multiyear contract in his written statement and raises a few concerns relative to consistency in the budget request for the F–22A as well as issues related to the forward-aft boom. Regarding the first issue, I believe the Quadrennial Defense Review substantiated the requirement for continued F–22A production and funding through at least 2010, and Program Budget Decision (PBD) 720 enacts this plan in the fiscal year 2007 President's budget. Regarding, the second issue, DOD recognized the maturity of F–22A production processes a year ago in April 2005 when they approved the program for full rate production. I know that some have claimed that this forward boom titanium heat-treating issue indicates a design stability problem. Rather, all the facts we have on this situation indicate that the design is completely stable. Instead, this is an issue of a contractor—which the prime contractor is no longer using—not following the stated design rather than there being a problem with the design. It is clear that this is not a structural integrity or safety of flight issue. Could you expound upon this issue and discuss the extent to which, if any, there are safety, design, or performance concerns relative to the forward boom titanium heat-treating issue?

General HOFFMAN. The Air Force learned in December 2005 that F–22 forward boom frames might have been improperly heat-treated. Upon further investigation, it became clear that this issue was not the result of an improper design, but an issue with one supplier's manufacturing process. Subsequently, the Air Force tested the improperly heat-treated forward boom frames and determined they did not affect safety of flight and, consequently, no restrictions have been put on F–22 flight operations.

The heat-treat process enhances the boom frame's structural properties by holding the frames at a high temperature long enough to achieve the desired grain structure. A section of the forward boom frames under investigation may not have been held at this temperature long enough to completely achieve the desired grain structure. A series of material tests confirm that the atypical grain structure does not affect aircraft structural integrity, although, additional tests are underway to determine any long-term impact of the affected parts on aircraft service life. The Air Force expects the results of these tests by the end of May.

This heat-treat issue potentially affects aircraft 4017 through 4107 (aircraft through Lot 5 production). The supplier of these frames no longer manufactures F–22 forward boom frames, therefore, aircraft manufactured after 4107 are not affected by this heat-treat issue.

F–18 MULTIYEAR CONTRACT

62. Senator CHAMBLISS. Mr. Sullivan, Mr. Bolkcom, General Hoffman, and Admiral Kilcline, I think a valid comparison to the F–22A multiyear discussion is the F–18 multiyear contract which was first approved in fiscal year 2000. The F–18 multiyear decision might pre-date all of us, but I understand that the F–18 had a minor technical problem related to wing flutter at the time the multiyear contract was being considered. Congress determined at that time that, despite this minor technical issue, the risk in proceeding with a multiyear contract was small and chose to grant multiyear procurement authority to the Navy at that time. Can you comment on this issue and whether or not I have stated the record correctly?

Mr. SULLIVAN. You have stated the issue correctly. The aircraft did have a wing flutter problem, and Congress determined that the program was ready for multiyear procurement despite the problem. In commenting, I would direct you to our answers to questions 4 and 9 above as it relates to the F–22A program.

Mr. BOLKCOM. My understanding is that the F/A–18E/F "wing drop" problem was first experienced in March 1996, and led DOD to delay fiscal year 1998 funding for the program pending solution of the problem. After a number of modifications to the wing's leading edge, fiscal year 1998 funding was approved for the procurement of

additional aircraft in the spring of 1998. However, the F/A–18 MYP decision may not be a valid comparison to the proposed F–22A MYP. The defining feature of the F–22A proposal appears to be incremental funding, not the MYP alone. Reducing the rate of production to 20 aircraft per year is another concern, and, as CBO has testified, so is the potential shortfall in the contract's cancellation ceiling. I would expect that these considerations would weigh more heavily on the minds of decision-makers than the MYP proposal by itself.

General HOFFMAN. The Air Force was not involved in the acquisition of the F–18. I will defer to the U.S. Navy for the acquisition details.

Admiral KILCLINE. Wing drop, which we assume is what the request or is referring to as wing flutter, was resolved prior to the program being allowed to proceed to the full-rate production phase. The resolution was the addition of a porous wing fold fairing on the upper surface of each wing. The wing drop was not an issue in the final GAO report, the operational evaluation report, or the Beyond Low-Rate Initial Production report. By the time the FA–18E/F multiyear contract was awarded, wing drop was not an issue.

QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

F136 FUNDING

63. Senator LIEBERMAN. General Hoffman, there has been a lot of discussion and debate on the F136 alternate engine program. Is this program on the Air Force's unfunded priority list?

General HOFFMAN. No, the F136 alternate engine program is not on the Air Force's unfunded priority list.

F–22A ENGINE PERFORMANCE

64. Senator LIEBERMAN. General Hoffman, the Air Force laid some heavy demands for high performance, super cruise, stealth, vectored thrust, as well as reliability and maintenance on the F–22A engine. How would you characterize the performance of the F–22A propulsion system in its testing and early deployment?

General HOFFMAN. The F119 program developed the world's most advanced tactical fighter engine and this engine entered service with unprecedented performance, reliability, and maintainability. The F119 engine contributed to the F–22 exceeding the KPPs for supercruise and acceleration. It has a better introductory in-flight shutdown record than legacy F100–PW–100, –220, and –229 engines (F–15/F–16) with only one operational in-flight shutdown event in over 17,000 engine flight hours. The engine also displayed unprecedented stall-free operations during testing and deployment. Four years prior to maturity, the F119 has a lower shop visit rate (engine removals for maintenance) than currently being demonstrated on the F100–PW–100 and –229.

65. Senator LIEBERMAN. General Hoffman, would you say that the F–22A propulsion system has met or exceeded its expectations? Would you expect this experience to carry over to the F–35 program?

General HOFFMAN. The F119 program developed the world's most advanced tactical fighter engine and this engine entered service with unprecedented performance, reliability, and maintainability. The F119 has exceeded both engine related KPPs of supercruise and acceleration and is outperforming legacy F–15/F–16 engines in key reliability and maintainability metrics. Many F119 manufacturing processes, parts, maintenance practices, and lessons learned are being used by the F135 program. The Air Force anticipates that the success of the F119 program will continue with the F135.

JOINT STRIKE FIGHTER ENGINE COST

66. Senator LIEBERMAN. General Hoffman, the F135 engine for the JSF program is a derivative of the F119 engine for the F–22A program. Despite the sole-source strategy and the instability of the F–22A program, would you please describe the cost history of the F119 engine?

General HOFFMAN. The F119 unit price has decreased with each lot procurement of F–22s.

[In millions of dollars]

Quantity (FFP)	Quantity (Spares)	Contract	F119 Unit Price	Reduction from PRTV (Percent)
6		PRTV	11.442	
12	4	PRTV 2	11.420	0
20	5	Lot 1	10.853	−5
26	6	Lot 2	10.535	−8
42	7	Lot 3	10.385	−9
44	10	Lot 4	9.757	−15
48	10	Lot 5	9.174	−20
48	13	Lot 6	working proposal	TBD

67. Senator LIEBERMAN. General Hoffman, if this committee grants multiyear authority, as proposed in the fiscal year 2007 President's budget, what impact, if any, do you anticipate will occur on costs associated with the engine?

General HOFFMAN. Assuming this question is concerning the F–22 fiscal year 2007 President's budget proposed multiyear procurement, the preliminary BCA from IDA predicts an F119 engine multiyear cost savings of 2.7 percent. The final BCA will be delivered to Congress in mid-May 2006.

EA–6B REPLACEMENT

68. Senator LIEBERMAN. General Hoffman, the Navy plans to replace the EA–6Bs with the E–18G. It is less clear what the Marine Corps intends to do to replace the rest of the current EA–6B fleet. The Air Force had been planning to develop a stand-off jamming capability for the B–52 to help meet its jamming requirements, but this year, the Air Force has canceled the program with no replacement envisioned. What does the Air Force intend to do to replace the capability represented by the rest of the EA–6B fleet?

General HOFFMAN. The Air Force is participating in a joint OSD study to help determine the best stand-off jamming solution. We are approaching this from a systems-of-systems approach to mitigate risk. All options are still open.

69. Senator LIEBERMAN. General Hoffman, are you counting on the Navy to buy more E–18G aircraft to meet your needs?

General HOFFMAN. No, the Air Force is not counting on the Navy to buy more EA–18G aircraft. Even though the EA–18G is a great electronic attack platform, it does not meet the Air Force's need for stand-off jamming.

ALTERNATE ENGINE PRIORITY

70. Senator LIEBERMAN. Admiral Kilcline, again there has been a lot of discussion and debate on the F136 alternate engine program. Is this program on the Navy's priority list?

Admiral KILCLINE. No. The recommendation to remove the F136 engine from the 2007 President's budget was an affordability measure made possible by the demonstrated reliability of the F119 engine.

71. Senator LIEBERMAN. Admiral Kilcline, how many aircraft in the Navy's fleet have alternate engines?

Admiral KILCLINE. None in the deployable fleet or training squadrons. Very few of the Navy's executive and priority cargo jets can utilize alternate engines, i.e. UC–35 aircraft (Pratt & Whitney 535 or JT15) which is a military equivalent of the commercial Cessna aircraft.

72. Senator LIEBERMAN. Admiral Kilcline, it is my understanding that the Navy operates the world's largest fleet of aircraft (F–18) powered by a single engine supplier. Would you please characterize the Navy's experience managing a single engine supplier.

Admiral KILCLINE. The following points are provided, based upon the F404–GE–400/402 engine (F/A–18A–D power plant) and the F414–GE–400 engine (F/A–18E/F and EA–18G power plant) production history.

- The F404 engine, produced by GE, was originally a sole source, new design, based upon the F110 engine. Industrial base concerns and possible

cost savings led the Navy to begin production of an identical design by a second source, Pratt & Whitney. Pratt & Whitney made rapid progress on the second source engine. Feeling competitive pressure, GE offered the Navy tremendous savings in return for a sole sourcing agreement. The Navy terminated Pratt & Whitney participation and awarded a sole source agreement to GE for F404 engines. This engine is meeting F/A–18A–D performance requirements and reliability is currently above goal.

• The GE F414 engine was designed using lessons learned from the F404 engine program. From the beginning, GE in concert with the airframe manufacturer Boeing, were focused on lowering costs. Utilizing multiyear procurement and performance-based logistics contracts has allowed the F414 engine to exceed fleet performance and reliability goals.

73. Senator LIEBERMAN. Admiral Enewold, there has been great debate on whether an engine has flown in support of the JSF program. I seem to recall an engine was flown as part of the JSF demonstrator joint advanced strike technology program. Is this in fact correct, and if so, was the flight(s) successful? Additionally, would you please clarify what engine was flown?

Admiral ENEWOLD. Yes. During the JSF concept demonstration phase, Lockheed Martin flew two JSF concept demonstrator aircraft approximately 200 flight test hours over many sorties to demonstrate specified objectives for three JSF variants. A derivative of the Pratt & Whitney F119 engine powered the demonstrator aircraft.

ALTERNATE ENGINE CANCELLATION DECISION

74. Senator LIEBERMAN. Admiral Enewold, in the decision to cancel the JSF alternate engine, what factors, in addition to the immediate recovery of $2 billion, were most compelling?

Admiral ENEWOLD. The JSF Program Office was not involved in the Department's decision to cancel the F136 Program, and also was not involved in the related supporting analysis. I, therefore, do not have insight on details of the Department's analysis. Department leadership have stated that their decision to cancel the F136 alternate engine program is based on affordability, providing the Department the best balance of risk and cost. I believe the assessment of low operational risk was the most compelling additional reason to propose the cancellation.

75. Senator LIEBERMAN. Admiral Enewold, does the decision to move out with the Pratt & Whitney F135 as the sole engine for your short-take-off/vertical-landing (STOVL) airplanes cause you any concern?

Admiral ENEWOLD. Development concerns with the STOVL are not F135 (or F136) unique. The integration and performance of fan, structural weight, and thermal loading are risks that require balanced technical solutions.

F–18 SHORTFALL

76. Senator LIEBERMAN. Admiral Kilcline, I understand that the Navy is projecting a shortfall of F–18 aircraft during the next decade. The shortfall could be in the range of 40–50 aircraft short of the number required to support the 10 aircraft carrier wings. I also understand that this shortfall assumes that you will be able to operate F–18s for up to 10,000 flight hours. This raises a couple of concerns. Will the Navy be able to maintain its fleet response plan of being able to surge five or six carriers within 30 days of notification, followed by another carrier within 90 days if you are 40–50 aircraft below requirements?

Admiral KILCLINE. I am confident that we will continue to be able to support the requirements of the Navy's Fleet Response Plan. Aircraft carriers and air wings bring a host of capabilities with them when they deploy into theater, not just strike fighters. These include airborne early warning, airborne electronic attack, anti-surface unit warfare, and combat search and rescue capability. Later arriving air wings may not look like the first responders, but the combatant commander will have different needs 30 or 90 days into the fight. The sixth or seventh air wing to surge will be tailored to what is required in theater. Additionally, the projected shortfall will be spread across the entire fleet of Navy and Marine Corps Hornets, including those surging, those remaining in Reserve, and those in the support units.

77. Senator LIEBERMAN. Admiral Kilcline, how much risk are we exposing ourselves to by assuming that the F–18, which was designed for 8,000 hours, will be able to fly operationally until it reaches 10,000 hours?

Admiral KILCLINE. The F/A–18 aircraft was designed for a 6,000-hour service life and was extended via service life bulletin 08 to an interim 8,000 flight hours based upon early fatigue data. Service life extensions of the F/A–18 Hornet are being addressed through the SLAP, which analyzes the impact of potential service life extensions and identifies hot-spots throughout the aircraft. These areas then require recurring inspections and/or aircraft modifications to maintain the health of the aircraft beyond current service life. SLAP phase I analysis, which focused on ground events (CTL) is complete and inspection bulletins and aircraft modification plans are in work. SLAP phase II analysis, which addresses the flight hour extension, is underway with an estimated completion date of December 2007. As the analysis is completed, work will begin on high flight hour inspections and aircraft modifications. The goal of SLAP phase II is to extend the service life to 10,000 flight hours. The current modeling shortfall is based using this flight hour limit.

TECHNOLOGY TRANSFER

78. Senator LIEBERMAN. Admiral Enewold, we have been hearing concerns expressed by a number of the JSF partner countries about the sharing of technology as JSF development proceeds. Is there reason for concern on this issue?

Admiral ENEWOLD. The Department is addressing those concerns with the respective partner countries and this committee. The pace of technical information disclosure, involvement in operational testing, and industrial participation have all been raised during negotiations for the JSF Production, Sustainment, and Follow-on Development Memorandum of Understanding (MOU). The Department is working for resolution by mid-summer 2006 so that each country can begin its MOU staffing process.

79. Senator LIEBERMAN. Admiral Enewold, are you sure that the U.S. Government is giving fair review to these requests for transferring technology to our partners from within the JSF program?

Admiral ENEWOLD. The DOD and Department of State devote extensive attention to this aspect of the JSF program, and are committed to due diligence on all releases.

QUESTIONS SUBMITTED BY SENATOR DANIEL K. AKAKA

JOINT STRIKE FIGHTER ENGINE CANCELLATION JUSTIFICATION

80. Senator AKAKA. Admiral Enewold, as you may remember, during the 1980s, the DOD received many benefits including lower acquisition of engines, better responsiveness from the contractors, but most importantly better readiness for the warfighter. It is my understanding that it was for these reasons that we funded the F136 for the last 10 years. Recently, Under Secretary of Defense for Acquisition, Ken Krieg, has called for more competition in DOD programs. Given this statement, what is the justification for eliminating the F136 from the JSF program?

Admiral ENEWOLD. Department leadership have stated that their decision to cancel the F136 alternate engine program is based on affordability, providing the Department the best balance of risk and cost.

JOINT F–22/JSF VULNERABILITY

81. Senator AKAKA. General Hoffman, if there is such a high degree of commonality between the F119 engine in the F–22 and the F135 engine in the F–35, why wouldn't both aircraft fleets be at risk if a common part becomes faulty and why wouldn't that speak to the benefit of having a second engine producer for the F–35?

General HOFFMAN. The F135 is a derivative of the F119 engine and is modified for the F–35 missions and usage. The turbomachinery is approximately 70 percent common with the F119 from a parts and manufacturing processes perspective. The engine's compressor shares the most common parts with F119. The rest of the turbomachinery has commonality through design criteria and manufacturing processes. Based on the F119 engine's reliable performance after 18,000 flight hours, the Department determined the risks of a single engine supplier are modest and acceptable.

[Whereupon, at 3:58 p.m., the subcommittee adjourned.]

[Annex 1: Subsequent to the hearing, on May 10, 2006, Senator McCain submitted the following additional information for the record:]

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4th May 2006

Dear Senator McCain,

I am writing to respond to your questions regarding the current procurement plan for the Joint Strike Fighter (JSF).

The foreign and security policy of the United Kingdom (UK) is designed to strengthen international peace and stability. A strong transatlantic relationship is fundamental to our vision. To meet the challenges of today, prepare for the tasks of tomorrow and be capable of building for the future, our respective armed forces need to be interoperable for maximum effectiveness.

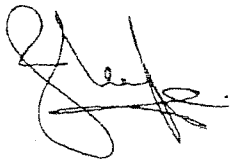
I would like to reassure you that the Joint Strike Fighter remains the optimum solution to the UK's Joint Combat Aircraft requirement. However, as you know, the UK is seeking appropriate access to technology to give us the confidence we need to deliver an aircraft fit to fight, on our terms. This is currently a key concern for the UK. Keeping costs down is also of great importance to all the JSF partner nations and we would certainly agree that proper development and testing of the JSF is essential if we are to produce an efficient more capable aircraft that meets our expectations. The UK remains committed to working closely with the US administration to resolve the issue of technology sharing and ensuring that the JSF programme is founded on a robust acquisition strategy that offers the greatest chance of success and delivers long term value for money. We are optimistic that our ongoing discussions with the US administration will be successful.

In the near future we in the UK will be taking decisions about our requirement for two new aircraft carriers, a key defence capability for the UK

and for future joint coalition operations. The new carriers will be some three times the size of the existing platforms, and will be designed to operate the short take-off and vertical landing variant of the JSF. In reaching our decisions, we need to be confident that the JSF will meet its time, cost and performance parameters. To ensure we make the right decision we must have the right level of confidence that JSF will meet its stated requirements. It is essential to get this right for our warfighters and taxpayers. I would agree that a properly founded development programme should achieve that aim.

The UK's defence and security policy is rooted in the transatlantic alliance at the heart of which is the uniquely close and enduring relationship between our two countries. We are proud that the US counts us as, and trust us to be, your closest ally.

We very much appreciate your personal efforts.



United States Government Accountability Office

GAO

Report to Congressional Committees

April 2006

DEFENSE ACQUISITIONS

Major Weapon Systems Continue to Experience Cost and Schedule Problems under DOD's Revised Policy

GAO-06-368

April 2006

GAO
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Highlights

Highlights of GAO-06-368, a report to congressional committees

DEFENSE ACQUISITIONS

Major Weapon Systems Continue to Experience Cost and Schedule Problems under DOD's Revised Policy

Why GAO Did This Study

The Department of Defense (DOD) is planning to invest $1.3 trillion between 2005 and 2009 in researching, developing, and procuring major weapon systems. How DOD manages this investment has been a matter of congressional concern for years. Numerous programs have been marked by cost overruns, schedule delays, and reduced performance. Over the past 3 decades, DOD's acquisition environment has undergone many changes aimed at curbing cost, schedule, and other problems. In order to determine if the policy DOD put in place is achieving its intended goals, we assessed the outcomes of major weapons development programs initiated under the revised policy. Additionally, we assessed whether the policy's knowledge-based, evolutionary principles are being effectively implemented, and whether effective controls and specific criteria are in place and being used to make sound investment decisions.

What GAO Recommends

GAO recommends that DOD insert specific criteria into the policy at key investment points and require programs satisfy those criteria before allowing them to move forward. In order to insure transparency and accountability, GAO also recommends that DOD require decision makers to include the rationale for their decisions in decision documentation. DOD partially concurred with our recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-06-368.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Michael J. Sullivan at (202) 512-4841 or sullivanm@gao.gov.

What GAO Found

Changes made in DOD's acquisition policy over the past 5 years have not eliminated cost and schedule problems for major weapons development programs. Of the 23 major programs we assessed, 10 are already expecting development cost overruns greater than 30 percent or have delayed the delivery of initial operational capability to the warfighter by at least 1 year. The overall impact of these costly conditions is a reduction in the value of DOD's defense dollars and a lower return on investment. The following table illustrates the problem.

Cost and Schedule Outcomes Sorted by Percent of Product Development Remaining

Programs	Percent cost growth*	Schedule growth, in months	Percent of development remaining
Aerial Common Sensor	45%	24	85%
Future Combat System	48%	48	78%
Joint Strike Fighter	30%	23	60%
Expeditionary Fighting Vehicle	61%	48	49%
C-130 Avionics Modernization Program	122%	Delays anticipated	Undetermined
Global Hawk (RQ-4B)	166%	Delays anticipated	Undetermined

Sources: DOD (data); GAO (analysis and presentation).

*Cost growth is expressed as the percent change in program development cost estimates in 2005 base year dollars.

Poor execution of the revised acquisition policy is a major cause of DOD's continued problems. DOD frequently bypasses key steps of the knowledge-based process outlined in the policy, falls short of attaining key knowledge, and continues to pursue revolutionary—rather than evolutionary or incremental—advances in capability. Nearly 80 percent of the programs GAO reviewed did not fully follow the knowledge-based process to develop a sound business case before committing to system development. Most of the programs we reviewed started system development with immature technologies, and half of the programs that have held design reviews did so before achieving a high level of design maturity. These practices increase the likelihood that problems will be discovered late in development when they are more costly to address. Furthermore, DOD's continued pursuit of revolutionary leaps in capability also runs counter to the policy's guidance.

DOD has not closed all of the gaps in the policy that GAO identified nearly 3 years ago, particularly with regard to adding controls and criteria. Effective controls require decision makers to measure progress against specific criteria and ensure that managers capture key knowledge before moving to the next acquisition phase. However, DOD's policy continues to allow managers to approach major investment decisions with many unknowns. Without effective controls that require program officials to satisfy specific criteria, it is difficult to hold decision makers or program managers accountable to cost and schedule targets. In this environment, decision-making transparency is crucial, but DOD is lacking in this area as well.

Contents

Letter		1
	Results in Brief	2
	Background	4
	DOD's Revised Policy Has Not Improved Development Program Outcomes	8
	DOD Is Not Effectively Implementing the Policy's Knowledge-Based, Evolutionary Approach	12
	Specific Criteria Are Needed to Ensure Disciplined and Transparent Investment Decisions	18
	Conclusions	22
	Recommendations for Executive Action	23
	Agency Comments and Our Evaluation	24
Appendix I	**Scope and Methodology**	27
Appendix II	**Comments from the Department of Defense**	28
Appendix III	**Program Data for 23 Programs Initiated under DOD's Revised Acquisition Policy (as of December 2005)**	31
Related GAO Products		33
Tables		
	Table 1: Cost and Schedule Outcomes for 23 Programs Initiated under the Revised Policy (as of December 2005)	9
	Table 2: Cost and Schedule Outcomes for 6 of the 10 Largest Development Programs Sorted by Percent of System Development Remaining	10
	Table 3: Assessment of Program Design Maturity	17
	Table 4: Assessment of Program Acquisition Strategies for GAO's Nine Case Studies	18
	Table 5: Types of Controls Considered Best Practices for Successful Product Development	20

Figures

Figure 1: Development Cost Overruns by Decade (in Fiscal Year 2005 Dollars) and Key Reform Efforts 5
Figure 2: Comparison of DOD's Revised Policy and Commercial Best Practices Model 7
Figure 3: Cost and Schedule Growth under DOD's Revised Policy 11
Figure 4: Comparison of Programs with Mature versus Immature Technologies at Start of System Development 15

Abbreviations

DOD	Department of Defense
GAO	Government Accountability Office

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United States Government Accountability Office
Washington, DC 20548

April 13, 2006

The Honorable John Ensign
Chairman
The Honorable Daniel K. Akaka
Ranking Minority Member
Subcommittee on Readiness and Management Support
Committee on Armed Services
United States Senate

The Honorable Duncan L. Hunter
Chairman
Committee on Armed Services
House of Representatives

DOD's planned investment in research, development, and procurement of major weapon systems will total approximately $1.3 trillion between 2005 and 2009, with over $800 billion of that investment yet to be made. DOD is facing a significant number of problems in managing its acquisitions. Military operations in Afghanistan and Iraq are consuming a large share of DOD resources and causing the department to invest more money sooner than expected to replace or fix existing weapons. Meanwhile, DOD is intent on transforming military operations while pursuing multiple megasystems that are expected to be the most expensive and complex ever. These costly conditions coupled with increases in spending for other national priorities, such as health care and social security, make it essential that DOD effectively leverage its investments, particularly in weapon system acquisitions. If DOD manages its current portfolio of weapons within traditional margins of error, the financial consequences could be dire.

DOD's strategy for acquiring major weapon systems has traditionally been to plan programs that would achieve a big leap forward in capability within a single development program, a strategy that often results in major cost and schedule problems. We have assessed weapon acquisitions as a high-risk area for 15 years, and although U.S. weapons are among the best in the world, the programs to acquire them have continued to produce poor cost and schedule outcomes. However, the current defense acquisition environment continues to be characterized by cost and schedule growth, a lack of confidence by congressional and DOD leaders, and no appreciable improvement in the defense acquisition system. DOD

knows what to do to achieve better outcomes. It has written into policy an approach that advocates that adequate knowledge be attained at critical junctures before DOD managers agree to invest more money in the next phase of weapon system development. The policy also emphasizes evolutionary principles for acquiring weapons rather than trying to achieve a big leap forward in capability within a single development program. We have reported in the past that DOD's revised policy does not incorporate adequate controls to ensure the effective implementation of a knowledge-based, evolutionary acquisition process. However, DOD believes that the policy includes the necessary controls to achieve effective outcomes.

You requested that we evaluate DOD's compliance with and implementation of its revised acquisition policy intended to produce better cost, schedule, and performance outcomes for major acquisition programs. In order to obtain an early assessment of the cost and schedule impact of the revised policy, and to assess DOD's effectiveness in implementing a knowledge-based, evolutionary acquisition approach we assessed (1) the cost and schedule status of major weapons development programs initiated under the revised policy, (2) whether the policy's knowledge-based, evolutionary acquisition principles are being effectively implemented, and (3) whether effective controls and specific criteria are in place and being used to make sound investment decisions.

In conducting our evaluation, we reviewed pertinent acquisition statutes, policies, and guidance; analyzed development cost and schedule data for 23 major acquisition programs approved to start system development under DOD's revised acquisition policy between October 2000 and December 2004; conducted case study reviews of nine of those 23 programs; and interviewed officials from the Office of Secretary of Defense and each of the military services. We conducted our review from May 2005 to February 2006 in accordance with generally accepted government auditing standards. Additional information about our methodology is contained in appendix I.

Results in Brief

DOD's revised acquisition policy has not led to improved acquisition program outcomes. Programs initiated under the revised policy are already beginning to experience cost and schedule problems similar to programs managed under prior versions of the policy. Although the programs we reviewed have been in development for only a short period of time, nearly half are already estimating development cost growth greater than 30 percent or are expecting to delay initial delivery to the warfighter by at least 1 year. Program officials are facing the familiar

predicament of having to add unplanned money or time or to reduce system capabilities and quantities after initial business cases have been approved and system development has begun. As a result, DOD is reducing its buying power and is not achieving the return on investment it expected when the programs began.

Acquisition officials are not effectively implementing the revised acquisition policy's knowledge-based process. They regularly bypass key phases of the early acquisition process, approach key decision points with limited knowledge about critical technologies and system design, and do not employ evolutionary acquisition principles. Nearly 80 percent of the programs we assessed were permitted to bypass the policy's initial major decision review and the associated systems-engineering process that are intended to ensure that a system's requirements match available resources and that a sound business case is developed prior to starting system development. By not consistently following key processes and strategies, acquisition officials are not ensuring that a solid foundation of knowledge about cost, schedule, and performance is established before allowing programs to start system development, thus resulting in unexecutable business cases. Although the policy explicitly states that programs shall increase program knowledge by maturing technologies before beginning system development, we found that almost three-fourths of the programs started since the policy was revised began development with immature critical technologies. Our analysis also indicates that decision makers are continuing to commit programs to system demonstration and initial manufacturing before officials have demonstrated high levels of design knowledge, as emphasized in the policy. In addition, programs like the Joint Strike Fighter and Future Combat System are still structured to achieve major leaps in capability within a single development program, a strategy that has historically proven to be problematic in terms of cost and schedule outcomes.

Effective implementation of the revised policy is limited by the absence of effective controls that require compliance and specific criteria for clearly demonstrating that acceptable levels of knowledge about technology, design, and manufacturing have been attained at critical junctures during system development before making further investments in a program. Without effective controls, the policy cannot prevent DOD decision makers from starting system development even when they face significant unknowns about technology, design, and production. Without specific criteria—or standards against which a judgment or decision is quantifiably based—decision makers are permitted to make decisions on the basis of subjective judgment. We reported this condition in 2003, yet DOD has not

closed gaps in the policy. In the absence of such controls and criteria, DOD faces the added problems of transparency and accountability because it often does not sufficiently document the rationale for its decisions to allow acquisition programs to advance with low levels of technology, design, and manufacturing knowledge.

This report contains recommendations that DOD require programs to meet specific knowledge-based criteria at each key decision points in the acquisition process and require decision makers to provide clear and specific rationale for their decisions. In addition, we recommend that before programs enter system development they should be required to complete disciplined concept and technology development phases that include specific activities dedicated to capturing knowledge critical to developing an executable business. DOD partially concurred with our recommendations. DOD agrees that knowledge-based decision making is consistent with sound business practice and stated that it would continue to develop policy that reflects a knowledge-based approach and improves acquisition outcomes. DOD also agrees that acquisition decisions should be documented, decision makers should be held accountable, and that they should provide the rationale for their decisions.

Background

Historically, DOD's programs for acquiring major weapon systems have taken longer, cost more, and often delivered fewer quantities and other capabilities than planned. GAO has documented these problems for decades. In 1970, GAO reported that considerable cost growth had been and was continuing to occur on many current development programs. Since that report was issued, numerous changes have been made to DOD's acquisition process and environment to try to improve acquisition outcomes. Those changes include numerous executive branch initiatives and legislative actions as well as roughly 11 revisions to DOD's acquisition policy between 1971 and 2005. Despite these efforts, defense acquisition programs in the past 3 decades continued to routinely experience cost overruns, schedule slips, and performance shortfalls.

Figure 1 illustrates the continued problem of development cost overruns. The figure depicts the combined cost overruns for large development programs (programs totaling more than $1 billion for research, development, testing and evaluation in fiscal year 2005 dollars) in each of the past 3 decades. The figure also identifies some of the major studies and improvement efforts initiated during this time frame. As the figure illustrates, efforts to improve acquisition outcomes have not been successful in curbing acquisition cost problems. Programs initiated in the

1970s exceeded DOD's initial investment estimate by 30 percent, or $13 billion (in fiscal year 2005 dollars), and similar outcomes continued during the subsequent decades despite numerous reform efforts and policy revisions.

Figure 1: Development Cost Overruns by Decade (in Fiscal Year 2005 Dollars) and Key Reform Efforts

1970 - 1979	1980 - 1989	1990 - 1999
Development cost overrun: **$13 billion** (30%)	Development cost overrun: **$12 billion** (39%)	Development cost overrun: **$15 billion** (40%)
Key Studies and Initiatives Impacting the Defense Acquisition Process		
• **1970** Fitzhugh Commission • **1972** Commission on Government Procurement	• **1981** Carlucci Initiatives • **1982** Grace Commission **1986** Packard Commission	• **1994** Federal Acquisition Streamlining Act • **1996** Clinger-Cohen Act
DOD Acquisition Policy Changes		
• **1971** DOD 5000 policy established • **1975** Policy revised • **1977** Policy revised	• **1980** Policy revised • **1982** Policy revised • **1985** Policy revised • **1986** Policy revised • **1987** Policy revised	• **1991** Policy revised • **1996** Policy revised

Source: DOD (data); GAO (analysis and presentation).

Since the mid-1990s, we have studied the best practices of leading commercial companies. Taking into account the differences between commercial product development and weapons acquisitions, we articulated a best practices product development model that relies on increasing knowledge when developing new products, separating technology development from product development, and following an evolutionary or incremental product development approach. This knowledge-based approach requires developers to make investment decisions on the basis of specific, measurable levels of knowledge at critical junctures before investing more money and before advancing to the next phase of acquisition. An evolutionary product development process defines the individual increments on the basis of mature technologies and a feasible design that are matched with firm requirements. Each increment should be managed as a separate and

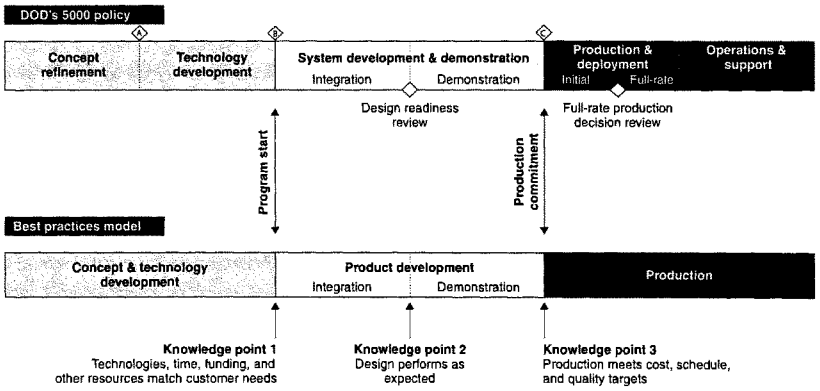
distinct acquisition effort with its own cost, schedule and performance baseline. An increment that excludes one of these key elements puts an extra burden on decision makers and provides a weak foundation for making development cost and schedule estimates. The knowledge-based, evolutionary approach in our model is intended to help reduce development risks and to achieve better program outcomes on a more consistent basis.

Hoping to improve acquisition outcomes, DOD leaders initiated significant revisions to the department's acquisition policy again in October 2000, by adopting the knowledge-based, evolutionary system development approach.[1] We reported in November 2003, that much of the revised policy agrees with GAO's extensive body of work and that of successful commercial firms. DOD's revised policy emphasizes the importance of and provides a good framework for capturing knowledge about critical technologies, product design, and manufacturing processes. If properly implemented and enforced this approach could help DOD's decision makers gain the confidence they need to make significant and sound investment decisions for major weapon systems. Furthermore, the policy's emphasis on evolutionary system development sets up a more manageable environment for achieving knowledge. We also noted that DOD's policy strongly suggests the separation of technology development from system development, a best practice that helps reduce technological risk at the start of a program and makes cost and delivery estimates much more predictable.[2] Figure 2 depicts in general how DOD's revised policy adopts key aspects of the best practices model.

[1]In addition to the acquisition policy, the process used by DOD to establish program funding, known as the Planning, Programming, Budgeting and Execution System (PPBES), and the process used to determine system requirements, now called the Joint Capabilities Integration and Development System (JCIDS), also impact program outcomes. Both processes are currently being studied to determine if any changes could be made to improve program performance as it relates to funding and requirements.

[2]GAO. *Defense Acquisitions: DOD's Revised Policy Emphasizes Best Practices, but More Controls Are Needed*, GAO-04-53 (Washington, D.C.: Nov. 10, 2003).

Figure 2: Comparison of DOD's Revised Policy and Commercial Best Practices Model



Source: DOD (data); GAO (analysis and presentation).

Although DOD took significant steps in the right direction, its policy does not include controls that require program officials to meet the key criteria that we believe are necessary for ensuring that acceptable levels of knowledge are actually captured before making additional significant investments. We previously recommended that DOD design and implement necessary controls to ensure that appropriate knowledge is captured and used to make decisions about moving a program forward and investing more money at critical junctures. DOD officials acknowledged the advantages of using knowledge-based controls, but stated that they believed the policy already included enough controls to achieve effective program results. The officials agreed to monitor the acquisition process to assess the effectiveness of those controls and to determine whether additional ones are necessary.

DOD's Revised Policy Has Not Improved Development Program Outcomes

The cost and schedule outcomes being achieved by development programs initiated since DOD first issued its revised policy have not improved over those achieved by programs managed under prior versions of the policy. Of the 23 major programs we assessed, 10 have already reported estimated development cost growth greater than 30 percent or expected delays of at least 1 year in delivery of an initial operational capability to the warfighter. These programs combined represent a cost increase of $23 billion (in fiscal year 2005 dollars) and an average delay in delivery of initial capability of around 2 years. Most of the other programs were still in the early stages as of December 2005 with over half of system development remaining and had not yet reported an adequate amount of cost or schedule data to effectively analyze their progress. Table 1 contains the cost and schedule increases for the 23 programs we assessed, expressed as a percentage of each program's development estimate.

Table 1: Cost and Schedule Outcomes for 23 Programs Initiated under the Revised Policy (as of December 2005)

Program	Percent growth in estimated development cost[a]	Percent growth in estimated development schedule
Expeditionary Fighting Vehicle	61%	70%
Active Electronically Scanned Array radar (upgrade for F/A-18 E/F fighter/attack aircraft)	14%	1%
Global Hawk unmanned aerial vehicle	166%	Undetermined
Joint Strike Fighter	30%	23%
UH-60M helicopter upgrade	151%	25%
C-130 Avionics Modernization Program	122%	Undetermined
C-5 Reliability Enhancement and Re-engining Program	0%	25%
Joint Tactical Radio System Cluster 1	31%	44%
Joint Tactical Radio System Waveform	44%	Undetermined
Advanced Anti-radiation Guided Missile	7%	0%
Multi-Platform Radar Technology Insertion Program	0%	Undetermined
Future Combat System	48%	53%
E-2 Advanced Hawkeye	5%	0%
Warfighter Information Network-Tactical	0%	0%
Small Diameter Bomb	0%	0%
EA-18G	7%	0%
Joint Tactical Radio System Cluster 5	0%	2%
Multi-Mission Maritime Aircraft	0%	0%
Standard Missile-6 Extended Range Active Missile Block 1	0%	0%
Aerial Common Sensor	45%	36%
B-2 Radar Modernization Program	0%	0%
Patriot/Medium Extended Air Defense System Combined Aggregate Program (fire unit)	0%	0%
Mission Planning System	0%	0%

Sources: DOD (data); GAO (analysis and presentation).

[a]Cost growth is expressed as the percent change in program development cost estimates in fiscal year 2005 dollars.

The Army's Future Combat System is a case in point. Less than 3 years after program initiation and with $4.6 billion invested, the Army has already increased its development cost estimate $8.9 billion or 48 percent and delayed delivery of initial capability by 4 years over the original business case. Similarly, just over 1 year after initiating development of the Aerial Common Sensor aircraft, the Army has reported that severe weight

and design problems discovered during development have stopped work on the program. As a result, program officials are anticipating at least a 45 percent cost increase and a delay of 2 years in delivering an initial capability to the warfighter. These two Army programs are not the only ones experiencing problems. Table 2 contains cost and schedule data for 6 of the 10 largest development programs initiated under the revised policy, including the Future Combat System and Aerial Common Sensor. As the table illustrates there are several programs experiencing large cost increases and schedule delays.

Table 2: Cost and Schedule Outcomes for 6 of the 10 Largest Development Programs Sorted by Percent of System Development Remaining

Programs	Percent development cost growth	Delay in delivery of initial capability in months	Percent of development remaining
Aerial Common Sensor	45%	24	85%
Future Combat System	48%	48	78%
Joint Strike Fighter	30%	23	60%
Expeditionary Fighting Vehicle	61%	48	49%
C-130 Avionics Modernization Program	122%	Delays anticipated due to program restructure	Undetermined due to program restructure
Global Hawk (RQ-4B)	166%	Delays anticipated due to program restructure	Undetermined due to program restructure

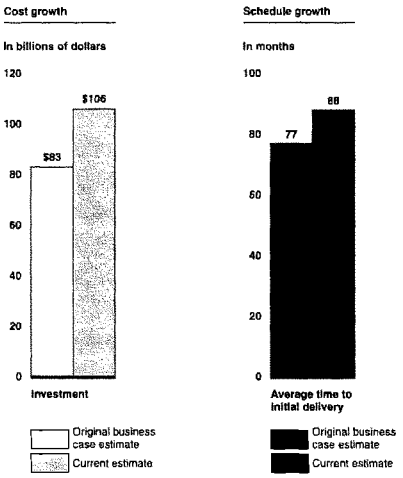
Sources: DOD (data); GAO (analysis and presentation).

A good measure of acquisition performance is return on investment as expressed in acquisition program unit cost because unit cost represents the value DOD is getting for its acquisition dollars invested in a certain program. The programs listed in table 2 will not achieve the return on investment that DOD anticipated when they began development. In the case of Joint Strike Fighter, for example, DOD initially intended to purchase 2,866 aircraft at an acquisition program unit cost of about $66 million. The Navy has reduced the number of Joint Strike Fighter aircraft it plans to buy; technology and design problems encountered during development have led to the significant cost growth. As a result, the acquisition program unit cost is now about $84 million, an increase of 27 percent. We recently reported that the risk of even greater increases is likely because flight testing has not yet started and the acquisition strategy involves substantial overlap of development and production. Similar problems have led to increases in the Future Combat System program. At program initiation, the Army anticipated that each of 15 units would cost about $5.5 billion to develop and deliver. Since that time, instability in the program's technologies and requirements have led to significant cost

increases, leading to a 54 percent increase in acquisition program unit cost, now estimated to be $8.5 billion.

Regarding all 23 development programs, DOD leaders originally planned to invest a total of about $83 billion (fiscal year 2005 dollars) for system development and anticipated delivering an initial operational capability to the warfighter in 77 months on average. However, development costs have grown and delivery schedules have been delayed significantly. DOD now expects to invest over $106 billion in those same programs, an increase of over $23 billion or 28 percent. The delivery of initial capability to the warfighter is expected to take an average of 88 months or nearly 1 year longer than originally planned. Figure 3 shows changes in these business case elements for these programs in the short time since their initiation.

Figure 3: Cost and Schedule Growth under DOD's Revised Policy



Source: DOD (data); GAO (analysis and presentation).

DOD Is Not Effectively Implementing the Policy's Knowledge-Based, Evolutionary Approach

DOD is not effectively implementing the knowledge-based process and evolutionary approach emphasized in its acquisition policy. While the policy outlines a specific knowledge-based process of concept refinement and technology development[3] to help ensure a sound business case is developed before committing to a new development program, almost 80 percent of the programs we reviewed were permitted to bypass this process. Furthermore, the policy emphasizes the need to mature all critical technologies before starting system development and to demonstrate that the product's design is mature before beginning system demonstration. However, nearly three-fourths of the programs reported having immature critical technologies when they received approval to start development, and at least half of the programs had not achieved design maturity before holding their design review and gaining approval to enter the system demonstration phase of development. The policy also emphasizes the use of an evolutionary product development approach, yet program officials continue to structure major acquisition programs to achieve large advances in capability within a single step development program. This strategy has historically resulted in poor cost and schedule outcomes.

Knowledge-Based Process Not Enforced

DOD decision makers continue to approve programs for system development that have not followed key elements of the policy's suggested knowledge-based process. The policy requires program managers to provide senior decision makers with knowledge about key aspects of a system at critical investment points in the acquisition process. Our prior reviews have identified those critical points as the start of system development or program start (referred to as Milestone B in the DOD acquisition policy), design readiness review separating system integration and system demonstration, and production commitment (Milestone C in the DOD acquisition policy). The most important point occurs at program start, when system development begins. DOD acquisition guidance emphasizes the importance of the acquisition phases preceding program start, noting that the decisions made during those phases—concept

[3]According to DOD Instruction 5000.2, the concept refinement phase is intended to refine the initial concept and develop a technology development strategy. Concept refinement ends when the decision authority approves a preferred solution resulting from the analysis of alternatives and approves the associated technology development strategy. After concept refinement, a project enters technology development at Milestone A, when the decision maker has approved the technology development strategy. The purpose of this phase is to reduce technology risk and to determine the appropriate set of technologies to be integrated into a full system.

refinement and technology development—generally define the nature of an entire acquisition program.

Acquisition Officials Are Not Effectively Using Early Processes to Develop Executable Business Cases

Acquisition officials continue to begin system development without following early processes for developing executable business cases. A business case should provide demonstrated evidence that (1) the warfighter's needs are real and necessary and that they can best be met with the chosen concept and (2) the chosen concept can be developed and produced within existing resources—including technologies, design knowledge, funding, and the time to deliver the product when it is needed. Establishing a business case calls for a realistic assessment of risks and costs; doing otherwise undermines the intent of the business case and invites failure. This process requires the user and developer to negotiate whatever trade-offs are needed to achieve a match between the user's requirements and the developer's resources before system development begins.

The revised policy and associated guidance emphasize the importance of following a sound process of systems engineering[4] and decision making prior to initiating a system development program. The process established in the policy consists of two phases, concept refinement and technology development, and a major decision review called Milestone A, which if rigorously followed, would provide acquisition officials with an opportunity to assess whether program officials had the knowledge needed to develop an executable business case. However, almost 80 percent of the programs we reviewed began system development without holding any prior decision review. Senior officials with the Office of the Secretary of Defense confirmed that this is a common practice among defense acquisition programs. This practice eliminates a key opportunity for decision makers to assess early product knowledge needed to establish a business case that is based on realistic cost, schedule, and performance expectations.

Although program officials conduct analysis before starting a development program, they do not consistently follow a process to capture the critical knowledge needed to produce executable business cases, as evidenced by

[4]Systems engineering is a technical management tool that provides the knowledge necessary to translate requirements into specific, achievable capabilities. By using the tools of systems engineering during these early phases of concept refinement and technology development acquisition decision makers and developers can work together to close gaps between requirements and available resources—well before system development starts.

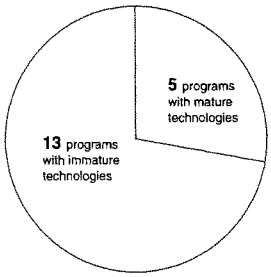
the poor outcomes current programs are experiencing. Officials with the Office of the Secretary of Defense recognized this lack of rigor and discipline in acquisition process, and in February 2004, the Under Secretary of Defense (Acquisition, Technology and Logistics) issued a department-wide policy memorandum directing acquisition officials to place greater emphasis on systems engineering when planning and managing acquisition programs. The policy requires programs to develop a systems engineering plan that describes the programs' overall technical approach, including processes, resources, metrics, and applicable performance incentives. Although DOD's systems engineering initiative has the potential to improve program performance, officials have found that the preliminary results are mixed. Early analysis shows that implementation is inconsistent while program officials learn to develop and implement systems-engineering plans.

Programs Continue to Enter System Development with Immature Technologies

DOD decision makers continue to permit programs to enter system development before critical technologies are mature. Our review of technology readiness assessments and acquisition decision memorandums for our nine case study programs found that seven of the nine programs were approved to begin development even though program officials reported levels of knowledge below the criteria suggested in the policy and associated guidance, specifically in the area of technology maturity.[5] Those seven programs are not isolated cases. As illustrated in Figure 4, 13 of the programs (nearly three-fourths) that received approval to enter system development under the revised policy did so with less than 100 percent of their critical technologies mature to the level specified by DOD. Only 2 of those programs had more than 75 percent of their technologies mature when they began (see appendix III for technology maturity data for each program).

[5]DOD's revised policy emphasizes the importance of reducing technology risk and demonstrating technologies in a relevant environment (technology readiness level 6) prior to program start. A technology readiness level of 6 means the technology should be very close to the planned form, fit, and function of its physical configuration and that it has been tested or proven to work in a relevant environment such as a laboratory. GAO recommends a higher level of maturity in its best practice model based on best commercial practices. This would require a demonstration of the technology in the environment it is expected to be used.

Figure 4: Comparison of Programs with Mature versus Immature Technologies at Start of System Development



Source: DOD (data); GAO (analysis and presentation).

Note: This figure depicts technology maturity status for 18 of the 23 programs in our review. Technology maturity data was not available for the other 5 programs.

Even though acquisition policy states that technologies shall be mature before beginning system development, the practice of accepting high levels of technology risk at program start continues to be the norm and not the exception. An official with Office of the Secretary of Defense responsible for reviewing and validating program assessments of technology maturity informed us that the office generally views immature critical technologies at the beginning of development as an acceptable risk as long as program officials can show that they have a plan to mature the technologies by the time the program reaches its design readiness review, which requires additional investments to move a program from system integration into system demonstration. Therefore, risk management plans are consistently viewed as acceptable substitutes for demonstrated knowledge.

Programs Continue Past Design Reviews before Design Maturity is Demonstrated

In addition to emphasizing the importance of capturing technology knowledge before starting system development, DOD's policy also highlights the importance of demonstrating design maturity before moving from the integration phase of system development into system demonstration and initial manufacturing. The policy establishes a design readiness review between the two phases to determine whether a product's design is mature and stable and whether the product is ready to move ahead. While DOD's policy does not require programs to

demonstrate any specific level of design maturity, our past work has found that a key indicator of design maturity is the completion of 90 percent of the system's engineering drawings. We found that defense programs that moved forward with lower levels of design maturity, as indicated by drawing completion, encountered costly design changes and parts shortages that, in turn, caused labor inefficiencies, schedule delays, and quality problems. Consequently, those programs required significant increases in resources—time and money—over what was estimated at the point each program entered the system demonstration phase.

We analyzed engineering drawing completion data for 8 programs initiated under the revised policy that have held a design review,[6] and found that more than half of those programs had not completed 90 percent of their design drawings before they received approval to enter the system demonstration phase of development. We also analyzed drawing-release data for three programs that have not yet held their design review but have projected the number of drawings officials anticipate will be completed when their reviews are held. Based on projections provided by program officials, 2 of those 3 programs are expected to have less than 55 percent of their drawings complete before they seek approval to begin system demonstration and initial manufacturing.

[6]Some programs did not report having a design readiness review but did report having a critical design review. Where this was the case, we assessed those programs' drawing data at their critical design review.

Table 3: Assessment of Program Design Maturity

Program	Percentage of design drawings complete at design review
Joint Tactical Radio System Cluster 1	28%
Global Hawk unmanned aerial vehicle	33%
Active Electronically Scanned Array radar (upgrade for F/A-18 E/F fighter/attack aircraft)	59%
Expeditionary Fighting Vehicle	81%
B-2 Radar Modernization Program	84%
E-2 Advanced Hawkeye	90%
EA-18G	97%
C-5 Reliability Enhancement and Re-engining Program	98%
Multi-Platform Radar Technology Insertion Program	100%*
Joint Strike Fighter	52%*
Aerial Common Sensor	39%*

Sources: DOD (data); GAO (analysis and presentation).

*Program office projections.

Evolutionary Acquisition Is Not Being Used

Despite the revised policy's guidance that capabilities should be developed and delivered in individually defined and separately managed increments, a majority of major weapon acquisition programs we assessed continue to be structured to achieve revolutionary increases in capability within one development program. According to the policy, the objective of an evolutionary approach is to balance needs and available capability with resources and put capability into the hands of the user quickly. The policy states that the success of the strategy depends on consistent and continuous definition of requirements and the maturation of technologies that lead to disciplined development and production of systems that provide increasing capability. In this approach, requirements that cannot be satisfied within these limits as well as available financial resources must wait for future generations of the product and be managed as separate system development programs with separate milestones, costs, and schedules. In our case studies of nine acquisition programs initiated under the revised policy, we found only one program—the Small Diameter Bomb—that satisfied all of the criteria of an evolutionary approach. In five case studies, we found that program officials had claimed that their

programs were evolutionary, yet our evidence shows they were not evolutionary in practice;[7] and in three cases, program officials chose not to use evolutionary acquisition from the outset. Table 3 summarizes our assessment of the nine case studies.

Table 4: Assessment of Program Acquisition Strategies for GAO's Nine Case Studies

Programs in GAO's case study	Claim to be evolutionary?	Meet evolutionary criteria?	Greater than 30% cost growth or more than 1-year schedule slip
Future Combat System	Yes	No	Yes
Global Hawk (RQ-4B)	Yes	No	Yes
Joint Strike Fighter	Yes	No	Yes
Aerial Common Sensor	Yes	No	Yes
Multi-Mission Maritime Aircraft	Yes	No	No
Small Diameter Bomb	Yes	Yes	No
E-2 Advanced Hawkeye	No	No	No
Expeditionary Fighting Vehicle	No	No	Yes
Multiplatform Radar Technology Insertion Program	No	No	No

Sources: DOD (data); GAO (analysis and presentation).

Specific Criteria Are Needed to Ensure Disciplined and Transparent Investment Decisions

The revised acquisition policy does not contain effective controls that require the demonstration of product knowledge measured against specific criteria to ensure that acquisition officials make disciplined, transparent, and knowledge-based investment decisions. The lack of specific required criteria creates an environment in which unknowns about technology, design, and manufacturing processes are acceptable. Decision makers and program officials are left with no objective measures against which to gauge a program's level of knowledge, making accountability difficult. In the absence of criteria, transparency in acquisition decisions is essential to ensuring accountability, but key decision documents do not provide sufficient information about major decisions. DOD believes that acquisition decision memorandums, used to document program decisions, provide adequate transparency. However,

[7]GAO, *TACTICAL AIRCRAFT: Opportunity to Reduce Risks in the Joint Strike Fighter Program with Different Acquisition Strategy*, GAO-05-271 (Washington, D.C.: March 15, 2005) and GAO, *UNMANNED AERIAL VEHICLES: Changes in Global Hawk's Acquisition Strategy Are Needed to Reduce Program Risks*, GAO-05-6 (Washington, D.C.: November 5, 2004).

the decision memorandums we reviewed did not contain an explanation of the decision maker's rationale and rarely identify remaining risks, especially as they relate to the key knowledge standards emphasized in the policy. Further, the timeliness, accessibility, and depth, of the data contained in the *Selected Acquisition Reports*, DOD's primary means of providing Congress with a status report of program performance, inhibits the reports' usefulness as a management and oversight tool.

In November 2003, we reported that the revised acquisition policy lacked many of the controls that leading commercial companies rely on to attain an acceptable level of knowledge before making additional significant investments.[8] Controls are considered effective if they are backed by specific criteria and if decision makers are required to consider the resulting data before deciding to advance a program to the next level. Controls used by leading companies help decision makers gauge progress in meeting cost, schedule, and performance goals and hold program managers accountable for capturing relevant product knowledge to inform key investment decisions. The controls we have articulated as best practices used by successful commercial product developers are listed below in table 5.

[8]GAO, *DEFENSE ACQUISITIONS: DOD's Revised Policy Emphasizes Best Practices, but More Controls Are Needed*, GAO-04-53 (November 10, 2003).

Table 5: Types of Controls Considered Best Practices for Successful Product Development

Program start (Milestone B): Start of product development
Demonstrate technologies to high readiness levels
Ensure that requirements for the product are informed by the systems engineering process
Establish cost and schedule estimates for product on the basis of knowledge from preliminary design using system engineering tools
Conduct decision review for program start
Design readiness review: Beginning of system demonstration
Complete 90 percent of design drawings
Complete subsystem and system design reviews
Demonstrate with prototype that design meets requirements
Obtain stakeholders' concurrence that drawings are complete and producible
Complete the failure modes and effects analysis
Identify key system characteristics
Identify critical manufacturing processes
Establish reliability targets and growth plan on the basis of demonstrated reliability rates of components and subsystems
Conduct decision review to enter system demonstration
Production commitment (Milestone C): Initiation of low-rate production
Demonstrate manufacturing processes
Build production-representative prototypes
Test production-representative prototypes to achieve reliability goal
Test production-representative prototypes to demonstrate product in operational environment
Collect statistical process control data
Demonstrate that critical processes are capable and in statistical control
Conduct decision review to begin production

Sources: GAO (analysis and presentation).

Some senior officials with the Office of the Secretary of Defense believe that the effective use of controls in DOD's policy and the establishment of more specific criteria for decision making would improve program outcomes. They note that specific criteria need to be established and that programs need to be held accountable to those criteria before being permitted to proceed into the next phase. They also note that the criteria for moving an acquisition effort from one phase of the process to the next, primarily documented in acquisition decision memorandums as exit

criteria, are not typically specific and often do not relate to the key knowledge-based criteria suggested in the policy.

We found this to be true for our nine case study programs. We reviewed acquisition decision memorandums in our case studies and determined that they were not useful in explaining the decision maker's rationale and in almost all of the cases they did not address the key knowledge criteria suggested in the acquisition policy. In most instances, the decision maker simply noted that the program being assessed was ready to proceed into system development, but did not provide an explanation of the rationale for the decision. Senior officials with the Office of the Secretary of Defense told us that they agree that a better explanation of the decision maker's rationale, specifically in instances where the knowledge criteria are not fully met, would provide transparency and ultimately allow for a more accountable decision-making process. The following two examples illustrate how decision documentation is lacking:

- The Future Combat System program received approval to enter system development and demonstration in 2003, with 19 percent of its critical technologies mature, well below the policy's standard. The acquisition decision memorandum supporting this decision did not provide the rationale for approving the system with such a large number of immature critical technologies. The memo did direct an updated review of the decision 18 months later and that the program "remain flexible and open to accommodate trades in the system architecture and in the individual systems' designs."

- The Joint Strike Fighter program was approved to enter system development in 2001. The acquisition decision memorandum did not address the fact that 75 percent of the program's critical technologies were not mature to the policy's standard. The memorandum did acknowledge that the program's requirements could be changed or modified, noting that further refinements in the requirements should be explored as a potential way to reduce program costs. However, the memorandum did not explain why the decision maker determined that the program should enter development without achieving the technology and requirements knowledge emphasized in the policy.

The acquisition decision memorandums for most of the other programs we reviewed did not specifically address critical gaps in knowledge, nor did they effectively explain the decision makers' rationale for deeming those programs ready to begin system development. In memos where we found a reference to key knowledge principles, such as technology maturity, the

decision makers acknowledged that more effort was needed to meet the policy's suggested criteria but considered the risk acceptable to begin development. These memos did not explain why risks were considered acceptable. For example, the Navy's Multi-Mission Maritime Aircraft program had none of its critical technologies mature at program initiation. The decision maker acknowledged the need to further mature the critical technologies but approved the program to enter development. Instead of holding the program to the policy's criteria for entering development, the decision maker simply directed the Navy to work with the Office of the Secretary of Defense to implement risk mitigation and technology maturation plans during the integration phase of system development.

In addition to the lack of transparency provided through acquisition decision memoranda, we also found that the data presented to Congress in DOD's *Selected Acquisition Reports* (*SARs*) provided only limited usefulness as an oversight tool. Since 1969, *SARs* have been the primary means by which DOD reports the status of major weapon system acquisitions to Congress. *SARs* are reports that are expected to contain information on the cost, schedule, and performance of major weapon systems in comparison with baseline values established at program start, full-scale development, and production decision points. Our analysis, as well as a previous GAO review,[9] of current and historical SAR data found that the timeliness, accessibility, and depth of the data contained in the reports limits their usefulness as an oversight tool. Our prior review noted that a number of opportunities exist for DOD to give Congress more complete information on the performance of major defense acquisition programs. DOD agreed that SAR data could be improved to make it more useful to Congress.

Conclusions

Failing to consistently implement the knowledge-based process and evolutionary principles emphasized in the revised acquisition policy—coupled with a lack of specific criteria for making key investment decisions—are keeping DOD on its historical path of poor cost and schedule outcomes. Most programs are incurring the same scope of cost overruns and schedule delays as programs managed under prior DOD policies. More consistent use of the early acquisition processes would improve the quality and viability of program business cases by ensuring

[9]GAO, *DEFENSE ACQUISITIONS: Information for Congress on Performance of Major Programs Can Be More Complete, Timely, and Accessible*, GAO-05-182 (March 28, 2005).

they are founded on knowledge obtained from rigorous and disciplined analysis. The initiative by Office of the Secretary of Defense to reinstitute the use of systems engineering is a step in the right direction. However, in order for this initiative to be effective DOD must establish and enforce specific criteria at key decision points. Our past work has identified and recommended criteria and controls that should be consistently applied at major decision points. The enforcement of these criteria is critical to ensuring that programs have the knowledge necessary to successfully move forward through the acquisition process. DOD officials have acknowledged the advantages of using knowledge-based criteria and controls, but believe the policy already includes enough controls to achieve effective program results. However, without enforceable criteria, defense officials are challenged to determine whether adequate knowledge has been obtained for investing taxpayer dollars. The lack of enforceable criteria also makes it difficult to hold defense officials accountable for their decisions.

Recommendations for Executive Action

DOD must ensure that appropriate knowledge is captured and used at critical junctures to make decisions about moving a program forward and investing more money. We recommend that the Secretary of Defense require program officials to demonstrate that they have captured appropriate knowledge at three key points—program start, design review for transitioning from system integration to system demonstration, and production commitment—as a condition for investing resources. At a minimum those controls should require program officials to demonstrate that they have achieved a level of knowledge that meets or exceeds the following criteria at each respective decision point:

- **Program start (Milestone B): Start of product development**
  - Demonstrate technologies to high readiness levels
  - Ensure that requirements for the product are informed by the systems-engineering process
  - Establish cost and schedule estimates for product on the basis of knowledge from preliminary design using system engineering tools
  - Conduct decision review for program start

- **Design readiness review: Beginning of system demonstration**
  - Complete 90 percent of design drawings
  - Complete subsystem and system design reviews
  - Demonstrate with prototype that design meets requirements
  - Obtain stakeholders' concurrence that drawings are complete and producible
  - Complete the failure modes and effects analysis
  - Identify key system characteristics
  - Identify critical manufacturing processes
  - Establish reliability targets and growth plan on the basis of demonstrated reliability rates of components and subsystems
  - Conduct decision review to enter system demonstration

- **Production commitment (Milestone C): Initiation of low-rate production**
  - Demonstrate manufacturing processes
  - Build production-representative prototypes
  - Test production-representative prototypes to achieve reliability goal
  - Test production-representative prototypes to demonstrate product in operational environment
  - Collect statistical process control data
  - Demonstrate that critical processes are capable and in statistical control
  - Conduct decision review to begin production

Furthermore, to ensure that major decisions are transparent and that program officials and decision makers are held accountable, we recommend that the Secretary of Defense require decision makers to include written rationale for each major decision in acquisition decision documentation. The rationale should address the key knowledge-based criteria appropriate for milestone decisions, explain why a program's level of knowledge in each area was deemed acceptable if criteria have not been met and provide a plan for achieving the knowledge necessary to meet criteria within a given time frame.

Agency Comments and Our Evaluation

DOD provided written comments on a draft of this report. The comments appear in appendix II.

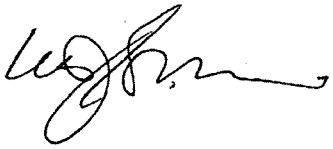
DOD partially concurred with our recommendation that the Secretary of Defense should establish specific controls to insure that program officials demonstrate that they have captured a level of knowledge that meets or exceeds specific criteria at three key points in the acquisition process: program start, design readiness review, and production commitment. DOD agreed that knowledge-based decision making is consistent with sound business practice and stated that it would continue to develop policy that

reflects a knowledge-based approach and improves acquisition outcomes. DOD noted that it would consider our recommendations as it reassesses the DOD acquisition business model and the knowledge required at each decision point. We believe that DOD's plan to reassess its business model provides a good opportunity to establish the controls and specific criteria recommended in this report. Therefore, we are retaining our recommendation that the Secretary of Defense should establish controls to insure that program officials demonstrate that they have captured a level of knowledge that meets or exceeds specific criteria at three key points in the acquisition process.

DOD also partially concurred with our recommendation that the Secretary of Defense require decision makers to provide written rationale in acquisition decision documentation for each major decision. DOD agreed that acquisition decisions should be documented, decision makers should be held accountable, and that they should provide the rationale for their decisions. DOD believes that the implementation of Section 801 of the National Defense Authorization Act for FY 2006 reinforces these processes. The act calls for the decision maker to certify that the program meets certain requirements, such as technology maturity, prior to starting a new development program at Milestone B. However, the act is focused on the decision to start a development program and does not identify specific criteria for programs to be measured against at design readiness review or production commitment. We believe our recommendation adds transparency and accountability to the process because it requires the decision maker to provide the rationale for a decision to allow a program to move forward, not only at Milestone B but at other key decision points as well. Therefore, we are retaining our recommendation that the Secretary of Defense require decision makers to provide written rationale for each major decision in acquisition decision documentation.

We are sending copies of this report to the Secretary of Defense; the Secretaries of the Air Force, Army, and Navy; and the Director of the Office of Management and Budget. We will provide copies to others on request. This report will also be available at no charge on GAO's Web site at http://www.gao.gov.

If you have any questions about this report or need additional information, please call me at (202) 512-4841 (sullivanm@gao.gov). Contact points for the offices of Congressional Relations and Public Affairs are located on the last page of this report. Key contributors to this report were Michael Hazard, Assistant Director; Lily Chin; Ryan Consaul; Christopher DePerro; Travis Masters; and Adam Vodraska.



Michael J. Sullivan
Director, Acquisition
and Sourcing Management

Appendix I: Scope and Methodology

To assess the impact of DOD's revised acquisition policy, we analyzed cost and schedule data for 23 major defense acquisition programs that were approved to begin system development under the revised policy. We did not assess space, missile defense, or ship programs. We collected our data from *Selected Acquisition Reports*, presidential budget documents, ongoing GAO work, and pertinent program officials. We utilized previous GAO reports related to defense acquisition policies and worked with knowledgeable GAO staff to ensure the use of current, accurate data. We also analyzed more than 150 annual *Selected Acquisition Reports* covering a 36-year period from 1969 to 2005, to determine historical trends related to outcomes of acquisition policy implementation.

We assessed whether the revised policy's knowledge-based, evolutionary acquisition principles were being effectively implemented by conducting 9 case study reviews and analyzing design maturity data for 11 programs that have made engineering-drawing data available to GAO. Our case study programs were the Aerial Common Sensor, Multi-Platform Radar Technology Insertion Program, Global Hawk Unmanned Aerial Vehicle, Small Diameter Bomb, Future Combat System, Joint Strike Fighter, Expeditionary Fighting Vehicle, Multi-Mission Maritime Aircraft, and the E-2 Advanced Hawkeye. We interacted directly with numerous program officials to seek input on current developments with their programs. We studied program documents to assess how well programs understand and are implementing the revised acquisition policy. We also analyzed drawing release data for those programs that have either passed their design review or have provided GAO with estimated drawing release data for a future design review to assess design maturity. In several cases, we asked that program offices verify information in these various documents.

We also reviewed Department of Defense (DOD) Directive 5000.1, DOD Instruction 5000.2, and the *Defense Acquisition Guidebook*. In addition we examined each of the military services' policy directives and guidance, DOD memorandums to include policy intent and DOD expectations regarding policy implementation as well as Joint Capabilities Integration and Development System documents. We interviewed relevant officials in Washington, D.C., from the Office of the Director, Defense Research and Engineering, the Joint Staff, the Office of the Secretary of Defense, and Army, Navy, and Air Force acquisition policy staff in order to better understand the content of these documents and the intent of DOD's policy.

We conducted our review from May 2005 to February 2006 in accordance with generally accepted government auditing standards.

Appendix II: Comments from the Department of Defense

ACQUISITION, TECHNOLOGY AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

APR 13 2006

DPAP/PAIC

Mr. Michael Sullivan
Director, Acquisition and Sourcing Management
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Sullivan:

This is the Department of Defense response to the GAO draft report, "DEFENSE ACQUISITIONS: Major Weapon Systems Continue to Experience Cost and Schedule Problems under DOD's Revised Policy" (GAO-06-368/GAO Code 120448) DOD Acquisition Policy Implementation. I concur with the recommendation in the report. Additional comment is attached.

Sincerely,

Shay Assad
Director, Defense Procurement
and Acquisition Policy

Attachment:
As stated

GAO DRAFT REPORT - DATED MARCH 7, 2006
GAO CODE 120448 /GAO-06-368

"DEFENSE ACQUISITIONS: Major Weapon Systems Continue to Experience Cost and Schedule Problems under DOD's Revised Policy"

DEPARTMENT OF DEFENSE COMMENT ON THE RECOMMENDATION

GAO RECOMMENDATION:

DOD must ensure that appropriate knowledge is captured and used at critical junctures to make decisions about moving a program forward and investing more money. We recommend that the Secretary of Defense require program officials to demonstrate that they have captured appropriate knowledge at three key points — program start, design review for transitioning from system integration to system demonstration, and production commitment — as a condition for investing resources. At a minimum those controls should require program officials to demonstrate that they have achieved a level of knowledge that meets or exceeds the following criteria at each respective decision point:

Program start (Milestone B): Start of product development

- Demonstrate technologies to high readiness levels
- Ensure that requirements for the product are informed by the systems engineering process
- Establish cost and schedule estimates for product on the basis of knowledge from preliminary design using system engineering tools
- Conduct decision review for program start

Design readiness review: Beginning of system demonstration

- Complete 90 percent of design drawings
- Complete subsystem and system design reviews
- Demonstrate with prototype that design meets requirements
- Obtain stakeholders' concurrence that drawings are complete and producible
- Complete the failure modes and effects analysis
- Identify key system characteristics
- Identify critical manufacturing processes
- Establish reliability targets and growth plan on the basis of demonstrated reliability rates of components and subsystems
- Conduct decision review to enter system demonstration

Production commitment (Milestone C): Initiation of low-rate production

- Demonstrate manufacturing processes
- Build production-representative prototypes
- Test production-representative prototypes to achieve reliability goal
- Test production-representative prototypes to demonstrate product in operational environment
- Collect statistical process control data
- Demonstrate that critical processes are capable and in statistical control
- Conduct decision review to begin production

Furthermore, to ensure that major decisions are transparent and that program officials and decision makers are held accountable, we recommend that the Secretary of Defense require decision makers to include written rationale for each major decision in acquisition decision documentation. The rationale should address the key knowledge-based criteria appropriate for milestone decisions, explain why a program's level of knowledge in each area was deemed acceptable if criteria have not been met, and provide a plan for achieving the knowledge necessary to meet criteria within a given time frame.

DOD RESPONSE: Partial Concurrence

Partially Concur. The Department of Defense agrees that knowledge-based decision making is consistent with sound business practice. Consequently, we will continue to develop policy that reflects that approach and improves acquisition outcomes. In keeping with that objective and in association with the results of the recently completed Quadrennial Defense Review, we will soon be reassessing the DoD acquisition business model and the knowledge required at each decision point. In that vein, we will consider the GAO proposals during that process. We also agree that acquisition decisions should be documented, that decision makers should be held accountable, and that they should provide the rationale for their decisions—a process reinforced through implementation of Section 801 of the National Defense Authorization Act for FY 2006.

Appendix III: Program Data for 23 Programs Initiated under DOD's Revised Acquisition Policy (as of December 2005)

Program	Program start	Formal Milestone I[a] or Milestone A decision review?	Percent technology mature (TRL 6) at program start	Percent design drawings complete at design review	Percent growth in estimated development cost[c]	Percent growth in estimated development schedule
Expeditionary Fighting Vehicle	12/2000	Yes	80%	81%	61%	70%
Active Electronically Scanned Array radar (upgrade for F/A-18 E/F fighter/attack aircraft)	12/2000	No	0%	59%	14%	1%
Global Hawk unmanned aerial vehicle	2/2001	No	0%	33%	166%	Undetermined
UH-60M helicopter upgrade	4/2001	No	Not available	Not available	151%	25%
C-130 Avionics Modernization Program	8/2001	No	100%	Not available	122%	Undetermined
Joint Strike Fighter	10/2001	Yes	25%	52%b	30%	23%
C-5 Reliability Enhancement and Re-engining Program	11/2001	Yes	100%	98%	0%	25%
Joint Tactical Radio System Cluster 1	6/2002	No	0%	28%	31%	44%
Joint Tactical Radio System Waveform	6/2002	No	Not available	Not available	44%	Undetermined
Advanced Anti-radiation Guided Missile	4/2003	No	Not available	Not available	7%	0%
Multi-Platform Radar Technology Insertion Program	4/2003	No	100%	100% b	0%	Undetermined
Future Combat System	5/2003	No	19%	Not available	48%	53%
E-2 Advanced Hawkeye	6/2003	No	50%	90%	5%	0%
Warfighter Information Network-Tactical	7/2003	No	25%	Not available	0%	0%
Small Diameter Bomb	10/2003	Yes	100%	Not available	0%	0%
EA-18G	11/2003	No	60%	97%	7%	0%
Joint Tactical Radio System Cluster 5	4/2004	No	50%	Not available	0%	2%
Multi-Mission Maritime Aircraft	5/2004	No	0%	Not available	0%	0%
Standard Missile-6 Extended Range Active Missile Block 1	6/2004	No	Not available	Not available	0%	0%
Aerial Common Sensor	7/2004	Yes	50%	39% b	45%	36%
B-2 Radar Modernization Program	7/2004	No	100%	84%	0%	0%
Patriot/Medium Extended Air Defense System Combined Aggregate Program (fire unit)	8/2004	No	83%	Not available	0%	0%
Mission Planning System	12/2004	No	Not available	Not available	0%	0%

Sources: DOD (data); GAO (analysis and presentation).

Note: In this table the term "not available" means that GAO had not received sufficient data to make an assessment of the given program's design and/or technology maturity.

[a]Milestone I was a forerunner to Milestone A, the decision review that currently precedes the start of technology development.

[b]Program office projections.

[c]Cost growth is expressed as the percent change in program development cost estimates in fiscal year 2005 dollars.

Related GAO Products

DOD Acquisition Outcomes: A Case for Change. GAO-06-257T. Washington, D.C.: November 15, 2005.

Defense Acquisitions: Stronger Management Practices Are Needed to Improve DOD's Software-Intensive Weapon Acquisitions. GAO-04-393. Washington, D.C.: March 1, 2004.

Best Practices: Setting Requirements Differently Could Reduce Weapon Systems' Total Ownership Costs. GAO-03-57. Washington, D.C.: February 11, 2003

Best Practices: Capturing Design and Manufacturing Knowledge Early Improves Acquisition Outcomes. GAO-02-701. Washington, D.C.: July 15, 2002.

Defense Acquisitions: DOD Faces Challenges in Implementing Best Practices. GAO-02-469T. Washington, D.C.: February 27, 2002.

Best Practices: Better Matching of Needs and Resources Will Lead to Better Weapon System Outcomes. GAO-01-288. Washington, D.C.: March 8, 2001.

Best Practices: A More Constructive Test Approach Is Key to Better Weapon System Outcomes. GAO/NSIAD-00-199. Washington, D.C.: July 31, 2000.

Defense Acquisition: Employing Best Practices Can Shape Better Weapon System Decisions. GAO/T-NSIAD-00-137. Washington, D.C.: April 26, 2000.

Best *Practices: DOD Training Can Do More to Help Weapon System Programs Implement Best Practices.* GAO/NSIAD-99-206. Washington, D.C.: August16, 1999.

Best Practices: Better Management of Technology Development Can Improve Weapon System Outcomes. GAO/NSIAD-99-162. Washington, D.C.: July 30, 1999.

Defense Acquisitions: Best Commercial Practices Can Improve Program Outcomes. GAO/T-NSIAD-99-116. Washington, D.C.: March 17, 1999.

Defense Acquisition: Improved Program Outcomes Are Possible. GAO/T-NSIAD-98-123. Washington, D.C.: March 17, 1998.

Best Practices: DOD Can Help Suppliers Contribute More to Weapon System Programs. GAO/NSIAD-98-87. Washington, D.C.: March 17, 1998.

Best Practices: Successful Application to Weapon Acquisition Requires Changes in DOD's Environment. GAO/NSIAD-98-56. Washington, D.C.: February 24, 1998.

Best Practices: Commercial Quality Assurance Practices Offer Improvements for DOD. GAO/NSIAD-96-162. Washington, D.C.: August 26, 1996.

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A Child's Hell in the Lord's Resistance Army

Years After She Escaped Ugandan Rebels, Grace Akallo Fights to End a War

By DeNeen L. Brown
Washington Post Staff Writer
Wednesday, May 10, 2006; C01

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War is ugly.

Yet she is still beautiful, sitting there with her scarred cinnamon brown skin. Her lips shine with a natural gloss. Her legs are wounded and polished.

Her eyes flicker with a comprehension of having gone to hell and returned to this side.

And she is telling how she survived.

She is here to put a face on the war. Tell about the atrocities, cruel and brutal; recount the scenes of a war in northern Uganda, where rebels led by a madman steal sleeping children from their beds, because children are easier to brainwash. Tell of rebels who smear the children with oil, promising that the oil will protect them. That the bullets will bounce off the oil. And the children believe them. Then they force the children to kill or be killed.

Grace Akallo, once one of those children, is waiting in the office of Sen. Sam Brownback (R-Kan.), who has requested to see her. The senator emerges from a meeting and introduces Grace, now 26, to a member of his entourage:

"The Lord's Resistance Army came in one night and took her into captivity."

"How long were you in captivity?" the man asks Grace.

"Seven months," Grace answers.

"Seven months," the man says. "Bless your heart and welcome to Washington."

She has come to Washington to get the U.S. government to do what it can to stop the war in northern Uganda, a 20-year-old war in which more than 30,000 children have been abducted, held in captivity and forced to fight in the Lord's Resistance Army.

The LRA, which wants to topple the Ugandan government and create a government based on the Ten Commandments as law, is led by Joseph Kony, who claims to represent the Acholi people. Except support among the Acholi has dwindled, and adults ceased to enlist in the LRA. But children were more easily manipulated. The LRA began snatching them from villages. Grace says children make up more than 80 percent of the LRA. They are subjected to a "spiritual initiation" and sometimes ordered to kill relatives or neighbors. Pretty girls are given to older commanders as wives; the others are often

killed.

Grace tells her story with passion but also with a kind of disassociation from the horrors that she as an unwilling child soldier witnessed and endured. She, too, had to kill people. She remembers being ordered to beat a little girl, taking a small stick and hitting the girl's legs. And because she was not hitting hard enough, one of the rebel commanders took a stick and hit Grace in the back of the head: "You know the soft part where it hurts." She blacked out. And when she came to, the little girl was already dead.

An Uneasy Sleep

Many children who live in northern Uganda leave their villages every night and commute to town centers in search of safe places to sleep. They have been called "Invisible Children." On April 29, people across the United States marched in a "Night Commute" to shed light on the plight of children in northern Uganda. In Washington, about 1,200 people camped in a plaza down the street from the Capitol. They crept on the ground, drew pictures and wrote letters to President Bush to ask the U.S. government to appoint a peace negotiator in Uganda.

"We are sleeping here because the kids in Uganda have to sleep outside because they fear being abducted by the rebels," said Bobby Bailey, 24, a filmmaker and co-founder of Invisible Children, a group organized to help children in Uganda. "Me and a few other guys went to northern Uganda in 2003 and made this movie. What we found inspired us to make a difference."

The documentary was made by three white kids from San Diego who went to Africa in search of a story -- any story. At first, like excited frat boys, they filmed themselves -- killing a snake emerging from its hole, getting sick, dancing, marveling at the African landscape. Then one night, they stumbled upon children sleeping in a town square. "We were going to Sudan because of the genocide," says Bailey, "but our host took us to a refugee camp in northern Uganda. Then a vehicle gets bombed in front of us. We say, 'What's going on?' She says we are in the middle of a war. We say, 'What war?' Then she took us to the city and we saw thousands of kids sleeping, lying down with blankets without their parents."

Cameras rolling, they began asking the children questions. Why are you here?

One boy, maybe 10, his English like the clear, lyrical recitation of a horrible epic, told how his brother had been killed by the rebels. He began to sob. The camera remains trained on the child's face until intimacy becomes torment.

Stolen Children

Before she was abducted, Grace begged her father to send her to school, a privilege often reserved for boys in Uganda. She went to board at St. Mary's College, a convent run by Italian nuns in Aboke.

The school was an oasis in the midst of war -- during the day. At night, the students had to leave their beds to go into town to avoid being abducted by the rebels. When Sister Rachelle Fassera heard of rebel movements, she would warn the girls to get their blankets and head to the city center to sleep that night. "Every night, Sister would say, leave your books on your desk. Go to the dormitory and take only your blanket."

It was Independence Day. There were no classes. The girls were dancing. People were happy. Grace

remembers someone saying, "Maybe this is the last time we will dance."

She remembers Sister Rachelle going out to find government soldiers to guard the dormitories that night. She returned with a promise of protection, but by midnight, no soldiers had arrived. The rebels attacked.

The rebels found the dormitory with the younger girls, and flashed lights through the windows. Grace remembers the beam freezing on the face of one girl, her eyes wide with fright. She heard a rebel shout: "They are there!"

The rebels demanded that the girls open the door, or they would throw bombs inside. One girl did, thinking it would give others a chance to escape.

In a moment of thick fear, the mind gets confused. Grace tried three times to change into a proper dress. Tried three times to slip on some shoes. But her mind would not engage her body to obey. She would spend the next seven months walking through the bush in a nightgown, barefoot.

"I was confused seeing the machete and seeing the gun. I thought I was going to die. My body went numb. I tried to put on that dress that would allow me to run."

The night of the abduction, Grace was 15. She would turn 16 in the bush with the rebels. The rebels made the girls tie themselves to a long rope. "It was not the time for tears. Girls were screaming."

The rebels marched 139 girls out of the school and into the darkness. They walked one night and one day, through the bush, following no road. The rebels did not realize Sister Rachelle was following their tracks.

When she found them, the nun fell on her knees and begged the rebels to let her girls go. "She was telling him, 'Take me and release the girls, or kill me and release my children.' " The commander made her take off her habit. "The veil is very important to the sisters," Grace said. "She removed it because she wanted the girls rescued. She had money and medicine. I wish you had seen her. She was so desperate."

The rebels sat down on banana leaves and began dividing the girls into two groups. "If you looked scared, you are picked. If you looked confident, you are picked. We thought they would kill either group. The girls were trying to disfigure themselves so they would be left behind." Some girls hitched arms up, trying to look crippled. Grace tied her nightgown, hoping they would think she was pregnant and have no use for her.

Twenty-eight girls were chosen to sit in a separate place. "They chose 28, but they wanted 30. The guy came to me and he said, 'Didn't I select you?' I said, 'No, sir.' He took me to the leader of the big group. They said I would be an example to the others."

"Kill me!" Sister Rachelle shouted. "Don't kill her."

The nun knelt down before the commander. The commander told her, "I'm not a god. Get up." Then, 109 girls were chosen, freed to go with Sister Rachelle.

The girls left behind began to wail. Grace can still hear their screams: *No, we would rather die than stay with these people.*

The 30 girls left with the rebels were warned: If any one girl escaped, the 29 left behind would die.

For seven months, they were held captive.

Grace's group was marched to southern Sudan, where rebels lived in bases protected by allies of the Sudanese government. The girls were taught to clean and dismantle guns. "The first thing, you're beaten. The beating is to initiate you into the army," Grace would testify more than a decade later, on another continent, in another world, in another life. "The second thing, you're forced to kill someone." She told the House Subcommittee on Africa, Global Human Rights and International Operations how she was forced to abduct other children: "The more you abduct, the more they give you a rank."

She said Joseph Kony uses "the spirit" to control his young brainwashed soldiers. "When you enter, they smear you with shea nut oil . . . they say that is protection." Then there is a ritual. "They tell you that, 'You do something, you dead. You think of escape, you dead . . . We already know your thoughts.' "

The older girls "became wives" to the men. "In Uganda, we don't say we were abused. There is no word for sex. It is not mentioned. They gave you as wives."

Escape was out of the question. "It's hard to hope."

One night, the children were ordered to invade a village. Grace remembers fainting from thirst, then waking up later in a shallow grave. She walked for three days, eating soil and leaves. She found another group of children who had escaped. "One wanted to kill me. I told them I am not going to die. I escaped from bullets." She persuaded them to join her. They started walking. Some villagers found them and turned them over to the Ugandan soldiers.

Grace was free.

Getting Normal Again

Grace found her family, then returned to St. Mary's to finish school, where Sister Rachelle was still teaching. She also began working as a counselor in a center Sister Rachelle had created for children who had escaped. Grace remembers one child in particular, Evelyn, whom the rebels had used as a shield. Evelyn had been shot in the mouth. "Most of the time, she would feel like her life was destroyed," Grace says. "I would tell her you never know how God works. She still had a future. I would relate my story to her. I told her I escaped and managed to go back to school and I am here to be with you. You can do that. You can become what you want even after going through the torture."

While studying at Uganda Christian University, near Kampala, Grace got a visa to travel to New York to visit Amnesty International. There, she met students who had gone on an exchange program to Uganda from Gordon College near Boston. "I asked them about the school and I applied and I got a scholarship." She is majoring in communications, but hopes to go to graduate school to study international relations and conflict resolution, and maybe someday travel back to Uganda to help the children. "I want to be part of the people struggling day and night to try to bring peace in the world," she told the subcommittee.

During her brief visit to the Hill, the child soldier turned activist lectures senators in hushed elevators and underground shuttles ferrying them to the Capitol. She is accompanied by earnest handlers. Star-struck, she shakes the hand of Sen. Barack Obama (D-Ill.) and compliments him on his book. "I

just finished writing a paper about you," she gushes.

Calm and poised, she urges members of Congress to use their influence to pressure the Ugandan government to end the war, to pressure the government of Sudan to stop supporting the Lord's Resistance Army.

At one point during her testimony, Rep. Diane Watson (D-Calif.) wanted to know more about survival, about how you ever fully escape war.

"How does a human being at any age, any sex, endure and live to tell about it?" Watson asked. "Do you feel they'll ever be normal again? You've learned to use a gun to kill. And I'm wondering how we could really impact on that. And I thought maybe since you've gone on with your education, you probably have insights that can help us as we try to help you and others like you."

Grace thanked her. "These children need love. These children need peace. These children need concrete futures. A matter of counseling a child for only six months doesn't help." Reclaiming a normal life takes more than that for a child no longer a soldier.

"I'm going back home. I'm going back to a community that does not accept me. I'm going back to a community where there's no food," Grace explains. "I'm going back to a community that's terrible. Like, I'm used to now getting food from the people forcibly, but I'm going home and I don't have food. Now, how do I get normal again?"

The day after her testifimony, Grace returns to the Hill to see Brownback, whom she met two years ago when he was on a fact-finding mission to Uganda. Brownback invites her to join him as he races to the Capitol to vote. Grace speaks bluntly as they head to the elevator. "The U.S. government needs to get the Ugandan government to talk peace," she says. "When they abduct you, they kill people. They force you to kill people when they try to escape."

Brownback excuses himself: "I need to go vote and I'll be right back."

Grace finds herself standing there patiently, in sandaled feet and proper dress, while barefoot children are being stolen in the night in Uganda. And the activist that she has become does what she once did as a soldier.

She waits.

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Question for the Record: Air Land Subcommittee, Senate Armed Services Committee

Mr. Sullivan, in your opinion, does the US Air Force's multiyear procurement proposal for the F-22A satisfy the conditions for entering into a multiyear contract for the purchase of property as set forth under 10 U.S.C. 2306b (a) (1)-(6)? Please explain.

Answer:

Sections (a)(1) through (6) of 10 U.S.C. 2306b establish the conditions for entering a multiyear procurement contract for acquiring property. In the case of DOD, this would include the acquisition of major weapon systems. DOD is seeking approval to enter a multiyear contract to acquire 60 F-22As over a three year period. Following is our opinion as to whether these conditions have been satisfied:

(1) **That the use of such a contract will result in substantial savings of the total anticipated costs of carrying out the program through annual contracts.**

We do not believe this condition has been met. The Air Force has not yet completed an estimate of multiyear procurement savings but has stated that it expects a maximum savings under its "best case" scenario of about 5 to 6 percent. It is expected to provide a final estimate to the Congress in May 2006. According to the CBO, substantial savings was defined in the past as at least 10 percent; however, the current law does not define substantial. We would point out, however, that the unit cost to procure remaining F-22As has increased 8 percent when comparing the fiscal year 2007 budget (using multiyear procurement) to the fiscal year 2006 budget (without multiyear procurement). The unit procurement costs to complete the F-22A program in fiscal year 2006 was $166 million per aircraft for 56 aircraft. The unit procurement cost to complete the program in fiscal year 2007 using multiyear procurement increased to $179 million for 60 aircraft. The multiyear plan proposes buying 20 aircraft each in fiscal years 2008 through 2010 whereas the fiscal year 2006 budget terminated procurement in 2008. The inefficiencies connected with extending the program by 2 years will add over $1 billion to the budget.

(2) **That the minimum need for the property to be purchased is expected to remain substantially unchanged during the contemplated contract period in terms of production rate, procurement rate, and total quantities.**

We do not believe this condition has been met. The planned quantities of F-22As have changed substantially over time starting with a requirement for 750 at program start to the current planned quantity of 183. The Air Force still includes the F-22A as one of its highest priority systems and continues to state a need for 381 aircraft, leaving a gap of 198 aircraft. However, in the last two years the quantities have changed twice. In December 2004, OSD determined that procurement of F-22As had to be terminated in fiscal year 2008 in order to save $10.5 billion. OSD stated this was all the F-22s that could be afforded. Then in December 2005, OSD changed the quantities again increasing them to 183 aircraft, adding over $1 billion to the F-22A budget. This tension between OSD and the Air Force will apparently continue into future budgets and quantities and could change again given the

potential for further demands on limited government resources through the 2010 timeframe (War on Terror, future natural disasters, aging population, and many others). This disconnect between quantities needed and quantities that can be afforded is a major contributor to the broken F-22A business case and we believe it needs to be resolved before additional funds are authorized for procurement or modernization. Until the disconnect between needs and affordability can be solved and quantities are firmly established, it is difficult to determine what role the F-22A should have. Other alternatives (JUCAS, F-15s, JSFs) might provide sufficient ground attack capabilities and could result in further reductions in F-22A if its primary role is air superiority.

(3) That there is a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation.

We do not believe this condition has been met. The Air Force has indicated that the fiscal year 2007 Future Years Defense Plan is short $400 million to successfully complete the multiyear procurement. The Air Force believes it will need these funds in fiscal years 2009 and 2010. We cannot predict what future demands will exist on DOD funding and can only point to the past two years where OSD has changed both the amount of funding for and quantities of F-22A aircraft. There is nothing to show for sure that greater demands will not happen again by 2010, the last year of the proposed multiyear contract.

(4) That there is a stable design for the property to be acquired and that the technical risks associated with such property are not excessive.

We do not believe this condition has been met. The baseline F-22A aircraft, designed primarily for the air superiority role (primarily air-to-air with limited ground attack) has successfully completed development and initial operational testing and its design is relatively stable for that particular mission. There are over 90 production aircraft already on fixed price type contracts and the F-22A is deployed in operational squadrons in the US. During testing, the F-22A was shown to be operationally effective, but was found to need improvements in maintainability and supportability. It has recently completed follow-on operational testing, albeit with continued concerns about maintenance and supportability.

However, the Air Force plans to spend several billions of additional dollars to modernize the F-22A to add more robust ground attack capability. A key to the success of this effort is the development and integration of new radar. The Air Force plans to begin installing this radar in the aircraft in November 2006 but the software needed to provide the robust ground attack will not be completed until 2010. Integrating this type of radar in other fighter aircraft programs has not been easy and the F-22A experienced significant problems when trying to integrate avionics and software during the development program. A representative of Defense Operational Test and Evaluation told us that the key to achieving a more robust ground attack capability will center on the integration of this new radar. Until software and integration testing in the F-22A have been successfully completed we consider the design unstable.

(5) That the estimates of both the cost of the contract and the anticipated cost avoidance through the use of a multiyear contract are realistic.

We believe this is questionable at this time and will require the Air Force to submit a detailed and independent estimate of the cost and will require some evidence that the contractor is willing to sign up to this cost.

(6) In the case of a purchase by the Department of Defense, that the use of such a contract will promote the national security of the United States.

We have no opinion on this, but would think that DOD would have to show that the above criteria were being met. Otherwise, it would not be prudent use of limited defense dollars that could be used more appropriately for other national security needs.

NOT FOR PUBLICATION
UNTIL RELEASED BY
SENATE ARMED SERVICES COMMITTEE

STATEMENT OF

CHRISTOPHER BOLKCOM
SPECIALIST IN NATIONAL DEFENSE
CONGRESSIONAL RESEARCH SERVICE

BEFORE THE

SENATE ARMED SERVICES COMMITTEE
AIRLAND SUBCOMMITTEE

HEARING ON AIR FORCE AND NAVY
TACTICAL AVIATION PROGRAMS IN THE
FY2007 DEFENSE AUTHORIZATION REQUEST
AND THE FUTURE YEARS DEFENSE PLAN

MARCH 28, 2006

NOT FOR PUBLICATION
UNTIL RELEASED BY
SENATE ARMED SERVICES COMMITTEE

Memorandum May 10, 2006

TO: Sen. John McCain
Attention: Chris Paul

FROM: Christopher Bolkcom (7-2577)
Specialist in National Defense
Foreign Affairs, Defense, & Trade Division

SUBJECT: Joint Cargo Aircraft (JCA) Program

This memo responds to your recent request that CRS review Sec. 801, §2366a. *Major defense acquisition programs: certification required before Milestone B or Key Decision Point B approval* from the FY2006 Defense Authorization Act and assess its applicability to the Joint Cargo Aircraft (JCA) program.

Per the January 20, 2006 Memorandum of Understanding (MOU) between the Army and the Air Force, the two Services agree that a shortfall exists in short-range intra-theater airlift. Prior to being merged by the Office of the Secretary of Defense (OSD), the Army's Future Cargo Aircraft (FCA) program and the Air Force's Light Cargo Aircraft (LCA) shared many similarities. Both envisioned purchasing a mature, low-cost, commercially available aircraft, and modifying it minimally for military use.

The two programs differed significantly, however, in their maturity. The FCA program conducted an analysis of alternatives (AOA), and completed the Joint Requirements Oversight Council (JROC) Initial Capabilities Document (ICD) phase. The Army was preparing for Milestone C (source selection). Low Rate Initial Production (LRIP) was anticipated at the beginning of FY2007. The LCA program, conversely, was much less mature. The Air Force had not completed, for example, an AOA.

In the strictest interpretation of §2366a, the JCA is viewed as non-compliant with the requirement for an AOA. Considering the disparate maturity of the Army's and Air Force's progress in defining Service-specific requirements, and exploring potential solutions and alternatives to these requirements, some might argue that it is appropriate and fully within the letter and spirit of §2366a to direct the JCA program to conduct a new AOA, and to align the Army and Air Force efforts, via the JCA program, in terms of budget and schedule.

However, interviews with Air Force representatives involved in the JCA program indicate a strong probability that the Army and Air Force will follow the January 2006 MOU with a Memorandum of Agreement sometime in May 2006. It is expected that as part of this

MOA, the Air Force will accept the Army's FCA AOA and CDD as fully representing Air Force needs. If this forthcoming MOA does include the Air Force's endorsement of the JCIDS findings and process for the FCA, then some may find it reasonable to consider the FCA AOA a defacto JCA AOA. Further, the Air Force did complete an *Initial* (emphasis added) Capabilities Document for the LCA, which presents LCA desired attributes. If the desired attributes described in this document jibe sufficiently with those described in the FCA's AOA, it may be reasonable to consider the requirements and alternatives studies completed for the FCA and LCA sufficient to satisfy §2366a requirements for the JCA. The following table summarizes the noteworthy capabilities desired for each program.

Parameter	**Army FCA Requirement**	**Air Force LCA Requirement**
Document	February 17, 2006 briefing to Congress	Initial Capabilities Document
Self-Deploy	X	2,200 nm unrefueled
Airdrop Capable	X	N/A
Reconfigurable	X	N/A
Mission Radius	400-600nm	600nm
Airspeed	250-300 kts	250 kts
Payload	436L pallets, CDS bundles Troops	18,000 lbs
Unimproved runways	Sod, Clay, Gravel	N/A
Maximum airstrip	2,000ft @ 6,000-ft PA & 95°F	2,000ft @ 6,000-ft PA & 95°F
Day/Night adverse weather, IFR/VFR	X	X
GATM Compliant	X	X
Modern Integrated ASE suite for survivability	X	X
NVG compatible	X	X
Pressurized	X	N/A

Key
X = Parameter required, no quantification or qualification of requirement provided
N/A = not addressed in document
nm = nautical miles
kts = knot, true airspeed
PA = pressure altitude (reading on a barometric altimeter)
IFR = Instrument flight rules
VFR = Visual flight rules
GATM = Global Air Traffic Management
ASE = Aircraft Survivability Equipment
NVG = Night vision goggles

Department of Defense Office of Inspector General

Report No. D-2006-075 April 12, 2006
(Project No. D2005-D000FE-0149.000)

Acquisition of the Joint Primary Aircraft Training System

Executive Summary

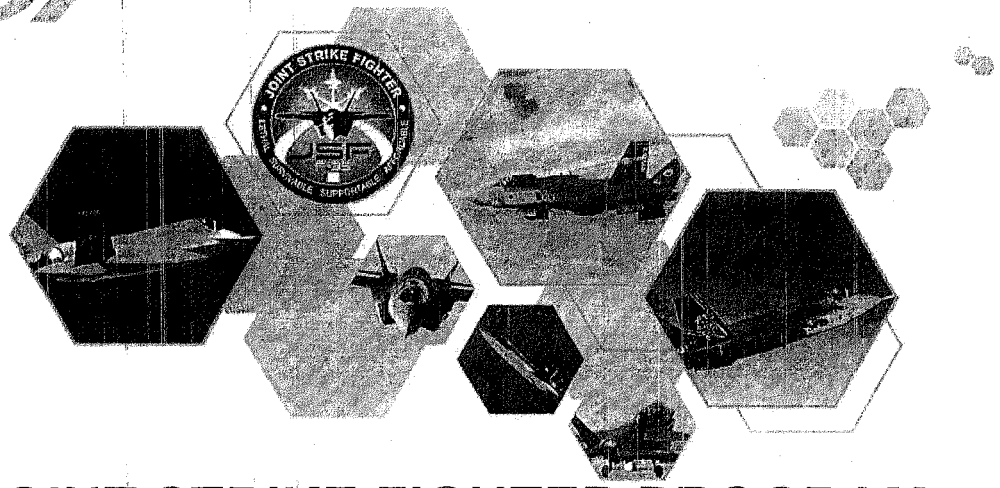
Who Should Read This Report and Why? Civilian and military managers involved in managing acquisition programs should read this report to obtain information about commercial item acquisitions that occurred because of DoD acquisition streamlining efforts.

Background. The Joint Primary Aircraft Training System is a joint program that is in the process of replacing the Air Force T-37 and the Navy T-34 aircraft with the T-6A Texan II aircraft (T-6A). The Joint Primary Aircraft Training System program also complements the T-6A with the Ground-Based Training System. The primary mission of Joint Primary Aircraft Training System is to provide students with the basic skills and qualifications necessary to become a military pilot. The Air Force and Navy plan to buy a total of 782 aircraft (454 Air Force, 328 Navy) and 122 Ground-Based Training Systems, at an estimated cost of $4.5 billion.

Results. The Air Force inappropriately awarded the T-6A production contract for Lots 7 through 13 as a commercial item under Federal Acquisition Regulation Part 12, "Acquisition of Commercial Items." As a result, the Air Force increased their risk of paying excessive prices for the T-6A. The risk increased because there was no commercial market and limited foreign sales. In addition, Air Force personnel were unable to obtain adequate cost and pricing information from the contractor. The Assistant Secretary of the Air Force (Acquisition) should discontinue the commercial item procurement strategy for the Joint Primary Aircraft Training System program and replace it with a strategy that would require the contractor to provide cost or pricing data as appropriate. (See the Finding section of the report for the detailed recommendations.)

Management Comments. The Military Deputy, Office of the Assistant Secretary of the Air Force (Acquisition) concurred with this report's recommendation. He stated that a senior level Air Force review group endorsed the use of Federal Acquisition Regulation Part 15, "Contracting by Negotiation," for the follow-on production contract. The strategy was subsequently approved by the Air Force Acquisition Executive on February 14, 2006. The comments from the Military Deputy, Office of the Assistant Secretary of the Air Force (Acquisition) were fully responsive. Therefore, no additional comments are required. See the Finding section of the report for a discussion of management comments and the Management Comments section of the report for the complete text of the comments.

JOINT STRIKE FIGHTER
is the next generation strike fighter



JOINT STRIKE FIGHTER PROGRAM

Tasking from 27 June 02 IPR

"Benefits of Competitive JSF Engines"

31 OCTOBER 2002

AGENDA

- TASKING & APPROACH
- BACKGROUND
  - Congressional Direction
  - Previous PMAG
  - Acquisition Strategy
- PMAG UPDATE
- CONCLUSIONS

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

TASKING & APPROACH

- **Tasking from 27 June 02 IPR**

  " Readdress the benefits of having a second source for the JSF engine early in the program and provide the assessment to me and the Cost Analysis Improvement Group by October 2002."

  "Additionally, provide the engine Unit Recurring Flyaway costs."

- **Approach**
  - Review and update previous PMAG

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

CONGRESSIONAL DIRECTION

- **FY96 Appropriations Conference:**
  - "The conferees are concerned about the lack of engine competition on the JAST Program and direct the Under-Secretary of Defense (Acquisition and Technology) to report by 1 Mar 196 the Department's plan to ensure engine competition in the JAST Program and to include a plan for production competition."
- **FY97 SASC:**
  - "The committee is persuaded that the benefits of engine competitions will out weigh any near-term investment. The committee directs that remaining competition funds be rebaselined to guarantee integration into the preferred weapons system concept at the earliest practical point."
- **FY98 National Security Committee**
  - "The committee continues to believe that a fully developed and flight tested alternate fighter engine is essential to reduce risk to the JSF program and to provide credible competition necessary for controlling program cost."

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

CONGRESSIONAL DIRECTION

- **FY00 HASC**
  - "The committee continues it's strong support for the development of an alternate engine to ensure sustainment of critical industrial base capabilities, control of engine cost growth and reduction of risk to the reliability of the planned fleet of 3000 JSF aircraft."
- **FY01 HASC**
  - "...recommends the Department specifically address measures to ensure the health of fighter engine industrial base in any proposed restructure of the acquisition program for JSF."
- **FY03 Appropriations Conference**
  - "The conferrees have included an additional $29,750,000 for the Joint Strike Fighter Interchangeable Engine Program only to continue the current effort to develop and maintain two, competing, interchangeable engine programs for the Joint Strike Fighter."

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

HISTORY OF CONGRESSIONAL PLUS-UPS

FY97	$10.0M
FY98	$15.0M
FY99	$7.5M
FY00	$15.0M
FY01	NONE
FY02	$2.5M
FY03	$29.75M
TOTAL	$79.75M

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

PREVIOUS PMAG

- **FY98 Authorization Act required SECDEF to certify "sufficient funding to carry out an Alternate Engine Development Program that includes flight qualification of an alternate engine in a JSF airframe."**
  - ✓ PMAG briefed ASN RDA on 12 Jan 98
  - ✓ SECNAV & SECAF notified SECDEF of intent to fund Alternate Engine through FY05 (POM 00)
  - ✓ DUSD(AT&L) certified to the SAC Defense Subcommittee Chairman "...sufficient funding to carry out an Alternate Engine Development Program that includes flight qualification of an alternate engine in a JSF airframe."

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

Previous EMAG Summary
Alternate Engine Program Assessment

Industrial Base	G
Readiness	G
Other Considerations	G
International Implications	G
Cost	Y
Growth Potential	Y
E&MD Risk Reduction	●

G Beneficial
Y Marginal
● No Value

Overall G

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

Previous PMAG Conclusion

The JSF Alternate Engine Program Offers:

- *Significant Benefits*
  - Contractor Responsiveness
  - Industrial Base
  - Readiness
  - International Participation
- *But Does Not Provide Significant*
  - E&MD Risk Reduction
  - Cost Savings
  - Additional Growth Capabilities

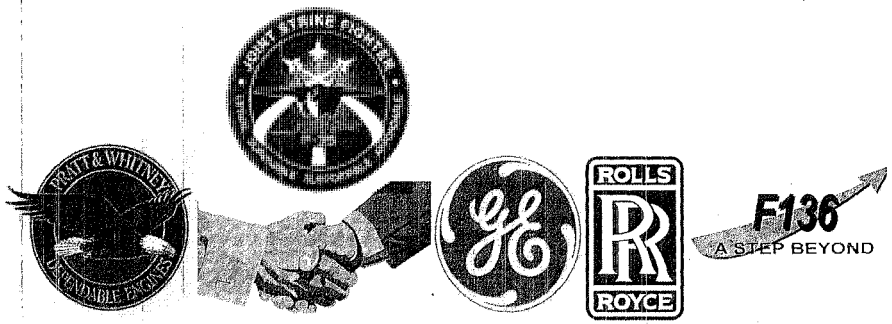
Recommendation

Proceed with the JSF Alternate Engine Program as currently planned. This recommendation is made independent of the services' affordability issues which were beyond the scope of the analysis.

PROPULSION ACQUISITION STRATEGY

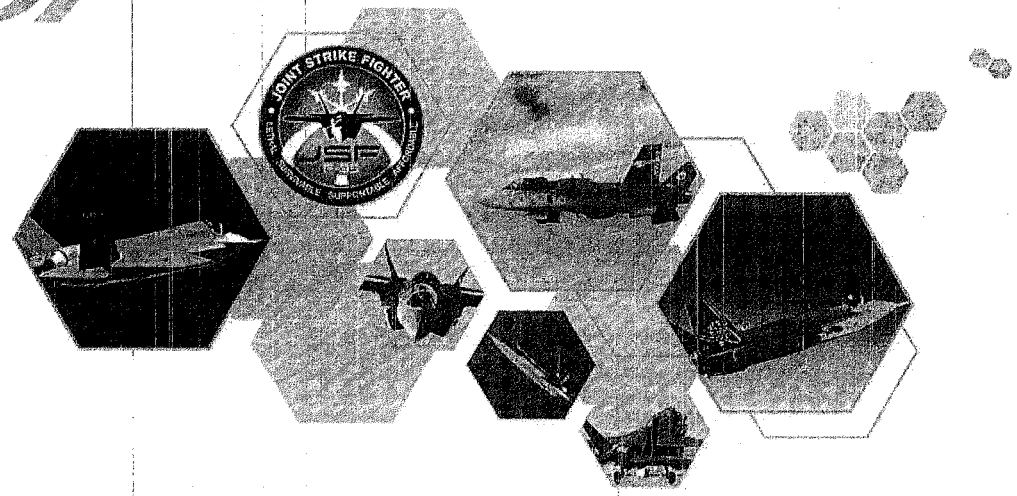
- Affordably Develop, Produce and Support two Physically and Functionally Interchangeable Engines
- All Aircraft can use either Engine
- Common JSF Autonomic Logistics System Interfaces

PRATT & WHITNEY
AIRCRAFT PRODUCTION SERVICES
F135
ROLLS-ROYCE HAMILTON SUNDSTRAND



COOPETITION

JOINT STRIKE FIGHTER
the next generation strike fighter



ENGINE PMAG UPDATE

Presented by:

RADM Tim Heely

Assistant Commander for Research and Engineering, NAVAIR 4.0

And

Mr. Bob May

Executive Director, Air Force Research Laboratory

PMAG Update Conclusion

The JSF Competitive Engine Program Offers:

- *Significant Benefits*
  - Contractor Responsiveness
  - Industrial Base
  - Readiness
  - International Participation
- *But Does Not Provide Significant*
  - SDD Risk Reduction
  - Cost Savings
  - Additional Growth Capabilities

Recommendation

Proceed with the JSF F136 Engine Program as currently planned. This recommendation is made independent of the services' affordability issues which were beyond the scope of the analysis.

PRE-DECISIONAL/INTERNAL WORKING DRAFT/CONTAINS PRE-DECISIONAL/INTERNAL WORKING DRAFT/OR

Summary
Engine Program Assessment Update

Industrial Base	G
Readiness	G
International Implications	G
Other Considerations	G
Cost	Y
Growth Potential	Y
E&MD Risk Reduction	●

G Beneficial
Y Marginal
● No Value

Overall G

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

JSF Engine PMAG Update
Team Members

EXECUTIVE LEADS

RADM Tim Heely - NAVAIR 4.0 ***Mr. Bob May - AFRL***

dustrial Base Team

Lead - Dean Gissendanner	***OUSD(A&T)/S&TS/AW***
Dave Edmunds	ASC/LP
Chris Cook	UK Defence Staff
Steve Bizzarro	NAVAIR 4.4
Steve Thompson	OUSD(AT&L)/IP/ICA

'eadiness Team

Lead - Dave Pauling	***NAVAIR 4.4***
Col Ross Pennington	Av Sup Log HQMC
Pat McLaughlin	***N -78***
Paul Kovalsky	***NAVAIR 3.1.1***
Tim Dues	OC-ALC/LR
Gil Montoya	OC-ALC/LPF

Life Cycle Cost Team

Lead - Don Allen	NAVAIR 4.2.1
Steve Gagen	Air Force
Al Pressman	***NAVAIR***
Sonia Sharkey	NAVAIR
Corey Gomez	NAVAIR
Doug McGinnes	NAVAIR
John Dorsett	***NAVAIR***
Mr. Paul Moseley	UK MoD
Tom Coonce	OSD CAIG

Participated in Previous PMAG

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

Industrial Base

- Industrial base includes: Technology, Design, Test, Manufacture, Supplier Base, Systems Integration, Support, Intellectual Capital
- P&W and GE have substantial commercial engine design, development, production, support business bases
- Significant commonality between commercial and military engine technology, but many military unique requirements

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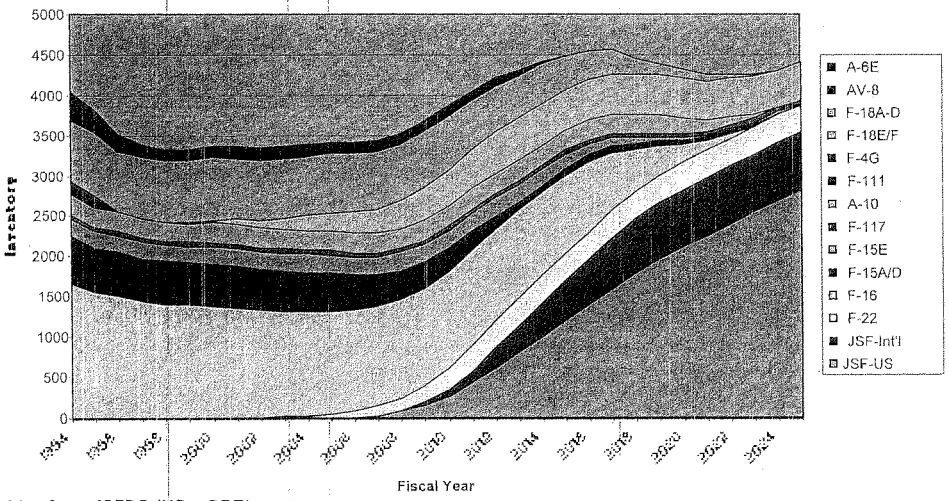
Industrial Base Assessment

- GE cannot sustain competitive fighter/attack engine technology design/development capability without F136 Engine Program
- Potential domestic and international buy of JSF is adequate to support two engine sources
- Supplier base adequate to support two engine sources
  - Significant commercial market
  - Many similarities between P&W/GE sources

F136 Engine Program Maintains/Enhances Industrial Base

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

TACAIR Aircraft Inventory



JSF Quantities from JSFPO (US = QDR)
All other Aircraft Qtys from PA&E, 2020 - 2025 extrapolated

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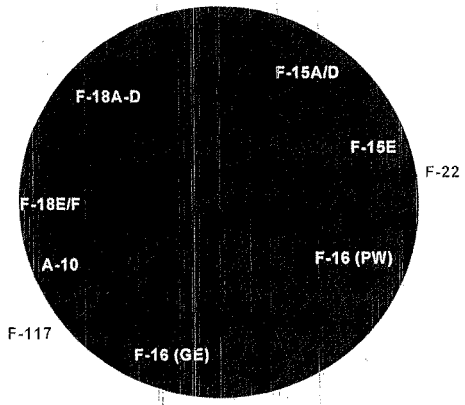
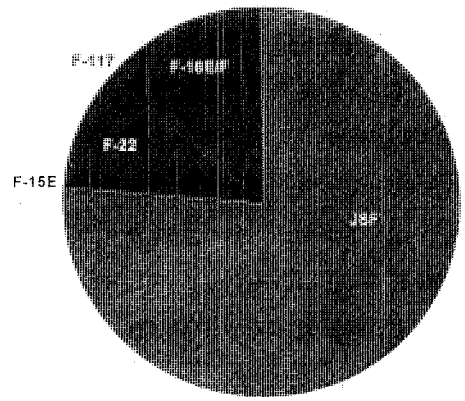
US Fighter/Attack Fleet by Engine Manufacturer



P&W	GE
43%	51%



P&W	GE	JSF
10%	14%	76%

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

Readiness

- **Readiness Requirement: Maintain sufficient serviceable engines to meet Defense Planning Guidance**

- **Engine Readiness Historically difficult to maintain**
  - Function of multiple complex factors
  - Severe internal engine operating environment
  - Expensive long lead parts with limited suppliers

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Readiness

- **Engine impact on readiness magnified by single engine design, long recovery lead times, and size of the JSF fleet**
- **Interchangeable Engines assure a single problem won't effect entire JSF fleet**
  - Flight safety related groundings/Increased safety risk
  - Aircraft holes/bare firewalls due to shortage of serviceable engines
  - Increased maintenance workload for risk management inspections/unscheduled maintenance
  - Labor Strikes and acts of God
- **Competitive pressures improve reliability/availability**
  - C-17's F117 commercial experience
  - F-16's F110/F100 competition
- **Alternate Engine Program complicates logistics support – but doable**
  - Interchangeability approach/common hardware will help
    - USAF F-16 (F100/F110)
    - USN F-14 (F110/TF30)

F136 Engine Program Enhances Readiness

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

International Implications

- **Current International Partners in favor of a second engine source:**
  - **United Kingdom** – "Despite the short-term cost and management disadvantages of a second engine supplier, the UK believes that the prospects of medium and long-term benefits are sufficiently robust to warrant continuation of a second engine programme."
  - **Netherlands** – "It is highly likely that NL will only select one type of engine for its fleet. However, we believe that competition will have a positive effect on the purchase cost of the engine. Therefore NL supports the two engine development approach.... The Dutch decision to participate as a level 2 partner for $ 800 million is based on a business case with involvement from the NL industry in the development and production of both Pratt & Whitney and General Electric engines."
  - **Canada** – "In all likelihood, if and when Canada buys JSF, we will elect one engine type.... We do see, however, the potential benefits in price that a competitive procurement environment would provide. It would be a shame to lose that potential because of short term cost cutting."
  - **Italy** – "The competition that in the past years has been the main driver for the success of the program during the CDP should continue, in our opinion for the engines for several reasons."
  - **Turkey** – "...Turkey is thinking positive in this issue and supporting the idea of the second source engine program."

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International Implications

- **Current International Partners opposed to a second engine source:**
  - **Denmark** – "...it is obvious that countries with a limited number of aircraft... would need to utilize only one type of engine.... there would be no measurable benefit from the possibility to choose between two engine configurations. Therefore,... the RDAF would want to utilize a single engine configuration for their JSF fleet,... from experience we would select the most mature engine for our jets, which because of the early JSF engine down selection is the Pratt & Whitney product. The RDAF therefore will not benefit from development of an alternate engine development."
  - **Norway** – "Norway's position on the second source engine program is that we would rather see only one engine developed for the JSF, compared with the two engines being developed in the program today. We very much concur with Denmark's position"

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Other Considerations

- **Competitive procurement environment provides maximum value at the minimum price**
  - Interchangeability plan helps keep support costs at a minimum
- **Candidate competitive areas**
  - $ URF
  - Supportability Factors
    - Time on wing
    - O level logistic footprint
    - Variant commonality/interchangeability
  - Commercial Elements of Logistic System
- **Potential to incentivize contractor investment**
  - Speed Reliability/Durability Improvements to the Field
    - Eliminate/off-set need for CIP
  - Development of Growth Technologies
    - Performance Improvements
      - SFC, Weight, Life Extension
- **Leveraging the potential for "best of breed" design solutions**
  - P&W and GE/RR collaborating on common hardware

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Engine Comp tition Studies

Gray: did not assess | Green: positive effect | Yellow: unclear effect | Red: negative effect

	ACQUISITION COST	ENGINE PERFORMANCE	LCC	CONTRACTOR RESPONSIVENESS	OPERATIONAL EFFECTIVENESS
Camm, Frank,"Development of the F100-PW-220 and F110-GE-100 Engines: A Case Study of Risk Assessment and Risk Management," RAND Corporation, Santa Monica, CA., 1993					
Drewes, Robert, "The Air Force and the Great Engine War," National Defense University Press, 1987					
Hoover, Jeffrey A.,"Alternate Fighter Engine Competition Study," ASD/ YZP, Wright-Patterson AFB, OH., 1986					
Hirschberg, Michael J., "The Air Force Alternate Fighter Engine Program (AFE)," ANSER, Inc., Arlington, VA., 1995					
Kennedy, David M.,"The Great Engine War," Kennedy School of Government, Harvard University, Boston, MA., 1985					
Mayes, Victoria, "Analysis of the Air Force and The Great Engine War," AFIT Masters Thesis, 1988					
Ogg, John, "Metamorphosis of Business Strategies and Air Force Acquisition Policies in the Aerospace Propulsion Industry: Case study of the Great Enigne War," MIT Masters Thesis, 1987					
Pilling, Donald L., "Competition in Defense Procurement," Brookings Institute, Washington D.C., 1989					

Cost Analysis

Y

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

Cost Analysis Groundrules

- **All cost shown in constant FY02$**
- **Sunk costs (F136 Phase I, II and III) not included**
- **Remaining investment includes**
  - GE/RR, P&W and LM SDD costs
  - Loss of learning due to split production
- **STOVL turbomachinery and complete CTOL/CV engines will be competed**
  - U.S. and International configurations are the same
  - STOVL lift system hardware will not be competed
- **15% spares factor applied to all production quantities**
- **Displaced improvement curve at point of competition**
  - Split-buy results in engines being purchased at higher points on improvement curves
- **Contractor business base impacts not addressed**

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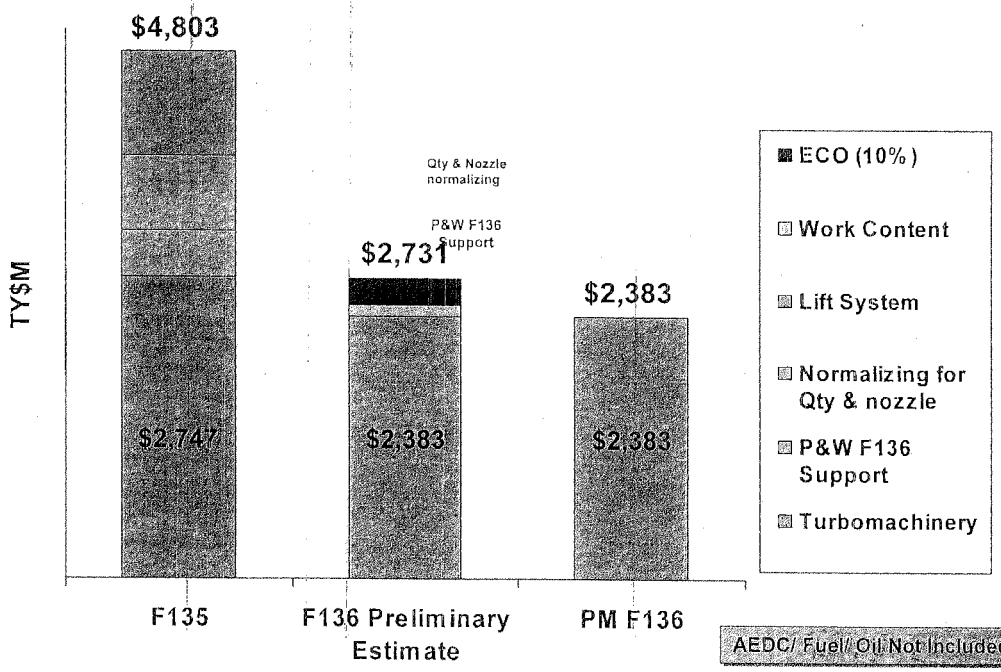
SDD Costs

TY$M



AEDC/ Fuel/ Oil Not Included

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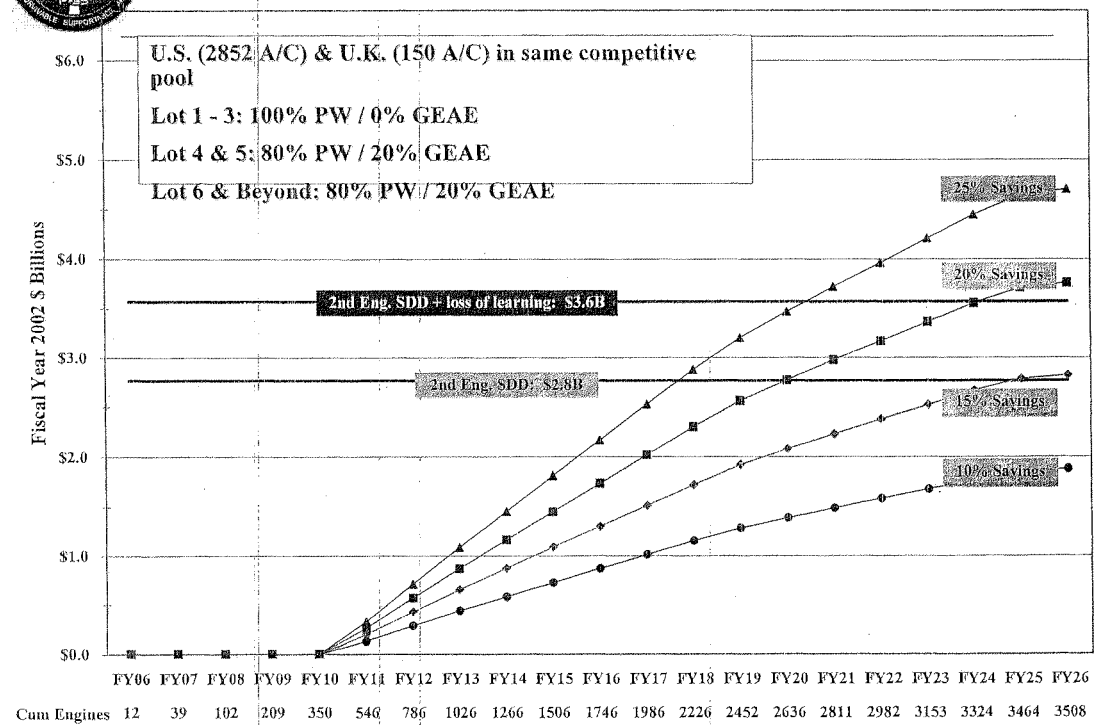
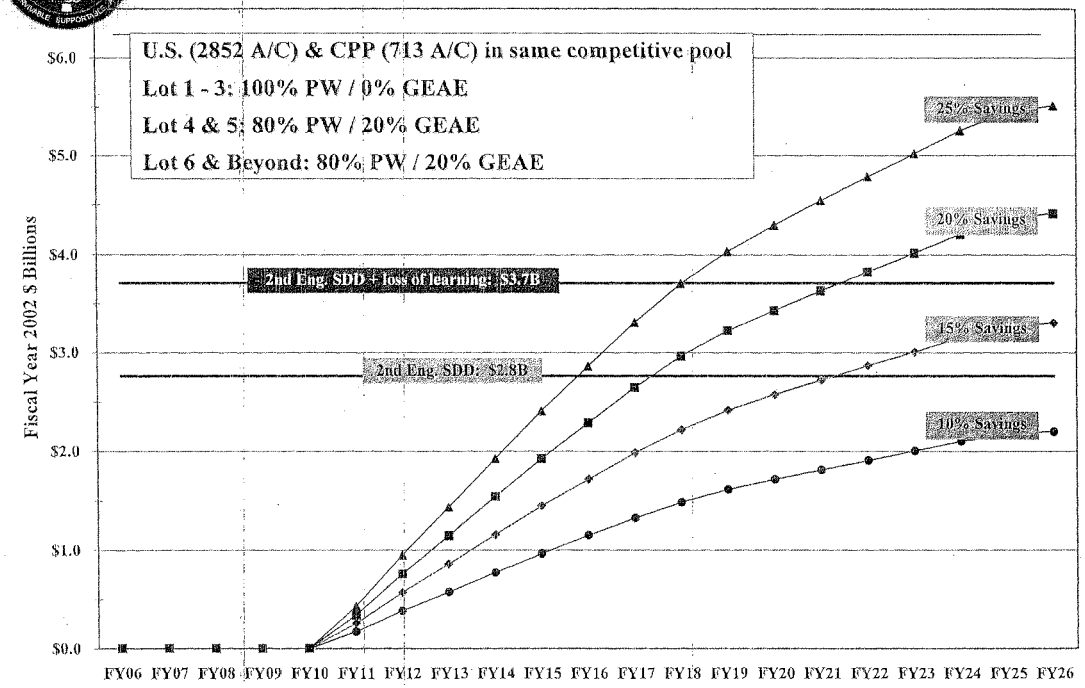
Case 1 Break Even Analysis



PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

Case 37 Break Even Analysis



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Impact by O&S Cost Category

O&S Cost Category	% of Total	Impact of 2 Engines	Comments
Mission Personnel	30 %	Neutral	Not expected to change manning at squadron level
Unit level Consumption	39 %	Beneficial	Savings potential - from improved reliability, lower SFC, & reduced spares cost as a result of engine competition
Intermediate Maintenance	1%	Neutral	No Impact
Depot Maintenance	5 %	Beneficial	Less depot maintenance - more reliable & maintainable engines
Support	25 %	Adverse	Extent of Duplicative support systems

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Total Engine Procurement & O&S Cost Estimates

Total Procurement	FY02$B
CTOL	$13.0
CV	$3.8
STOVL	$10.6
Total	**$27.4**

Total O&S	FY02$B
CTOL	$10.8
CV	$3.0
STOVL	$3.7
Total	**$17.5**

PRE-DECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR

Cost Conclusions

- **Remaining SDD Investment ~$2.8B**
  - ~10% of total Engine Procurement
  - ~ 6% of total Engine LCC
- **16% to 22% savings through production competition needed to recoup the SDD Investment + Loss of Learning**
- **Potential O&S savings not quantified**

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PMAG Update Conclusion

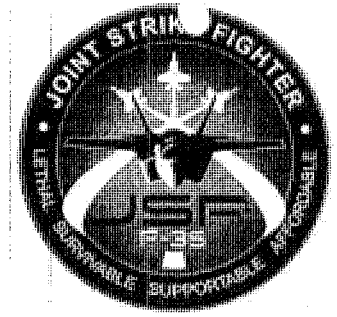
The JSF Competitive Engine Program Offers:

- *Significant Benefits*
  - Contractor Responsiveness
  - Industrial Base
  - Readiness
  - International Participation
- *But Does Not Provide Significant*
  - SDD Risk Reduction
  - Cost Savings
  - Additional Growth Capabilities

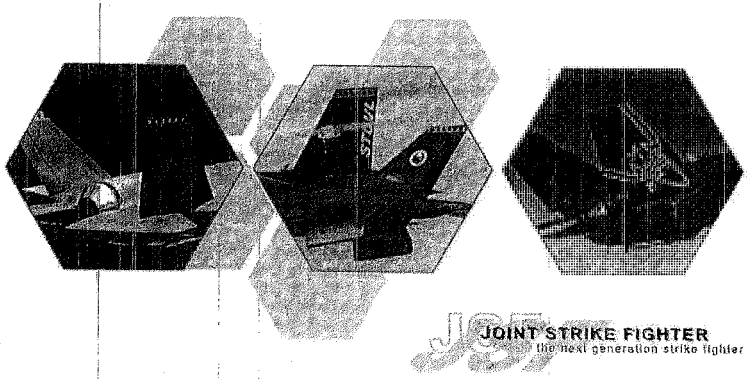
Recommendation

Proceed with the JSF F136 Engine Program as currently planned. This recommendation is made independent of the services' affordability issues which were beyond the scope of the analysis.

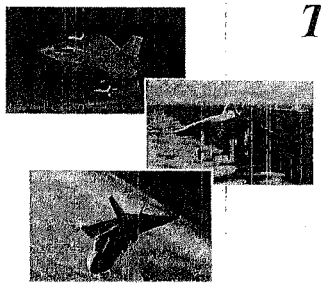
PREDECISIONAL INTERNAL GOVERNMENT WORKING PAPER CONTAINS PROPRIETARY, FINANCIAL AND/OR



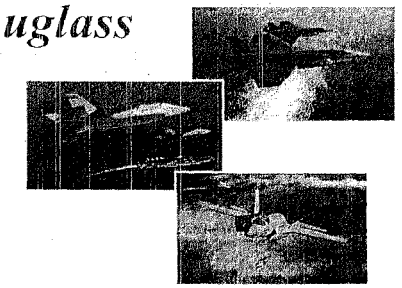
WORKING TO AFFORDABLY MEET THE REQUIREMENTS OF THE WARFIGHTER



PMAG Review of JSF Alternate Engine



Presented to:
The Honorable John Douglass
ASN-RDA



12 January 1998

Presented by:
RADM Joe Dyer
Assistant Commander for Research and Engineering, NAVAIR
&
Mr. Bob May
Propulsion Product Group Manager, San Antonio ALC

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Tasking

THE ASSISTANT SECRETARY OF THE NAVY
Research Development and Acquisition
1000 Navy Pentagon
Washington DC 20350-1000

DEC 01 1997

MEMORANDUM FOR THE DIRECTOR, STRATEGIC AND TACTICAL SYSTEMS
COMMANDER, NAVAL AVIATION SYSTEMS COMMAND
COMMANDER, SAN ANTONIO AIR LOGISTICS CENTER

SUBJ: JOINT STRIKE FIGHTER ALTERNATE ENGINE PROGRAM MANAGEMENT ADVISORY GROUP

The Joint Strike Fighter (JSF) Program is moving well along its concept demonstration path. Technologies critical for long term affordability are being matured and prototype aircraft are reaching a stable design level. Propulsion has been recognized, even from the beginning of the Joint Advanced Strike Technology (JAST) program, as a key enabler to an effective joint service family of tactical aircraft. A principle element of the JSF acquisition strategy has long been development of an alternative engine to foster production competition after the first several lots of aircraft. The fiscal year 1998 Defense Authorization Act requires the Secretary of Defense to certify that the alternate engine program is fully funded. This requirement, which would necessitate programming suitable funds into the POM 2000 future years defense plan, make this an appropriate time to thoroughly assess the costs and benefits of the alternate engine program and make a strategic decision in the near future.

To this end I direct the establishment of a joint service Program Management Advisory Group (PMAG) to thoroughly review the technical and progammatic issues of the alternate engine program, determine its costs and benefits, and report its findings to me in early February 1998. The PMAG shall make a specific determine its costs and benefits the continuation or elimination of the alternate engine program. The PMAG will be co-chaired by the Assistant Commander for Research and Engineering from the Naval Air Systems Command and the Propulsion Product Group Manager from the San Antonio Air Logistics Center, and should include members from the technical, operational and resources communities, with Office of the Secretary of Defense participation strongly encouraged. Also, representatives of the Royal Navy, our full partners in JSF, should be included in the PMAG. Please coordinate your assessment plans and requirements with Mr. William Stussie, the Deputy Assistant Secretary of the Navy for Air Programs, who can be reached at (703)614-7794.

John H. Douglass

ASN(RDA) Letter of 01 Dec 97

...review the technical and progammatic issues...determine its costs and benefits

...make a specific recommendation supporting either the continuation or elimination of the alternate engine program

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Conclusion

The JSF Alternate Engine Program Offers:

- *Significant Benefits*
  - Contractor Responsiveness
  - Industrial Base
  - Readiness
  - International Participation
- *But Does Not Provide Significant*
  - E&MD Risk Reduction
  - Cost Savings
  - Additional Growth Capabilities

Recommendation

Proceed with the JSF Alternate Engine Program as currently planned. This recommendation is made independent of the services' affordability issues which were beyond the scope of the analysis.

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Summary
Alternate Engine Program Assessment

- Industrial Base — G
- Readiness — G
- Other Considerations — G
- International Implications — G
- Cost — Y
- Growth Potential — Y
- E&MD Risk Reduction — ●

G Beneficial
Y Marginal
● No Value

Overall G

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JSF Alternate Engine PMAG Team Members

Executive Lead

RADM Joe Dyer - NAVAIR 4.0Mr. Bob May - SAALC/LR

Industrial Base Team

Lead -	*Dean Gissendanner*	OUSD(A&T)/S&TS/AW
	Gerry Freisthler	ASC/YF
	CDR Steve George	DE/ARP-MODUK
	Tom Harruff	UTC
	Diane Wright	OUSD(A&T)/S&TS/AW

Readiness Team

Lead -	*Otha Davenport*	ASC/LP
	BrigGen Bruce Byrum	ADC/S(Air) HQMC
	CDR Ken Ginader	N-88/JSF RO
	Paul Kovalsky	NAVAIR 3.1.1
	Bob Lawson	ASC/SYA
	Maj Kevin Leck	SAF/AQPF
	LtCol Rich Richardson	MAD, NAS Pax River
	Maj Tom Davidson	AF/XORFA

Growth Team

Lead -	*Dave Pauling*	NAVAIR 4.4
	Col Bob Nasby	HQMC/APW
	Mike Philpot	MODUK/DERA
	Joe Wood	UTC

Life Cycle Cost Team

Lead -	*David Steffee*	NAVAIR 4.2.1
	Shirley Ark	ASC/LPF
	John Dorsett	AFCAA/TD
	Pat McLaughlin	NAVAIR 2.2
	Chris Stewart	PE-MODUK
	Capt Kevin Head	ASC/LPF
	Capt Kevin Gould	ASC/LPF
	Dan Milano	NAVAIR 4.2.1
	Vicki Gutierrez	NAVAIR 4.2.4
	Al Pressman	NAVAIR 4.2.4

E&MD Risk Reduction/Programmatics Team

Lead -	*Donald Dix(Technical)*	ODDR&E(AT)
Lead -	*Jim Nehman(Program)*	DPEO(T)
	Pat McLaughlin	NAVAIR 2.2
	Norm Pfeifer	ASC/SMK
	Rick Rhodeback	ASC/PKC
	Ed Wallace	ASC/SM
	Trevor Wilcock	MODUK

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Study Questions

What specific recommendations support either continuation or elimination of the alternate engine program?

- What are the **Industrial Base** implications, to include both prime and subvendors? What are the international and other implications of not having an alternate engine? (Lead: Dean Gissendanner)
- What are the Life Cycle **Cost and Benefit** Impacts (by Phase)? To include considering learning curve, competition, and support costs. (Lead: Dave Steffee)
- How will having two different engines affect **Readiness**? (Lead: Otha Davenport)
- Are there any **Risk Reduction** benefits during E&MD? What alternatives could be considered? (Leads: Don Dix - Technical, and Jim Nehman - Acquisition)
- What are the benefits from a **Growth** perspective? (Lead: Dave Pauling)

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Data Sources

- History of F404 Dual Source Competition
- The Great Engine Wars (F110/F100)
- History of F-14 TF30/F110
- C-17 Engine History
- JSF Program Office
- Pratt & Whitney, GE, Boeing, and Lockheed

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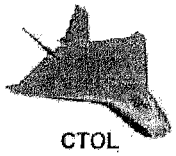
Variants and Inventory

Boeing	Lockheed	Mission	Qty	%
 CTOL	CTOL	• USAF Multirole aircraft (primary air-to-ground) to replace the F-16 and A-10 and to complement the F-22	1763	60%
CV	CV	• USN First day of war, survivable strike fighter aircraft to complement the F/A-18E/F	480	17%
STOVL	STOVL	• USMC/UKRN STOVL aircraft to replace the AV-8B and F/A-18 and UK Sea Harrier	609/60	23%

FISCAL YEAR	05	06	07	08	09	10	11	12
USAF	4	12	18	24	34	48	72	110
USN	4	8	12	24	36	48	48	48
USMC	4	8	12	24	36	36	36	36
UKR						3	6	10
Total	12	28	42	72	106	135	162	204

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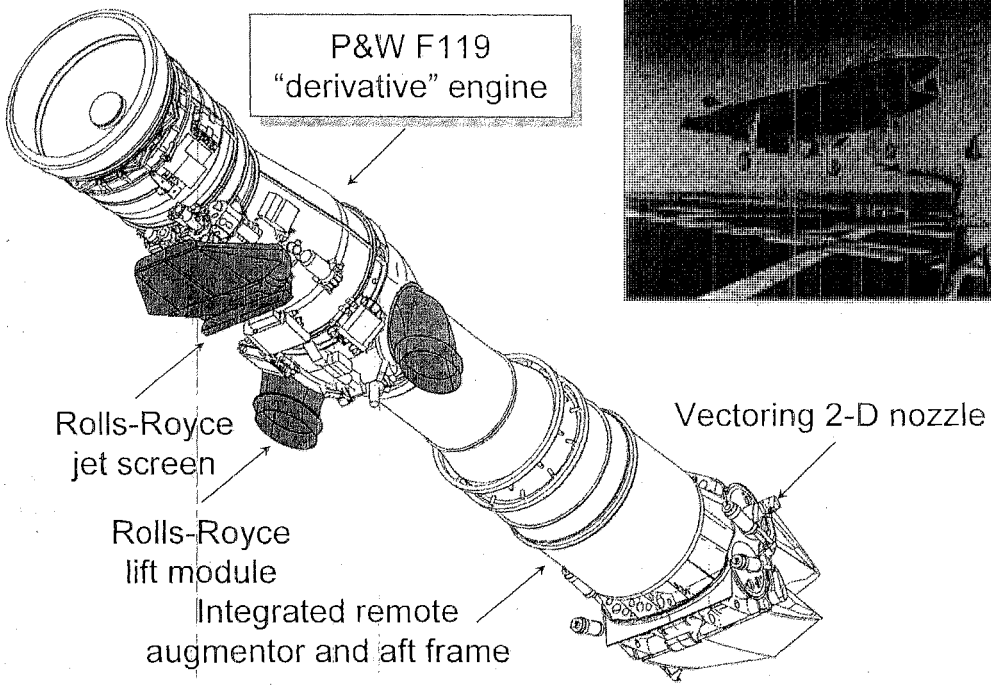
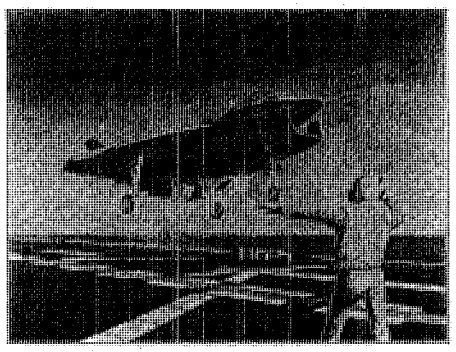
Boeing Propulsion System

Direct lift concept for STOVL





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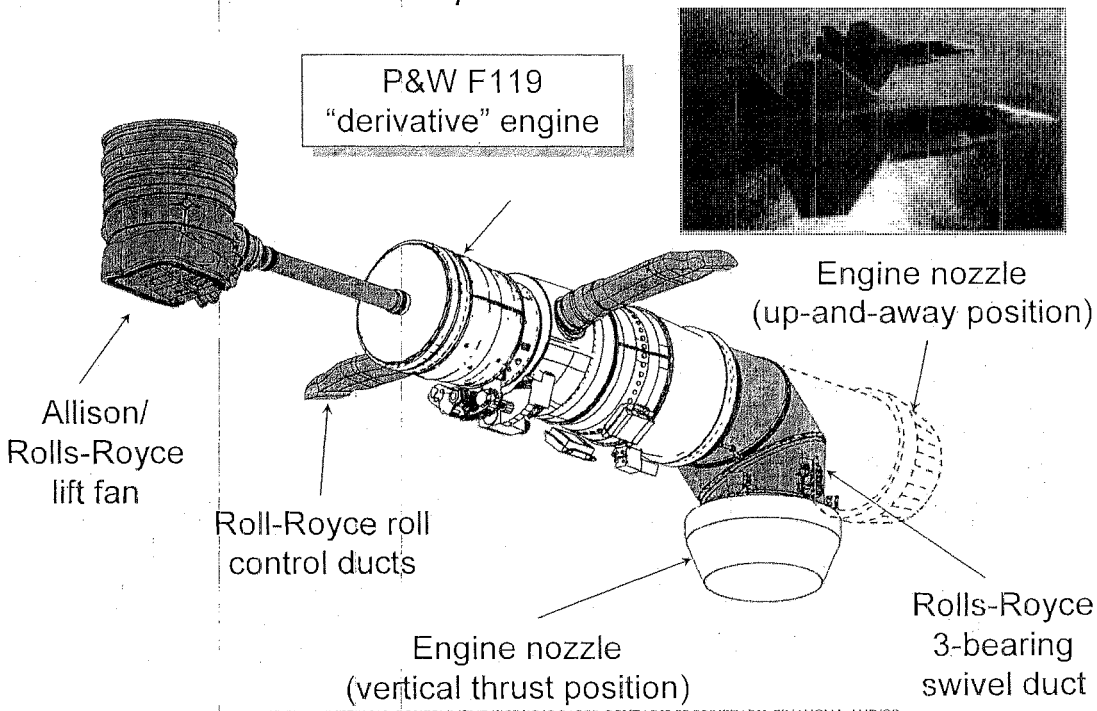
Lockheed Martin Propulsion System

Shaft-driven lift fan concept for STOVL



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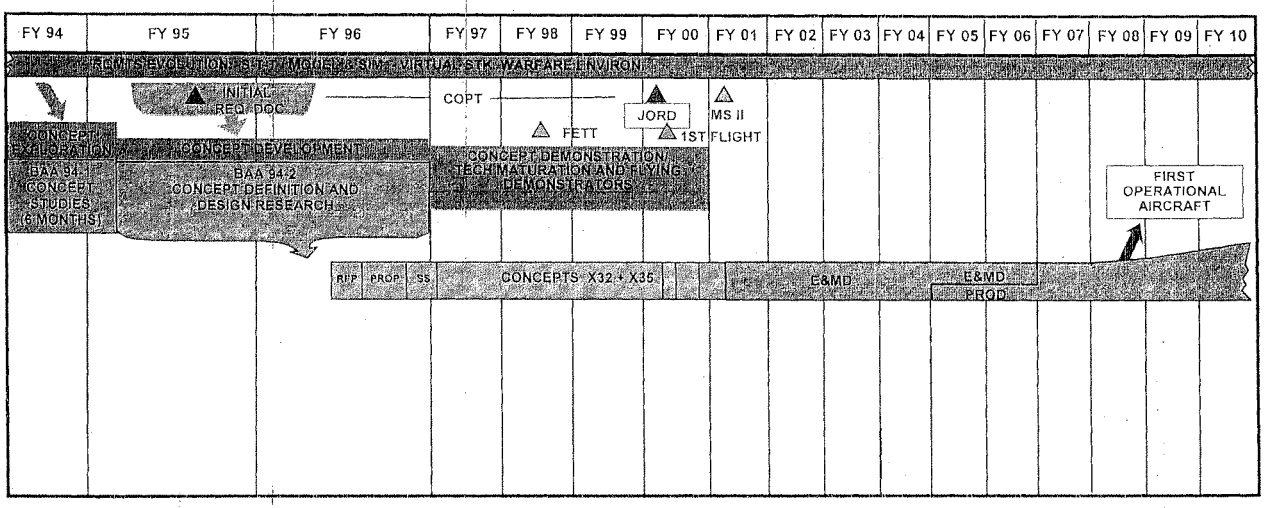
JSF Program Schedule



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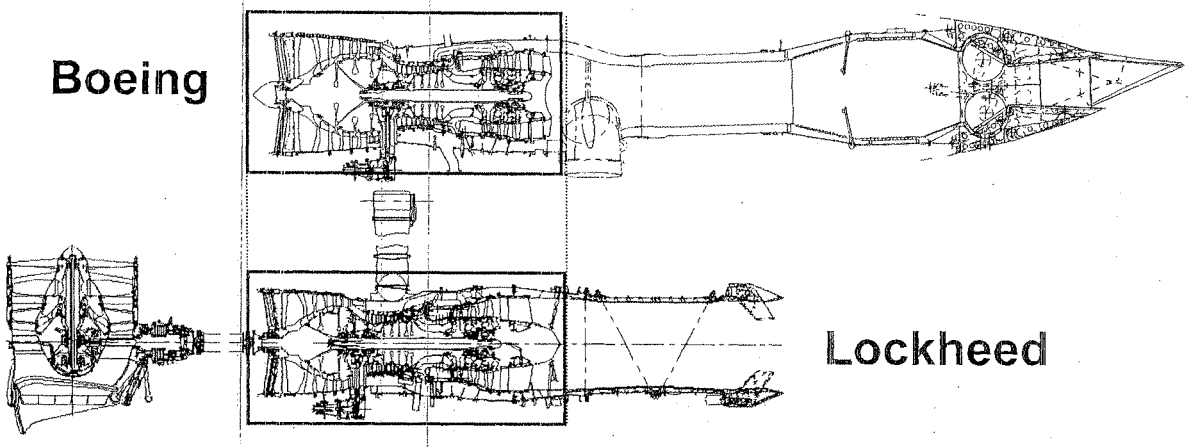
Alternate Engine Program



Turbomachinery Replacement

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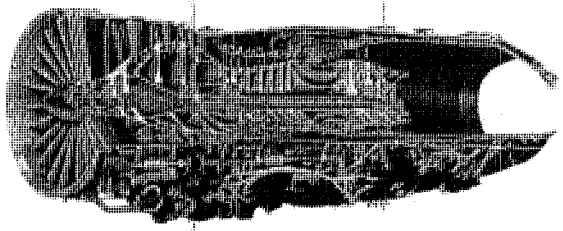
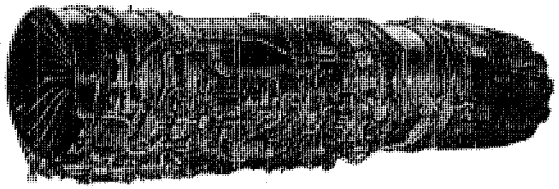
JSF Competing Engines

JSF Primary Engine
Pratt & Whitney
F119 "Derivative"



JSF Alternate Engine
GE / Allison / Rolls Royce
YF120 "Derivative"



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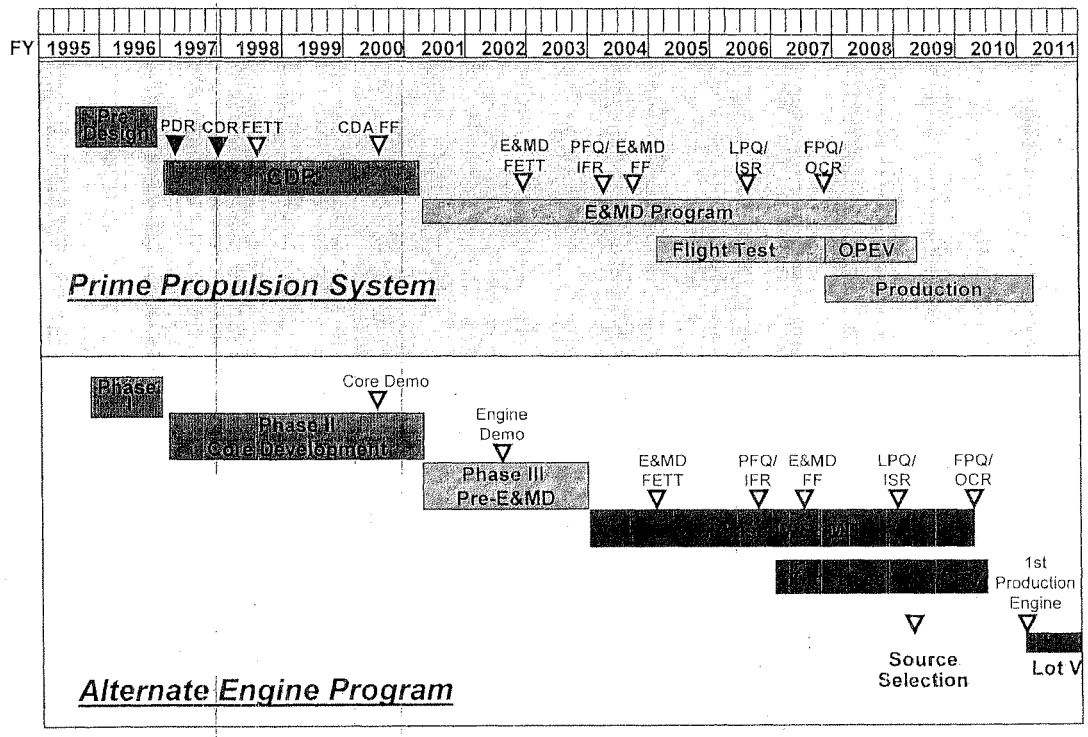
Overall JSF Propulsion Program Plan



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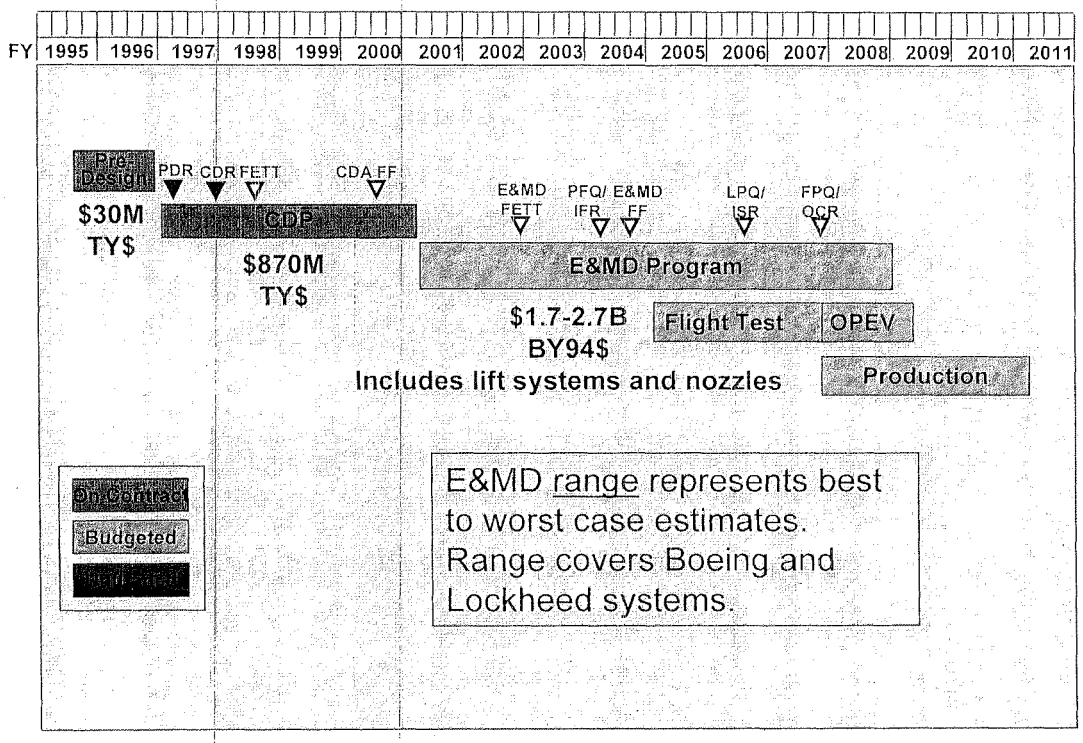
Primary Propulsion Program Plan



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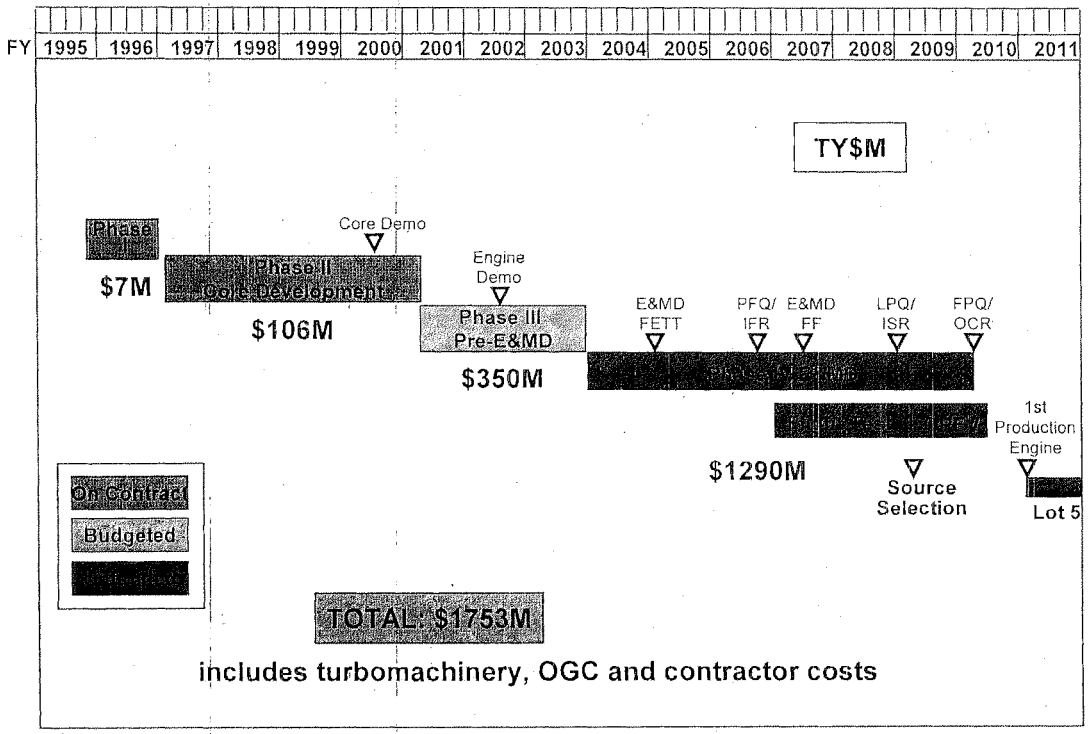
JSF Alternate Engine Program Plan



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Industrial Base

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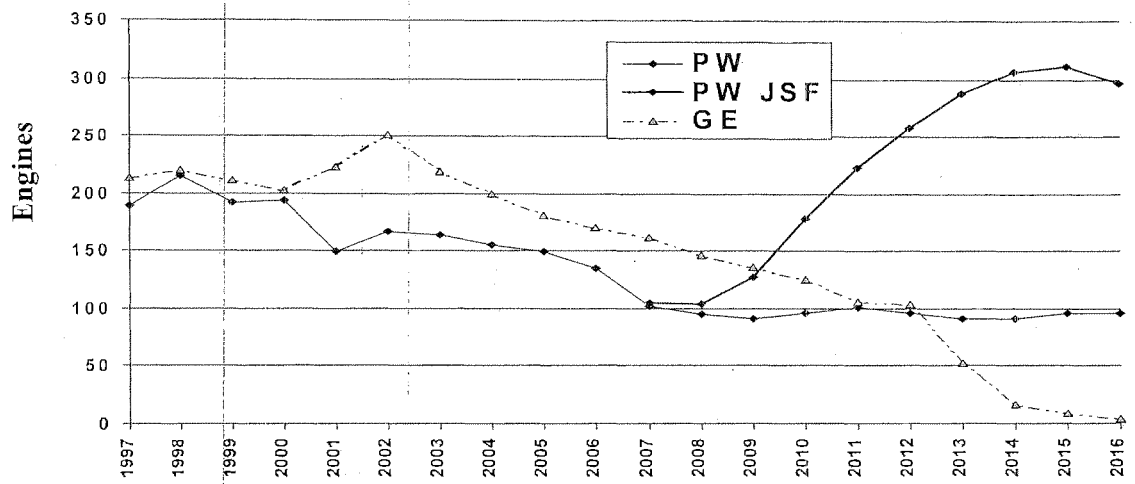
Unit Sales Forecast

Fighter/Attack Aircraft Engines (Domestic & International)



Note:

- Based on P&W data (Trends are common with GE data)
- Conservative assumptions - less than QDR quantities in most cases
- International sales of F-22 and JSF are included in projections

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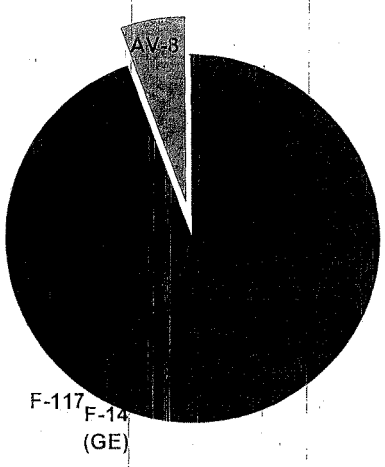
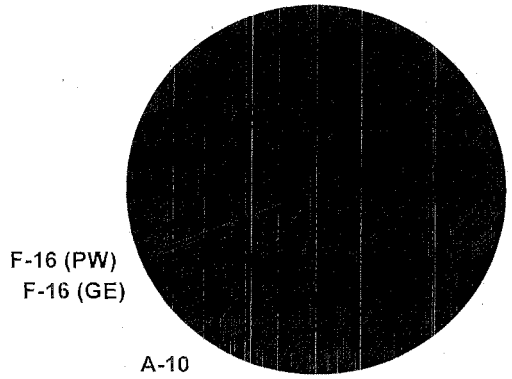
US Fighter/Attack Fleet by Engine Manufacturer



1997 US Forces

P&W	GE
42%	51%



2025 US Forces

P&W	GE
90.5%	9.5%

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Industrial Base Assessment

- GE and possibly Rolls Royce cannot sustain competitive fighter/attack engine design/development teams without JSF Alternate Engine Program
- Potential domestic and international buy of JSF is adequate to support two engine sources
- Supplier base adequate to support two engine sources
  - stable supplier base
  - significant commercial market
  - no significant similarities between P&W/GE sources

Alternate Engine Program maintains/enhances industrial base

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Readiness

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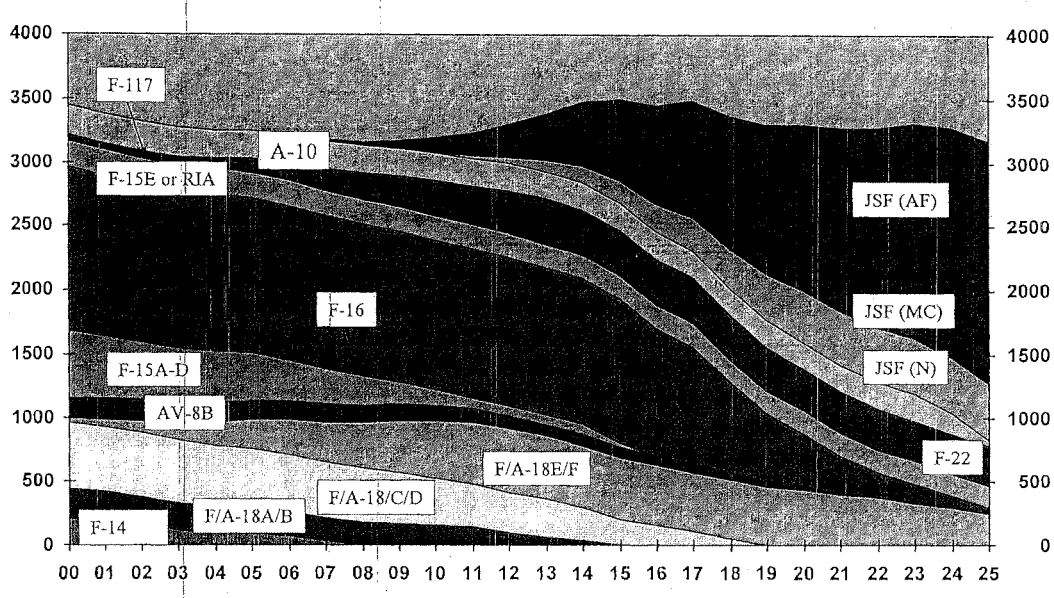
Projected Force Structure



Data from DOD and contractor Sources

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Readiness

- Alternate Engine Program assures single problem won't affect entire fleet
  - Flight safety related groundings
  - Aircraft holes/bare firewalls due to shortage of serviceable engines
  - Labor strikes and acts of God
- Competitive pressures improve reliability/availability
  - C-17's F117 commercial experience
  - F-16's F110/F100 competition
- Alternate Engine Program complicates logistics support - but doable
  - USAF F-16 (F100/F110)
  - USN F-14 (F110/TF30)

Alternate Engine Program enhances readiness

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Other Considerations

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Other Considerations

- The Alternate Engine Program will provide
  - More responsive contractors
  - Better warranties
  - Incentive for contractor investment
  - Limits to cost growth and schedule slips

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International Implications

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International Implications

- An alternate engine program would provide additional opportunities for international industry participation
- Alternate JSF engine would help export aircraft because
  - Provides opportunity for use of another network of commercial relationships
  - Engine competition should keep costs down, making JSF more competitive
  - Better fit with existing engine support structure/relationships
- Giving international customers a choice would exert competitive pressures on GE and P&W, benefiting US

Alternate Engine Program enhances JSF in world market

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Cost

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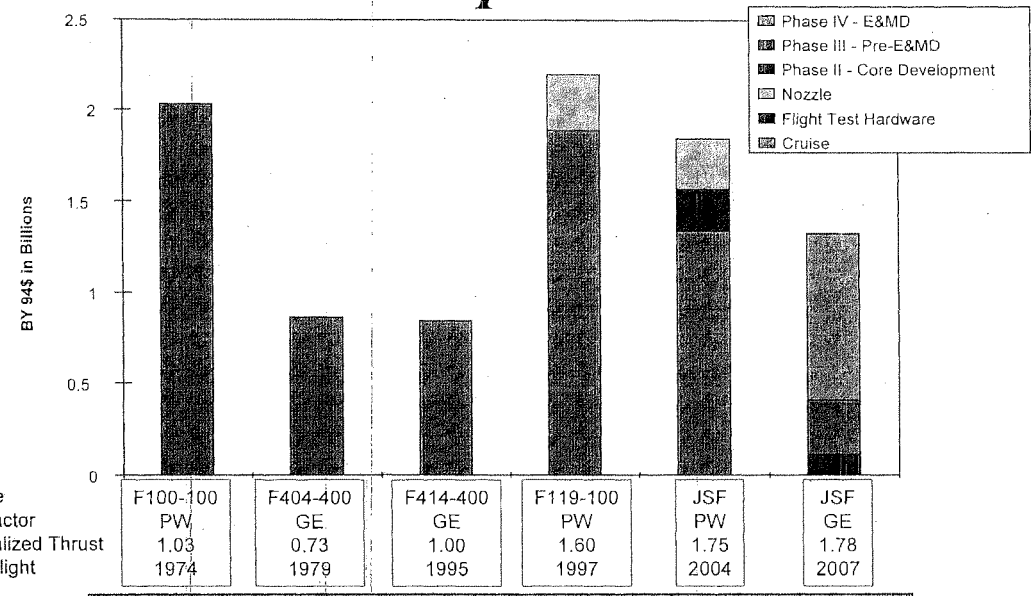
Engine E&MD Contract Cost Comparison



	F100-100	F404-400	F414-400	F119-100	JSF	JSF
Engine						
Contractor	PW	GE	GE	PW	PW	GE
Normalized Thrust	1.03	0.73	1.00	1.60	1.75	1.78
First Flight	1974	1979	1995	1997	2004	2007

E&MD costs for JSF PW and JSF Alternate Engine are consistent with historical precedents

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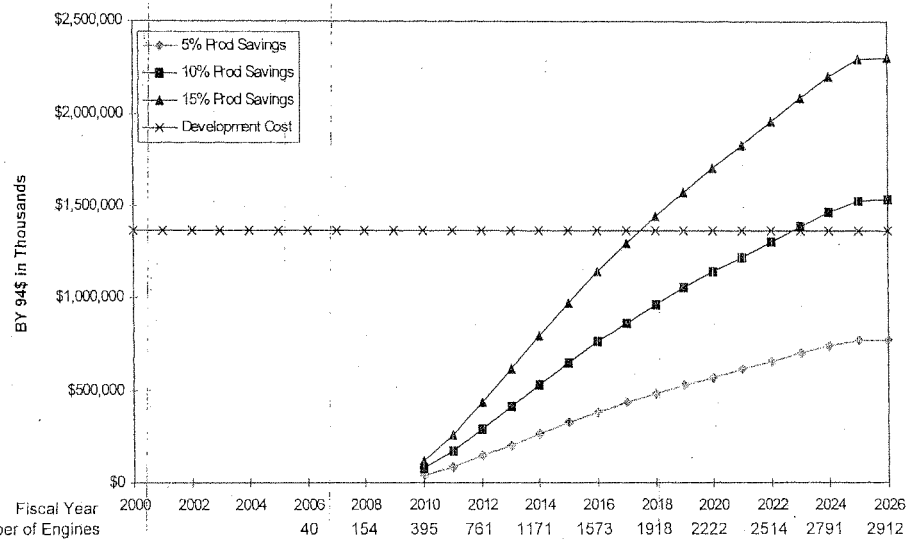
Break-Even Sensitivity
Alternate Engine Baseline Program



Note: Analysis based on Sole Source estimate for PW engine of $5.9M, BY 94$
Turbo Machinery only -- No nozzle

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O&S APPROACH

O & S Cost Category	% of O&S	Cost Impact	Comments
Mission Personnel	35 %	—	Not expected to change manning at squadron level
Unit level Consumption	44 %	↓	Savings potential - from improved reliability, lower SFC, & competitive environment for spares procurements
Intermediate Maintenance	2 %	—	No impact
Depot Maintenance	8 %	↓	Less depot maintenance - more reliable & maintainable engines
Support	11 %	↑	Duplicative support systems

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Cost Conclusions

Alternate engine development costs likely to be recovered through production and O&S cost savings

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Growth Potential

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Benefits of Alternate Engine Program From Growth Perspective

Thrust Growth	JSF F119	JSF F120
4-6%	Y	G
8-12%	Y	Y
>15%	R	R

- Minor growth capability built into Alternate Engine Program design
- Moderate growth will necessitate significant technology transition and airframe modification
- Growth options sensitive to system complexity

Alternate Engine Program provides limited growth capability

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E&MD Risk Reduction

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Risk Assessment for JSF F119 Engine

- Limited E&MD risk reduction from F119 F-22 experience
  - Limited commonality between F-22/JSF F119 configurations
- E&MD risk reduction achieved by CDA difficult to assess
  - Depends on commonality between CDA/E&MD configuration
- Current E&MD risk is commensurate with a new fighter engine
  - High temperature/STOVL integration requirements of particular concern

Overall development risk of JSF F119 program to completion is low-to-moderate

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Risk Assessment for JSF F120 Engine

- Limited E&MD risk reduction from YF120 experience
  - Limited commonality between configurations
- Current E&MD risk is commensurate with a new fighter engine
  - High temperature/STOVL integration requirements of particular concern
- Less concurrent development schedule reduces risk

Overall development risk of JSF F120 program to completion is low

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E&MD Risk Reduction Potential of Alternate Engine

- No significant E&MD risk reduction from alternate engine program as currently phased
- Concurrent alternate engine program not practical
  - Additional complexity/risk
  - Possible facility limitations
  - Significant additional cost

Alternate Engine Program
does not mitigate JSF Program E&MD risk
but
current JSF F119 E&MD risk is assessed as acceptable

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Engine Competition Studies

Gray: did not assess | Green: positive effect | Yellow: unclear effect | Red: negative effect

	ACQUISITION COST	ENGINE PERFORMANCE	LCC	CONTRACTOR RESPONSIVENESS	OPERATIONAL EFFECTIVENESS
Camm, Frank,"Development of the F100-PW-220 and F110-GE-100 Engines: A Case Study of Risk Assessment and Risk Management," RAND Corporation, Santa Monica, CA., 1993					
Drewes, Robert, "The Air Force and the Great Engine War," National Defense University Press, 1987					
Hoover, Jeffrey A.,"Alternate Fighter Engine Competition Study," ASD/ YZP, Wright-Patterson AFB, OH., 1986					
Hirschberg, Michael J., "The Air Force Alternate Fighter Engine Program (AFE)," ANSER, Inc., Arlington, VA., 1995					
Kennedy, David M.,"The Great Engine War," Kennedy School of Government, Harvard University, Boston, MA., 1985					
Mayes, Victoria, "Analysis of the Air Force and The Great Engine War," AFIT Masters Thesis, 1988					
Ogg, John, "Metamorphosis of Business Strategies and Air Force Acquisition Policies in the Aerospace Propulsion Industry: Case study of the Great Enigne War," MIT Masters Thesis, 1987					
Pilling, Donald L., "Competition in Defense Procurement," Brookings Institute, Washington D.C., 1989					

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Views of Others

- **F-22/JSF Engine Independent Review Team - 4 Nov 1997**
  - *"The overwhelming experience of the members of the EIRT is that the existence of an Alternate Engine in a program of such large proportions brings important reductions in LCC, especially through reduced acquisition costs and continuous improvements in reliability and supportability."*
- **HAC - 1996**
  - *"Citing engine performance difficulties experienced over the past two decades the committee stated it is unwise to have selected a single power plant design, i. e., a derivative of the F-22 engine which has yet to be proven."*
  - *"to cede the manufacture of all jet engines for three services future aircraft without additional competition is not likely to be cost effective."*
- **Lockheed**
  - *"Fully endorses Alternate Engine"*
- **Boeing**
  - *Supports Alternate Engine Program*

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Alternate Engine Programmatic Options

Option	*E&MD Cost**	*Advantages*	*Disadvantages*
I. Baseline	$1.4 B	• Maintains viable competition	• No Significant E&MD risk reduction
II. Concurrent Development	$2.4 B	• E&MD risk reduction • Earlier production competition	• Additional cost • Facility limitations
IIA. Earlier Development	$2.0 B	• Some E&MD risk reduction • Earlier production competition	• Some added cost • Facility limitation
III. Commercial Development	$200 M	• Maintains viable competition • Limited E&MD costs	• Requires statutory relief
IV. Redirect Budgeted Funding to JSF F119	0	• Reduces JSF F119 risk • Eliminates E&MD funding requirement	• No competitive alternative • Loss of approved funding

BY$94

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Summary
Alternate Engine Program Assessment

➡ Industrial Base	G
➡ Readiness	G
➡ Other Considerations	G
International Implications	G
Cost	Y
Growth Potential	Y
E&MD Risk Reduction	●

G Beneficial
Y Marginal
● No Value

Overall G

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Conclusion

The JSF Alternate Engine Program Offers:

- ***Significant Benefits***
  - **Industrial Base**
  - **Readiness**
  - **Contractor Responsiveness**
  - **International Participation**
- ***But Does Not Provide***
  - **E&MD Risk Reduction**
  - **Substantial Cost Savings**
  - **Significant Growth Capabilities**

Recommendation

Proceed with the JSF Alternate Engine Program as currently planned. This recommendation is made independent of the services' affordability issues which were beyond the scope of the analysis.

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SENATE ARMED SERVICES COMMITTEE
AIRLAND SUBCOMMITTEE

STATEMENT OF

RADM STEVEN ENEWOLD, USN

PROGRAM EXECUTIVE OFFICER JOINT STRIKE FIGHTER PROGRAM

BEFORE THE

SUBCOMMITTEE ON AIRLAND FORCES

OF THE

SENATE ARMED SERVICES COMMITTEE

ON TACTICAL AVIATION

MARCH 15, 2006

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AIRLAND SUBCOMMITTEE

Mr. Chairman and distinguished members of the subcommittee, I appreciate your invitation to present an update on F-35 program status.

JSF has completed four and a half years of System Development and Demonstration (SDD). The program continues working to translate concept designs to three producible variants by executing to the approved replan that commenced two years ago. Manufacture and assembly of the first flight test aircraft, a conventional takeoff and landing (CTOL) variant is well underway and detailed design work continues for the CTOL and Short Takeoff and Vertical Landing (STOVL) variants. Assembly times on the first test article were much less than planned, with exceptional quality demonstrated in fabrication, assembly and mate. First Flight of the CTOL variant is planned late this fiscal year. That test aircraft is fully fueled and pressure checked at the contractor's facility. At present, six (CTOLs and STOVLs) of fifteen flight test aircraft are in some stage of manufacture as are two static articles. Multiple system and software integration facilities that will flight certify many subsystems for production are in operation. Over 4700 hours on 10 engines have been completed through early March. The JSF program has aggressively addressed earlier performance issues associated with weight and airframe design. Demonstrated manufacturing process outcomes justify high confidence in design and weight predictions for all variants. The JSF acquisition strategy, including software development, continues to reflect a spiral acquisition approach. The President's Budget request for FY 2007 includes full funding for the initial production lot.

The Air System Critical Design Reviews for the production STOVL and CTOL configurations were held this February to evaluate design maturity and performance against requirements. The overall

consensus was that the designs display appropriate maturity, while some moderate technical risks still exist. The combination of expected manufacturing lead times and matching STOVL airframe structure loads to expected flight loads results in a five-month expected delay for STOVL First Flight. This delay does not affect the low rate production plans or fielding for the Marine Corps.

All three variants are projected to meet all Key Performance Parameter requirements except Interoperability, a facet of which is at risk due to complexities of evolving DoD interoperability standards and applications across other platforms. We are seeing production estimate increases in areas of labor rates and materials that will affect the average Unit Recurring Flyaway (URF) cost.

Through FY 2006, the other eight International Partners will have provided nearly $3 billion of their $4.5 billion commitment to the SDD phase of the program. Negotiations for an agreement for Partner participation in the next phase is nearing completion.

Joint development of the JSF is providing the Services and coalition partners with an affordable weapon system that meets the needs of the warfighters. The JSF will enhance precision strike capability with unprecedented stealth, range, sensor fusion, improved radar performance, combat identification and electronic attack capabilities compared to legacy platforms. In fact, analyses show F-35 will exceed legacy capability before delivery of our final software spiral.

Thank you again for this opportunity to appear today. I am happy to answer any questions you may have.

Air Force Fleet Viability Board

KC-135

Assessment Report

September 2005

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off, the Board predicts emerging corrosion issues will require increased dollars and effort toward the end of our 25-year projection.

Conclusion: In summary, the Board concludes (Ref E.S. Figures 11-16):

- While some KC-135 performance indicators are stable, many are declining, especially those associated with the D/E fleet. Furthermore, the technical issues associated with the D/E-model engines clearly indicate there is no future for this fleet as D/E-models.
- The majority of the Stratotankers are in mid-service life. For the next 25 years, fatigue will not be a limiting factor at current usage rates.
- There is evidence that major structural repairs will grow to higher workload rates than previously projected causing higher repair costs, especially toward the end of the 25-year assessment period.
- Except for possible contingency plans, there is evidence (i.e. usage rate) of overcapacity, in that the fleets are not flown much (i.e. less than 1.5 hours per day per aircraft)

Further, given the considerable cost and effort spent on this fleet with low usage, the Board recommends:

- The Air Force analyze the business case for the future of this mission area and, if warranted
    - Retire (now) the 29 aircraft that do not have the Expanded Interim Repair (and are currently removed from the flying schedule) due to their engine pylon support struts to avoid doing the Expanded Interim Repair and strut remanufacture and/or R-model conversion
    - Retire (by FY10) the remaining E-model aircraft in order of Expanded Interim Repair expiration and/or depot input date to avoid the remanufactured strut investment (i.e. Option 2), R-model conversion (i.e. Option 3), or depot costs
    - For the R/T-models, only Option 2 Plus and Option 3 provide a viable fleet until they can be replaced
    - Look for a window of opportunity for replacing the R/T-model fleet, which will average 70 years old at the end of this assessment period. Based on declining availability and increasing cost, it appears such an opportunity will open around FY22. Beyond that date, the fleet will require increasing structural work for corrosion as it approaches its estimated service life for fatigue (Ref. E.S. Figure 15)

Finally, the Board recommends the major operating commands and/or the System Program Manager take these additional actions to gain insight into the hidden condition of the KC-135 fleet:

- Tear down and analyze a representative sample of Expanded Interim Repaired engine pylon support struts to quantify their service life
- Within 5 years, teardown an appropriate number of aircraft to better assess structural fitness
- Finish analyzing and quantifying the fleet's subsystems according to their Functional System Integrity Program
  - Like the Aircraft Structural Integrity Program, System Program Manager should sustain the program to identify and mitigate risks
- Increase documentation of major structural repairs to monitor fleet health and improve projection fidelity

WRIGHT-PATTERSON AIR FORCE BASE

Aeronautical Systems Center
Public Affairs Office
(937) 255-3334
#2006-15
April 25, 2006

U.S. AIR FORCE

NEWS RELEASE

AIR FORCE TO ISSUE REQUEST FOR INFORMATION ON TANKER RECAPITALIZATION

By:

Chris McGee, Aeronautical Systems Center Public Affairs

WRIGHT-PATTERSON AFB, Ohio – The next milestone in the U.S. Air Force's recent resumption of its tanker recapitalization program will occur today, 25 April, when the service issues a Request for Information to industry.

The Tanker Systems Modernization Systems Squadron of Aeronautical Systems Center's Mobility Systems Wing here will send out the RFI for publication in Federal Business Opportunities (www.fedbizopps.gov) and will manage the program.

With the issuing of the RFI, the Air Force, through the TSMSS, restarts the requirements and acquisition processes necessary for a traditional competitive acquisition program to replace the KC-135 tanker.

ASC Commander Lt. Gen. Jack Hudson said, "We're looking forward to starting this very, very important program. Tankers are key enablers for our fighters, bombers, and transports in worldwide operations, especially over Iraq and Afghanistan."

The RFI will request information on KC-135 replacement platforms that is consistent with the findings of the Analysis of Alternatives, which focuses on a commercial derivative tanker aircraft in the 300,000- to the 1 million-pound take-off gross weight class. The RFI will consider vendor inputs on capabilities to complement the recapitalization effort, such as specialized commercial aerial refueling services and KC-135 modifications and upgrades.

-more-

A draft Request for Proposal is expected to be released by September 2006, with a final RFP to be published by January 2007. The award of the contract is expected in summer 2007.

After issuing the RFI, the Air Force's next steps include refining operational capability requirements and developing an acquisition strategy. According to Terry Kasten, TSMSS director, the squadron is working to complete and coordinate the overall acquisition strategy for the KC-X program, as Air Mobility Command formalizes the requirements within the Air Force and joint processes, and expects to have a draft request for proposal by early fall.

"This is an important early milestone on the path to recapitalizing our aerial refueling capability," he said. "We are looking forward to proceeding with a full and open competition that secures our tanker needs well into the 21st century and ensures the best value for the American taxpayers."

In a recent memorandum to Lt. Gen. Donald Hoffman, military deputy for Air Force acquisition, Secretary of the Air Force Michael W. Wynne lifted the hold placed on the KC-135 replacement acquisition program by then-Acting Secretary of the Air Force, Pete Geren, last September.

TSMSS manages the recapitalization and modernization of the world's largest aerial refueling fleet. Along with overseeing replacement of the KC-135 tanker, the squadron also manages the modernization of KC-10 aircraft.

Located at Wright-Patterson AFB, Aeronautical Systems Center designs, develops and delivers dominant aerospace weapon systems and capabilities for U.S. Air Force, other U.S. military, allied and coalition-partner warfighters in support of Air Force leadership priorities. ASC has a workforce of close to 12,000 people located at the base and 37 units worldwide, and is managing a Fiscal Year 2006 budget of approximately $27 billion. ASC's portfolio includes capabilities in fighter/attack, long-range strike, reconnaissance, mobility, agile combat support, special operations forces, training, unmanned aircraft systems, human systems integration and installation support.

-USAF-

15 -- KC-135 Tanker Replacement Program (KC-X) and Complementary Capabilities

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neral Information

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Department of the Air Force, Air Force Materiel Command, ASC - Aeronautical Systems Center, 2275 D Street, Wright-Patterson AFB, OH, 45433-7218

escription

KC-135 Tanker Replacement Program (KC-X) and Complementary Capabilities

KC-135 Tanker Replacement Program (KC-X) and Complementary Capabilities

FOR PLANNING PURPOSES

The Aeronautical Systems Center (ASC) Tanker Systems Modernization Systems Squadron (TSMSS), ASC Mobility Systems Wing/TSMSS, Wright-Patterson AFB OH, is submitting a Request for Information (RFI). The purpose of this two part RFI is to ensure early industry involvement in the effort. Part A requests information on KC-X platforms and concepts, whereas Part B requests information on complementary Air Refueling (AR) capabilities. The Tanker Systems Modernization Systems Squadron is currently seeking information to gain insight into the market to determine if there are potential sources that would be interested in providing a refueling capability. The submitted documentation, upon delivery, becomes the property of the U.S. Government and will not be returned. No solicitation documents exist at this time.

This is NOT an Invitation for Bid (IFB) or a Request for Proposal (RFP). The Government does not intend to award a contract on the basis of this advertisement. This is a request for information/market research announcement for planning purposes and the Government will not provide reimbursement of costs associated with the documentation submitted under this request. Although ?proposal? and ?offeror? are used in this inquiry, your response will be treated as information only and will not be used as a proposal.

Responders are solely responsible for all expenses associated with responding to this inquiry. This announcement is not to be construed as a formal solicitation. It does not commit the government to reply to information received, or to later publish a solicitation, or to award a contract based on this information.

REQUIREMENT

PART A - Tanker Recapitalization Capability Criteria. The primary purpose of the KC-X program is to replace the war-fighting capability provided by the KC-135 fleet. The KC-X aircraft is expected to provide world-wide [Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) compliant], day/night, adverse weather, probe/drogue and boom/receptacle AR (including provisions for multiple point, simultaneous air refueling operations) on the same sortie to fixed-wing, receiver-capable United States, allied, and coalition military aircraft (including un-inhabited air vehicles). KC-X may be employed to support global attack, air-bridge, deployment, Re-deployment, homeland defense, theater support to joint, allied, coalition air and maritime forces; and specialized national defense missions. Some of these aircraft will be used to support special operations and U.S. nuclear forces. KC-X may allow for mixing of secondary missions in a manner not to significantly impact its primary AR mission. Secondary missions for KC-X may include cargo and/or passenger transportation, aero-medical evacuation, and Command, Control, Communications and Computers (C4) augmentation.

The Air Force is requesting information and recommendations in the following areas:

- Delivery of AR capability to include the following or combinations thereof:

-- New and/or used commercial derivative tanker aircraft, including availability and acquisition timing of any suggested combinations.

-- Medium and/or large commercial derivative tanker aircraft (approximately 300K lbs to 1000K lbs maximum take off gross weight).

- Economic, performance, risk and logistics assessment capabilities of the above options or any combination of these options. Acquisition options to be assessed also include multi-role tanker, cargo and passenger configurations.

- AR concepts of operation, technology, design, development and test. Consideration should be given to direct-view versus remote operating stations for AR operator workstation, and the impacts and benefits of advanced

technology on AR operator capabilities.

- Offeror?s experience in aircraft design and/or modification capabilities to incorporate CNS/ATM compliant systems; military defensive systems; military communications equipment with strategic and tactical interconnectivity; and night vision internal, external and flight deck illumination. Also, capabilities for evaluating impacts and recommended approaches for Electromagnetic Pulse (EMP) hardening.

- Offeror?s experience in fielding of fully integrated commercial and/or government support systems for military aircraft. Previous experience (if any) in implementing Public-Private Partnerships and performance based logistics concepts is requested.

- Understanding and previous experience in obtaining FAA (or equivalent) type certificates or supplemental type certificates shall be demonstrated. Submit evidence of any FAA or equivalent production, repair or alteration station licenses.

- We are also interested in assessing the impact that potential events would have on this procurement. Please identify and quantify how the following may affect the life cycle costs of the KC-X program.

-- Business arrangements that involve a financial contribution from government, including an offeror?s receipt of subsidies; financing (such as ?launch aid?) for design and development; grants and government-provided goods and services to develop, expand or upgrade manufacturing sites; loans on preferential terms; assumption and forgiveness of debt resulting from launch and other production and development financing; equity infusions and grants; or research and development loans or grants.

-- Any change in the above business arrangements.

-- Application of retaliatory duties that may be imposed pursuant to the aircraft litigation at the World Trade Organization.

PART B - Complementary Tanker Support Capability Criteria. Over and above the effort described in Part A, the Air Force is also requesting information on complementary capabilities that would support, augment or enhance our air refueling mission, such as specialized (niche) Fee-for-Service support or modifications/upgrades to maintain KC-135 force structure as we recapitalize the tanker fleet. The Air Force will also consider vendor inputs on the following:

- Outsourcing a portion of the needed AR capability from private companies instead of providing it organically. :

-- Potential mission, uses and DoD benefits

-- Aircraft number, type and mission availability

-- Candidate refueling systems/subsystems

-- Schedule of potential service availability date(s)

-- Financial arrangements and anticipated fees (cost) to government

-- Liabilities and indemnification approach

-- Potential basing locations and operational limitations

-- Potential other aircraft missions with operational availability impacts

-- Offeror?s experience in acquiring, modifying and/or maintaining aircraft and any experience in AR concepts of operation with DoD aircraft.

- KC-135 Modifications/Upgrades. Specific information is requested in the following areas:

-- Modifications/upgrades to maintain KC-135 force structure during transition to the KC-X fleet. Possibilities include KC-135E struts/pylons, engines, avionics and flight deck, or complete KC-135E to KC-135R conversion

-- High maintenance and obsolete parts upgrades

-- Aircraft quantity for upgrades

-- Economic, performance, risk and logistics assessment of the above options or any combination of these options. Analysis should include proposed use within the overall framework of total KC-135 recapitalization, and the projected service life benefit.

-- Offeror?s experience in aircraft design and/or modification capabilities to incorporate major aircraft upgrades including struts/pylons, engines, avionics and flight deck.

GENERAL INFORMATION

Should the Air Force decide to pursue either a KC-X program, a KC-135 Modification/Upgrade, Complementary Tanker Services, or a combination of the above, offerors meeting the above criteria may be requested to supply additional information on their specific capabilities in future draft Requests for Proposal (RFPs).

If subsequent RFPs are released, a Notice of Contract Action will be published at least 15 days prior.

For Government planning purposes, anyone intending to submit information for either Part A or Part B is requested to notify the Government within 14 calendar days. Initial responses should provide summary level information on corporate capabilities and the offeror?s ability to receive, control, handle and destroy DoD classified material to the level of DoD Secret.

Interested parties should respond with their submittals within 45 calendar days after this notice is posted. Responses should include information on a corporate point of contact, as well as information on the product or service submitted. Offerors may submit information on all or any portion of this request. Responses to Part A and Part B should be provided in separate submittals. All correspondence should clearly identify which part it is addressing. Submittals are not expected to exceed 150 pages. Any proprietary information submitted should be marked accordingly. Interested parties are advised that technical data submitted to the Government in response to this request may be released to non-Government advisors for review and analysis.

Send responses to Ms. Sandra Palmatier;
E-mail: sandra.palmatier@wpafb.af.mil;
Phone: 937-656-9599; fax 937-255-3466;
Mailing address: ASC MSW/TSMSS, Bldg. 560, 2530 Loop Road West, WPAFB OH 45433-7101.

KC-135 Tanker Replacement Program (KC-X) is an Aeronautical Systems Center (ASC) program. The current status is Request for Information and it is a Category A ? Research and Development.
Solicitation No. KC-X (KC-135 RTA)
Request for Information Response Date: 09 Jun 2006
NAIC Code: 336411 Dollar Amount: N/A
How to contact this program: All correspondence should clearly identify which part (A or B) that it is addressing.
POC: Sandra Palmatier, Tel: (937) 656-9599
Tanker Systems Modernization Systems Squadron, ASC TSMSS/PK, Bldg 560 Room 159, 2530 Loop Rd W, WPAFB, OH, 45433-7101
Send email to Sandra Palmatier : sandra.palmatier@wpafb.af.mil
Register to receive email notification whenever this business opportunity has been updated.
Register as a Source for this Solicitation.
View Registered Sources for this Solicitation.

int of Contact

Sandra Palmatier, Contracting Officer/Contract Negotiator, Phone 937-656-9599, Fax 937-255-6350, Email sandra.palmatier@wpafb.af.mil

ace of Performance

Address: Aeronautical Systems Center, Mobility Systems Wing, Tanker System Modernization Systems Squadron, Bldg. 560, 2570 Loop Rd. W., WPAFB OH 45433-7101
Country: USA

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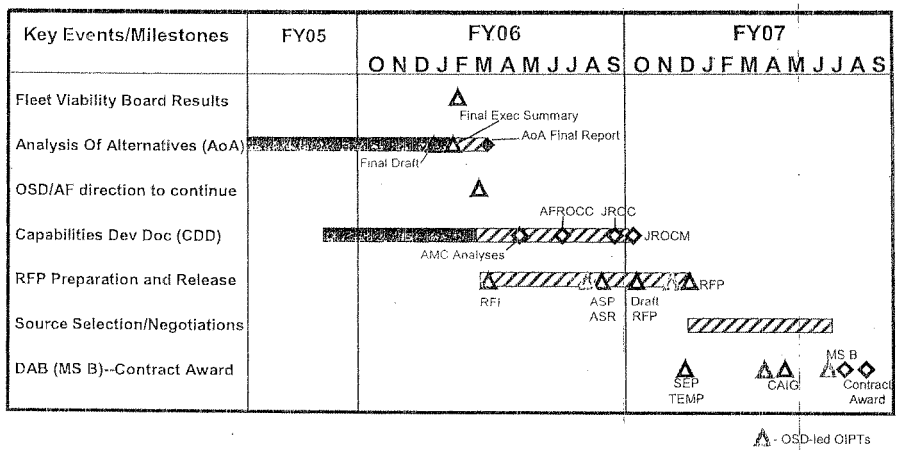
FOUO / Pre-Decisional

Notional Recapitalization Timeline

U.S. AIR FORCE

Notional 1 Feb start date, following meeting with Congressional staff



SDD Contract award ~Aug 07

Aircraft Deliveries ~FY11

KC-135 RETIREMENTS

Summary

- KC-135 constitutes bulk of the current tanker force (about 80% of refueling capability)
- KC-135 fleet is nearing 50 years of age and continued operation to 2050 would result in a 90-year-old fleet
- KC-135 has exhibited some technical difficulties and increased costs of operation (lowest mission capability rate of tankers)
- Total cost of both operating the KC-135s until they are retired and acquiring and operating their replacements is in the $200 billion range over the next half century

- AF currently has 590 tankers
- MCS identified a range from 520 to 640 tankers sufficient for two Major Theater Wars
- AF FY07 plan is to retire 78 E-models resulting in 512 remaining tankers (plan will put inventory 8 tankers below 520 lower bound of the MCS)
- AF can mitigate near-term and long-term risks by
    - Increasing the crew ratio in KC-135Rs
    - Increasing KC-135R utilization rate as retired to meet sustained surge/maximum surge (peak demand) requirements as defined in MCS
    - Quicker recapitalization of the legacy tanker fleet

Background

- Air Force currently has 590 tankers
    - KC-135Rs – 417
    - KC-135Es – 114
    - KC-10s – 59
- Current tanker availability (including aircraft in depot) – 61%
- Average age and current Mission Capability Rate (Mission Capable rate is percentage of a fleet that is unit possessed, not depot possessed, and capable of flying at least one assigned mission – AF goal is 75%)
    - E-model: 47.1 years / 68.9%
    - R-model: 44.5 years / 75.4%
    - KC-10: 21.4 years / 80%
- Tanker AoA could not state with high confidence that the current fleet *can* indeed operate into the 2040s without major cost increases or operational shortfalls
- KC-135Es currently have operating restrictions in AOR
    - Average take off fuel load is 20K less than an R-model on any day – impact is less fuel to offload to warfighter
    - At temps > 100 degrees, take off fuel load further reduce by an additional 25K reduction – for a total of 45K less fuel available to offload to warfighter
- Modification costs required to make aircraft a viable/capable fleet according to Fleet Viability Board
    - 114 KC-135Es – Approx $5.0B (does not bring them up to R status)
    - 416 KC-135Rs – Approx $5.0B (this is a mandatory investment to keep R-models viable during recapitalization effort through 2042)
    - Tanker AoA stated this conversion would result in a small (about 2 percent) increase in overall KC-135 fleet effectiveness (KC-135E to KC-135R conversion only has present-value-cost savings if the converted aircraft will be operated beyond the late 2030s)

- Retirement of 114 E-models equates to a 19% of fleet and a 9% capability reduction
    - In Sep 2004, 29 KC-135 E-models removed from the flying schedule due to cracks, corrosion and heat damage to the aircraft's engine pylon support struts
    - 8 additional E-models currently in back-up inventory due to transfer of R-models to Guard/Reserve under the R-model Transfer Plan briefed to Congress in Summer 2003
- Planned E-model retirements
    - FY04 – 37 planned, 12 allowed
    - FY05 – 41 planned, 0 allowed
    - FY06 – 49 planned, 0 allowed
    - FY07 – 78 planned, 0 allowed
    - FY08 – 36 planned
- Mitigates Near-Term Risk / Long-term Risk
    - Near-term risk mitigated by increasing crew ratio in remaining KC-135Rs and increasing KC-135R utilization rate as retired to meet sustained surge/maximum surge (peak demand) requirements as defined in MCS
    - Near-term risk reduced by placing a minimum of 44 KC-135Es into AMARC
        - Can reconstitute this capability if absolutely necessary should need arise)
    - Near-term and long-term risks mitigated by quicker recapitalization of legacy tankers
        - Minimizes increased costs to maintain and sustain KC-135Es
        - Avoids unforeseen difficulties (uncertainty) on operating a 50+ year old fleet
        - Minimizes budgetary implications of operating both the KC-135s until they are retired and acquiring their replacements (estimated in the $200 billion range)
    - Long-term risk mitigated by quicker recapitalization…tanker inventory back to lower MCS bound by FY14 with more capable, more efficient tanker fleet

POINT PAPER

ON

COSTS ASSOCIATED WITH 29 KC-135E AIRCRAFT REMOVED FROM FLYING

KC-135 Retirement Costs

- Cost associated with maintaining the 29 KC-135D/E aircraft that have been removed from the flying schedule is approximately $4.176M per year. The cost breakdown is:

  ↑ "warm" status

  -- Manpower - $3.534M

  -- Consumables - $0.063M

  -- Depot Level Reparables - $0.495M

  -- Aviation Petroleum, Oils & Lubricants - $0.084M

- AFMC developed a technical directive to sustain these 29 aircraft at a minimal level, or "warm" status. The following lists the major activities that must be accomplished on the aircraft:

  -- Daily Activities

    --- Perform daily walk-around inspections and repair discrepancies, leaks, etc

  -- 45-Day Inspections

    --- Perform structural drainage, check for exterior deterioration, ensure fluid levels are full, motor engines & APUs, ensure hydraulic system is operational

  -- 180/240-Day Inspections

    --- Inspect for corrosion--areas include doors, refueling boom, joints, paint, etc

  -- Special Inspections

    --- Monitor internal temperature and ventilate as required, remove snow accumulation, inspect oxygen system and maintain pressure, and maintain the fuel load at 80K lb and fill each tank to maximum capacity every 45 days

F/A-18 A-D Sustainment

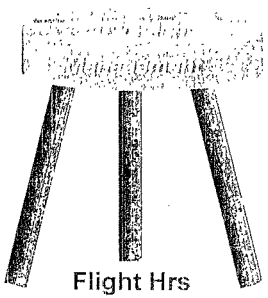
F/A-18 Sustainment Issues

- **F/A-18 A-D inventory challenged to meet DoN Strike Fighter requirement through JSF transition**
  - Shortage projected in 2011 - 2022
  - Program Manager estimates **50** aircraft shortfall by 2018

- **Issues affecting F/A-18 POR decision**
  - Success of F/A-18 A-D inventory sustainment effort to attain:
    - 10,000 Hours, 2600 Traps/Cats, 12,300 Landings, 391 CBRs
    - If attained, only *mitigates*, does not eliminate shortfall
  - Force requirements
    - 10 CVW (44 Strike Fighters w/ Entitlements) (35+2)
    - USMC (12+1)
    - Support FRP 6+1
  - JSF must maintain POR
    - Ramp rate (50 per year)
    - IOC dates (2012/2013)
    - Transition complete 2024

Legacy F/A-18 Sustainment…
…Growing Concern & Growing Risks

Design Limits	Parameters for no shortfall	Increase
6,000 flight hours	12,000 flight hours	100%
8,300 landings	14,500 landings	75%
2,000 traps	2,700 traps	35%



Required F/A-18 flight hour parameter *far exceeds* other TACAIR platforms:

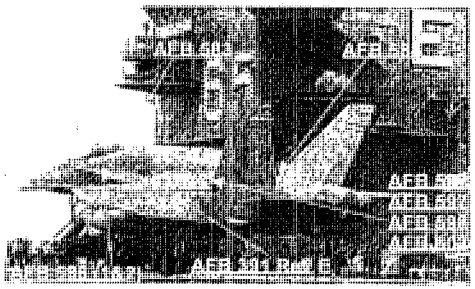
F-22, F-35, F-16, F-15	8,000 hour life limit
AV-8B	6,000 hours
F-14	6,500 retired

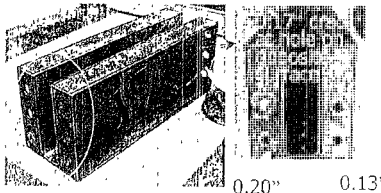
Critical Risk Areas
- F/A-18A-D SLAP /SLEP goal progress
- JSF IOC
- Inner wing spar crack

Important Risk Areas
- FH Utilization rates
- Impact of F/A-18E/F tanking
- Expect new issues
  (i.e vertical tails, ECS, corrosion, obsolescence)

F/A-18 to JSF (F-35) transition based upon *unattainable life limit goals*

Cats/Traps/Landings: F/A-18A-D Landing Limits





Unpredicted damage revealed during teardowns: NLG support structure cracks

SLAP I data, teardowns and inspections have generated Damage Equations which allow for CTLs beyond initial design limits

Risk assessment done BUNO by BUNO

Aircraft *not* automatically down upon reaching limits

Airframes Reaching Landing Limit

Landing Projections	2005	2006	2007	2008	2009
# A/C Reaching 2,000 Traps	9	28	53	89	126
# A/C Reaching 8,300 Lndgs	136	174	238	300	361

By 2009, half of Legacy fleet will exceed initial designed landing limits

FLT HRS: F/A-18A-D Limits

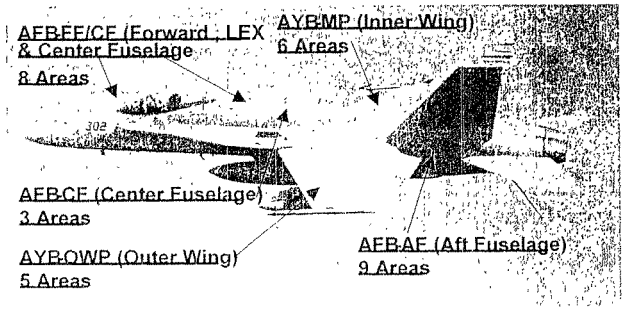
Current Flight Hour limit - 8000 hrs

Aircraft hard down at 8000 hours

Unable to mitigate past Flight Hour Limit as in CTL extension

SLAP II data collection and follow-on engineering efforts required to achieve 10,000 flight hours

SLAP II engineering assessment due out December 2007



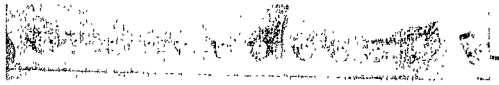
Airframes Reaching Flight Hour Limit

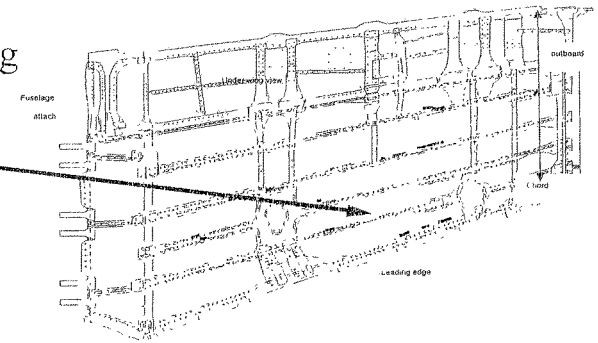
Flight Hour Projections	2005	2006	2007	2008	2009
# A/C Reaching 7,000 FH	45	94	167	281	370
# A/C Reaching 8,000 FH	2	10	28	67	128

By 2009, approximately a *quarter* of Legacy fleet will exceed 8000 hours

Unknowns: F/A-18A-D Inner Wing

Cracks found during customer service repair found of inner wing





40 wings inspected; revealed 40% cracked

No spares exist

Cracks due to corrosion, not tied to hours

Not included in inventory model shortfalls

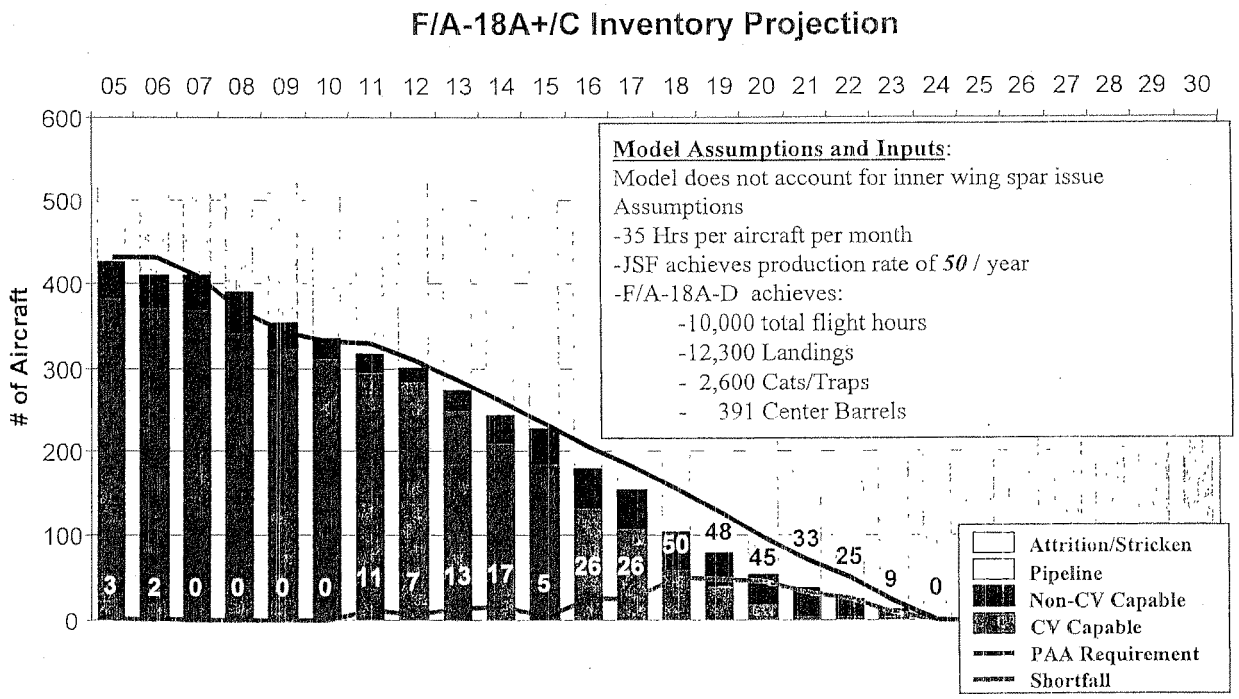
COST TBD

Airframes Reaching Wing Crack Limit

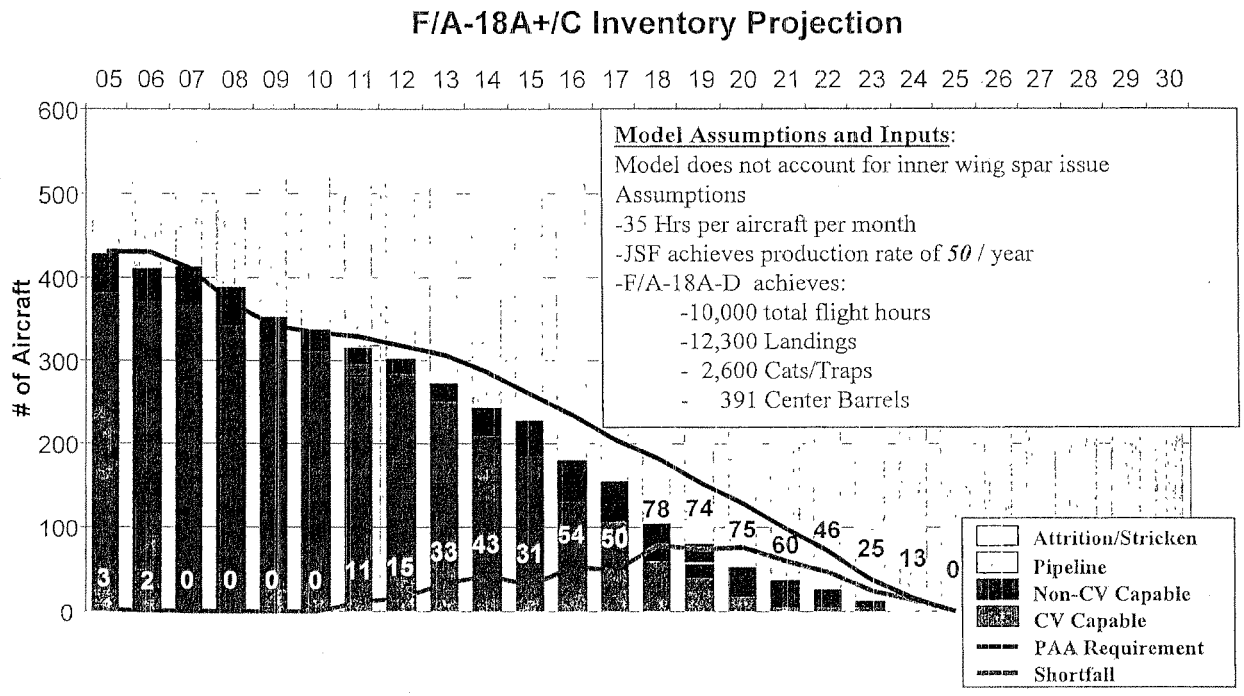
Aircraft Projections	2005	2006	2007	2008
Limits not defined		TBD	TBD	TBD
Limits not defined		TBD	TBD	TBD

Impact to fleet currently unknown

Program Manager's Assessment
F/A-18A+/C Projected Inventory

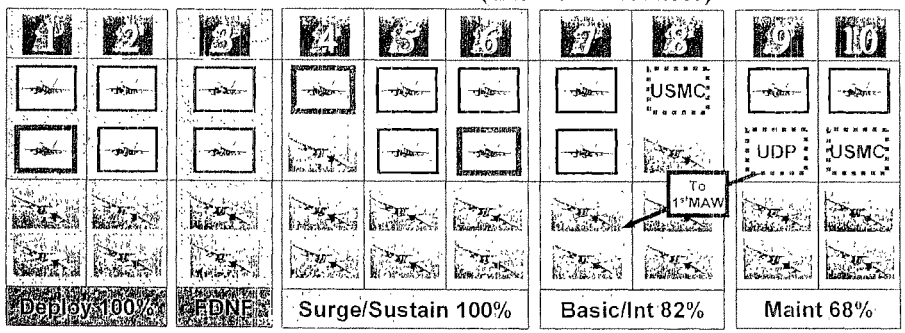


JSF 1 year slide



Projected 2010 Strike Fighter Laydown

10 CVW FRP Entitlement (Tiered Readiness)



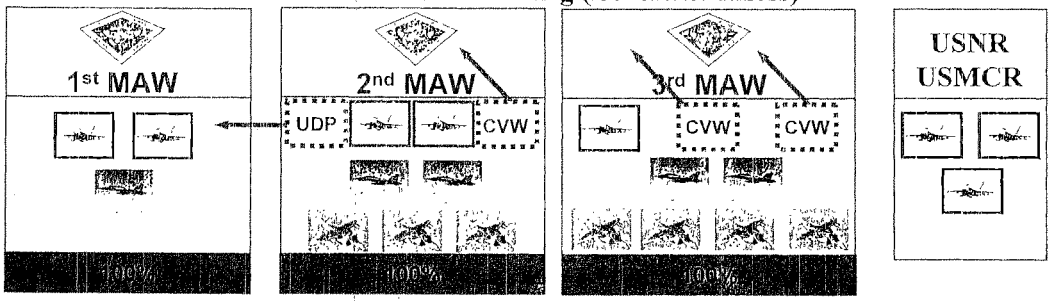
Accounts for TACAIR Integration and Marine Aviation Transition Strategy (MATS)

5 USMC squadrons integrated into CVW

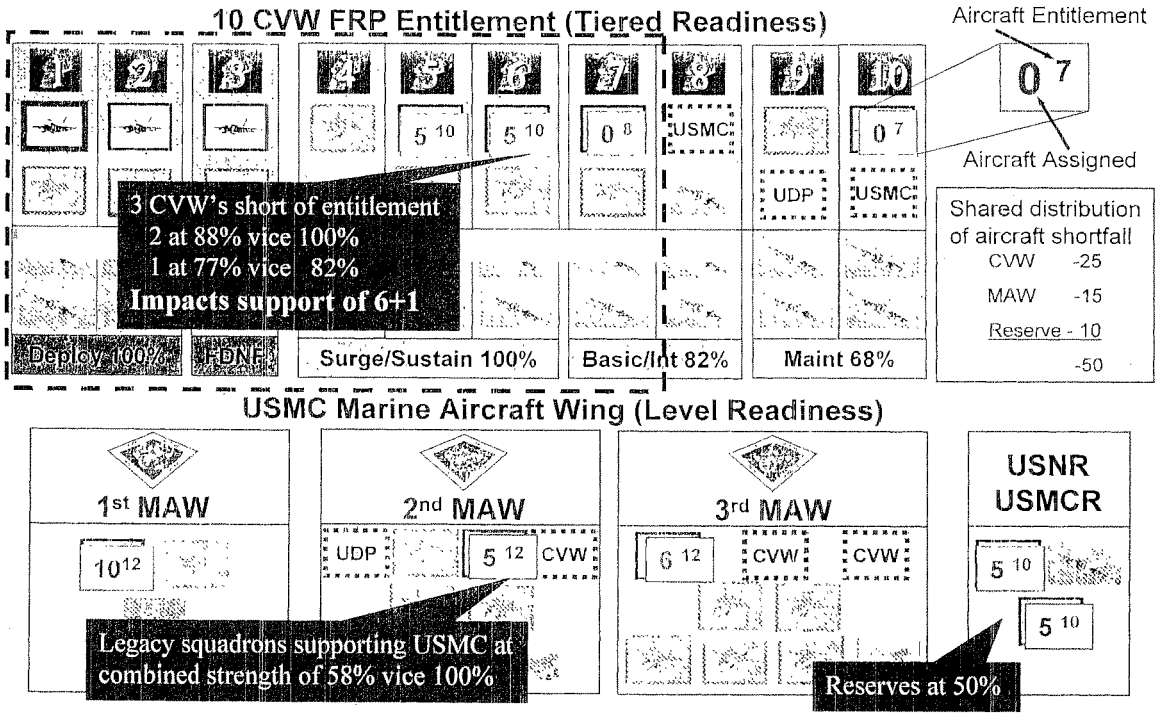
1 USN integrated into 1st MAW UDP cycle

Total
USN
35 Active + 2 Reserve
USMC
19 Active + 1 Reserve

USMC Marine Aircraft Wing (Level Readiness)



2018: Impact of 50 Aircraft Shortfall



Summary

- Significant challenges exists in extending life of F/A-18A-D
  - 50 aircraft shortfall in 2018
- Service Life Assessment Program
  - Complete in December 2007
  - Better defines life expectancy of F/A-18A-D
- Must maintain F/A-18E/F Program of Record
- Any slip in JSF exacerbates Strike Fighter shortfall

5/04/06 08:53 FAX 202 338 5950 001
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MDM/6/2

Senator John McCain
Room 241
Senate Russell Office Building
Constitution Avenue and Second Street NE
Washington DC 20510

4th May 2006

Dear Senator McCain,

I am writing to respond to your questions regarding the current procurement plan for the Joint Strike Fighter (JSF).

The foreign and security policy of the United Kingdom (UK) is designed to strengthen international peace and stability. A strong transatlantic relationship is fundamental to our vision. To meet the challenges of today, prepare for the tasks of tomorrow and be capable of building for the future, our respective armed forces need to be interoperable for maximum effectiveness.

I would like to reassure you that the Joint Strike Fighter remains the optimum solution to the UK's Joint Combat Aircraft requirement. However, as you know, the UK is seeking appropriate access to technology to give us the confidence we need to deliver an aircraft fit to fight, on our terms. This is currently a key concern for the UK. Keeping costs down is also of great importance to all the JSF partner nations and we would certainly agree that proper development and testing of the JSF is essential if we are to produce an efficient more capable aircraft that meets our expectations. The UK remains committed to working closely with the US administration to resolve the issue of technology sharing and ensuring that the JSF programme is founded on a robust acquisition strategy that offers the greatest chance of success and delivers long term value for money. We are optimistic that our ongoing discussions with the US administration will be successful.

In the near future we in the UK will be taking decisions about our requirement for two new aircraft carriers, a key defence capability for the UK

and for future joint coalition operations. The new carriers will be some three times the size of the existing platforms, and will be designed to operate the short take-off and vertical landing variant of the JSF. In reaching our decisions, we need to be confident that the JSF will meet its time, cost and performance parameters. To ensure we make the right decision we must have the right level of confidence that JSF will meet its stated requirements. It is essential to get this right for our warfighters and taxpayers. I would agree that a properly founded development programme should achieve that aim.

The UK's defence and security policy is rooted in the transatlantic alliance at the heart of which is the uniquely close and enduring relationship between our two countries. We are proud that the US counts us as, and trust us to be, your closest ally.

We very much appreciate your personal efforts.

Subject: F-35 Joint Strike Fighter (JSF)

Appropriation: Aircraft Procurement

Summary: The SASC is proposing reducing all AF/Navy JSF procurement funds in FY 07. Basis for the decision appears to be senior DoD official comments about potential JSF one-year slip, a recently revised SDD aircraft build schedule which adds 3-5 months to STOVL and CTOL test aircraft build schedules, and a potential slip of CV critical design review from Nov 06 to Feb 07. In addition, there are substantial rumors that the services may be adjusting 08 POM lines that would reduce or slip JSF production. These statements/action all bring in to question the need for 07 procurement funds.

Program Position: The JSF Program opposes the Senate reduction because it will increase F-35 development and production costs, delay operational capability to all Services and international partners, and increase legacy platform costs. The reduction will result in a $1.5-$2.5 billion increase to F-35 development costs due to stretching the build schedule of development test aircraft, and a subsequent 12 month delay in completion of flight test.

GAO Note: First, what is the evidence that a reduction in production cost will cause these cost increases. They are requesting $8 billion in next two years to continue development. Second, based on results of the delays in the first aircraft and second aircraft to date, we believe follow-on development aircraft will be late as well, minimizing impact on delaying production.

Procurement costs for all JSF aircraft would increase due to increased supplier costs from line disruption and lower confidence in USG acquisition plans as well as parts obsolescence caused by a slower production ramp rate starting in FY 2008. The reduction would also delay production of international partner aircraft by 1 year. The partner impact of a delay is larger than the DoD's as the Partners have fewer and older assets and less operational flexibility. The Senate's reduction is likely to prevent successful closure of the Production, Sustainment & Follow-on Development (PSFD) agreement at year end.

The program is on a solid track. The STOVL and CTOL critical design reviews were held in Feb 06 and demonstrated the maturity of our designs. The CV interim design assessment (IDA) was held in Apr 06 and the USG approved proceeding to detailed design. The completion of the first aircraft in Feb 06 provided an essential pathfinder for design, build, and test, with best-ever levels of cost, quality, and cycle time. All three variants have very good technical performance.

GAO Note: Development is not on track. First flight of the first CTOL aircraft has slipped at least 3 months. This aircraft is not production representative and does not include many of the design changes that resulted to lost weight. The first production representative aircraft (airframe still will not have mission systems)

STOVL has slipped from September 2007 to February 2008. This wll be first aircraft that incorporates design changes. While these have slipped the production decision has not. They cite that all three variants have good technical performance. There is no flight testing yet to support this (see test chart attached). This is based on engineering analysis, which required a major delay in the program to redesign the aircraft also costing $7 billion and 18 months. All three variants will not be in flight testing until 2009. Because of commonality, problems in one could ripple through all three variants.

Also, the first aircraft manufacturing was not as smooth as advertised. The wing for aircraft had significant problems with traveled work—a potential source of significant inefficiency and delay as the program moves forward. It was moved to final assembly only roughly 50 percent complete requiring significant manpower and workarounds to complete it. Also, due to the redesign the follow on aircraft will have a different manufacturing process for the wing which has not yet been demonstrated.

None of the current program risks translate into a one year slip. The 3-5 month adjustment in the SDD build schedule reflects the experienced gained from building the first aircraft (AA-1) and higher-confidence build spans.

GAO Note: again, the test aircraft development schedule is slipping, but production has not. Further, the flight testing has not started and experience in past programs (F-22, B-2) has been that the test program schedules almost doubled in those programs—often resulting in more expensive design changes.

The update was consciously made to take advantage of production line efficiencies gained from grouping the assembly of all STOVL and the first five CTOL and CV aircraft together. The change was also made to reflect the actual STOVL and CTOL design release dates to allow time to fully mature the designs. We are actively mitigating all risks related to execution of this schedule. This updated plan was briefed to all House and Senate JSF staffers. Note the adjustment to the CV design review date will not impact CV detailed design or production schedules.

Going forward, there are confidence milestones that can be readily used to show the production line is on track. By Sep 2006, major assembly (forward fuselage, center fuselage, and/or wing) of five STOVLs and three CTOLS will have begun. All major assemblies will be underway for the first four STOVLs with eight center fuselages in component fabrication. Delivery of our first flight software release to AA-1 will also occur by this date. These steps provide confidence the assembly line can perform to schedule, support the rest of the SDD build sequence and be ready to begin assembling the first LRIP jet in Feb 2008. Furthermore, this could serve a very good check that JSF is on track to execute FY07 procurements funds. In addition, the PW F-135 is performing to schedule - two engines have been accepted and the third flight test engine will deliver in June. Major aircraft warfighting systems - i.e. the radar, electro-

optical targeting system, distributed aperture sensor system, the electronic warfare system, mission computer - are all flying on test beds and performing very well in our integrated labs - either on or ahead of schedule.

GAO Note: again, there is no flight test data to date. Software released at production start in 2007 will be about 35 percent of total. The first aircraft that reflects the design changes will not fly until 2008. While the mission systems are in flight testing, they are not fully capable. Also, in the past, subsystems have worked on flying test beds but once integrated together and onto the aircraft they have encountered significant problems (F-22). DOT&E has consistently emphasized the need for actual flight test data in realistic environment as proof that it will work as intended. In the case of F-35, it will not be until 2011 timeframe that this takes place.

If all FY 07 procurement funds are taken, it would mean the assembly of the first AF CTOL could not begin until FY 08 (Oct-Nov CY 07). This would create a gap in production line activities that will require the program to slow the overall SDD test aircraft build schedule, hence raising SDD costs by at least $1.5B. If the SDD test aircraft build schedule was not stretched, the roughly 6-7 month gap in production activities would cost a loss of learning curve efficiencies in the Lockheed Martin, Northrop Grumman, BAES and supplier production lines. This means the costs of the initial production JSFs would rise if bought one year later.

GAO Note: We would point out that a $1.5 billion increase is very modest of overall program (about .05 percent) in comparison a modest 5 percent cost increase in production costs due to design changes resulting from flight testing would be nearly $10 billion. Our point measure twice cut once.

Partner sensitivity to price increases is particularly high at this point in their acquisition planning. A one year slip would also result in about a 10% increase in the cost of the first JSF partner country aircraft. This would mean the initial UK, Dutch, Italian, and Australian jets would cost $10-15M more than planned.

Compromise suggestion: Use the assembly milestones referenced above as checkpoint before the program is allowed to obligate FY07 procurement funds. Allow some number of aircraft to be bought in FY07 and some portion of long-lead funds be spent so the program can build production capacity and minimize cost increases and IOC delays.

GAO Overall:
The program's plan to enter production more than 2 years before all three JSF variants have completed some flight testing of the aircraft's basic design and 4 years before a fully configured and integrated aircraft is expected to be flight tested. A delay in funding production would allow the program time to gain much needed knowledge, reducing risks, and providing a greater opportunity for a more successful program outcome. The investment risk is high, as DOD plans to

increase spending from about $100 million a month for production in 2007 to over a $500 million a month just 2 years later.

When the JSF program is expected to begin low rate initial production in 2007, the program will have completed less than 1 percent of the flight test program and none of the three JSF variants will have a production representative prototype built and in flight testing. The first demonstration of a production-representative airframe that includes the latest design changes to reduce airframe weight is scheduled for 2008—after production has been initiated—with first flight of the short takeoff and vertical landing variant. All three variants will not be in flight testing until 2009. However, current JSF schedules are showing delivery of early test aircraft could be later than the planned delivery date. Several key test events to demonstrate the aircraft's flying qualities in the intended operational environment are not scheduled until 2009 or later. Also, two major ground tests of the airframe's structural integrity—fatigue and static testing—will be in their very early stages or not have started when production begins and not scheduled to be completed until 2009-2010 timeframe. The cost of discovering design problems during production could be significant because design changes needed in one variant could also ripple through the other two variants.

In addition to late design testing, many of the mission systems planned for JSF will not be available for initial flight testing either. It will not be until 2011 that a fully integrated and configured JSF is undergoing flight tests. JSF's expected performance is largely dependent on demonstrating software. The program plans to develop over 19 million lines of code but when production begins it will have completed less than 35 percent of the software needed for the system's functionality. Because the program will lack key design and testing knowledge, DOD plans to use cost reimbursement contracts for initial production orders, meaning the government will pay for any cost overruns.

We believe the bigger picture is most important here. This is about flying before buying--an age old concept. The JSF flight test schedule is attached showing percent testing complete based on variant and mission systems. Also the JSF is more complex and has three variants—and past programs have taken more time between their crititical design reviews and/or the start of flight testing and the start of production. See the other attached chart. The JSF is jumping right into production after critical design reviews and start of flight test.

The F-22, a quantum leap in technology like JSF, is taking 78 and 47 months between these two points and the start of production. F-18EF, and evolutionary and less risky development, took 33 and 16 months. The JSF is taking only 11 and 3 months. This is very high risk. Maybe the compromise is capping the annual low rate production buys at 5 or less until they have demonstrated through testing that the system works.

Joint Strike Fighter (JSF), Navy, Aircraft Advance Procurement, 2007

Line 6

Program Overview
The JSF program goals are to develop and field a family of stealthy, strike fighter aircraft for the Navy, Air Force, Marine Corps, and U.S. allies, with maximum commonality to minimize costs. The carrier suitable version will complement the Navy's F/A-18 E/F. The conventional takeoff and landing version will primarily be an air-to-ground replacement for the Air Force's F-16 and A-10 aircraft, and will complement the F-22A. The short takeoff and vertical landing version will replace the Marine Corps' F/A-18 and AV-8B aircraft.

Dollars in millions

	Fiscal Year		
	2005	2006	2007
Funding/Request	$0.000	$0.000	$245.000
Potential Excess			
Potential Rescission, Restriction, or Reduction			$245.000

Reason for Reduction
The Navy's fiscal year 2007 advanced procurement request for the JSF could be reduced by $245.000 million because the program's plan to enter production is premature. A delay in funding production would allow the program time to gain much needed knowledge, reducing risks, and providing a greater opportunity for a more successful program outcome. The investment risk is high, as DOD plans to increase spending from about $100 million a month for production in 2007 to over $500 million a month just 2 years later. In a March 2006 report (1), we recommended that DOD delay JSF investment in production aircraft until sufficient testing has at least demonstrated the basic airframe design of each JSF variant in important parts of the flight envelope and limit production quantities until a fully integrated aircraft demonstrates through flight testing the required capabilities.

At the start of low rate initial production in 2007, the program will have completed less than 1 percent of the flight test program and none of the three JSF variants will have a production representative prototype built and in flight testing. The first demonstration of a production-representative airframe that includes the latest design changes to reduce airframe weight is scheduled for late 2007--after production has been initiated--with first flight of the short takeoff and vertical landing variant. All three variants will not be in flight testing until 2009. However, current JSF schedules are showing delivery of early test aircraft could be later than the planned delivery date. Several key test events to demonstrate the aircraft's flying qualities in the intended operational environment are not scheduled until 2009 or later. Also, two major ground tests of the airframe's structural integrity--fatigue and static testing--will be in their very early stages or not have started when production begins and not scheduled to be completed until 2009-2010 timeframe. The cost of discovering design problems during production could be significant because design changes needed in one variant could also ripple through the other two variants.

In addition to late design testing, many of the mission systems planned for JSF will not be available for initial flight testing either. It will not be until 2011 that a fully integrated and configured JSF is undergoing flight tests. JSF's expected performance is largely dependent on demonstrating software. The program plans to develop over 19 million lines of code but when production begins it will have completed less than 35 percent of the software needed for the system's functionality. Because the program will lack key design and testing knowledge, DOD plans to use cost reimbursement contracts for initial production orders, meaning the government will pay for any cost overruns.

(1) GAO, Joint Strike Fighter: DOD Plans to Enter Production before Testing Demonstrates Acceptable Performance, GAO-06-356 (Washington, D.C.: Mar. 15, 2006).

P.O. Comments
The JSF acquisition strategy provides the most effective balance of technical risk, financial resources and Service operational needs. It is structured to provide test data necessary to support DOD reviews and related incremental investment decisions. Technical maturity, test accomplishments and operational effectiveness are key considerations at each acquisition decision point. Warfighting capability results from performance of key mission systems, not from flying the aircraft in its full flight envelope. Critical design reviews for the conventional take-off and landing and short take-off and landing variants were completed in February 2006, concluding that while some moderate technical risks exist the designs display appropriate maturity. Factory rollout of the first test aircraft also occurred in February, with assembly times much less than planned and exceptional quality demonstrated in fabrication, assembly, and mate. First flight of that aircraft is planned late this fiscal year. Six of fifteen flight test aircraft and two static articles are in some stage of manufacture. Demonstrated manufacturing process outcomes justify high confidence in design and weight predictions for all variants. Multiple system and software integration facilities that will flight certify many subsystems for production are in operation. Hardware/software integration for multiple subsystems (e.g., radar) in labs is occurring years sooner than in legacy programs. The JSF acquisition strategy, including software development, executes a spiral capability approach.

GAO Response
According to the program office, the JSF acquisition strategy is structured to provide test data necessary to support investment decisions. Despite the substantial investment, however, the key flight test event to support the decision to enter low rate production in 2007 is the JSF's first flight. This first aircraft however is not representative of what will be produced. In its comments, the program largely provided information on the JSF's development progress. The program office description of the JSF's design maturity is similar to that of a product entering the system demonstration phase of development and not production. System demonstration phase is intended to verify through flight testing that the system will work as intended. The JSF program is only in its fifth year of a 12-year development, but starting production with nearly 7 years of system demonstration and testing remaining leaves a high probability that, because it is not flying before buying, it will incur costly design changes and delay getting needed capability to the warfighter. The program points out in its comments that the warfighting capability for the JSF results from performance of key mission systems. We agree and this is why we believe it is vitally important to flight test a fully configured and integrated aircraft with mission systems before producing aircraft. Until this takes place we believe investing in production is a financial risk, a similar risk that other programs have accepted with disappointing results. Once expensive tooling is put in place, suppliers are brought on board, a large manufacturing workforce is hired, and overhead is significant so that small changes in the design can be significantly more costly than if identified and fixed before this costly infrastructure is put in place. With the JSF plan, the risk to DOD and the taxpayers increases quickly as spending for production goes from about $100 million a month in 2007 to over $500 million a month just 2 years later.

Point of Contact
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Joint Strike Fighter (JSF), Air Force, Aircraft Procurement, 2007

Line 1

Program Overview
The JSF program goals are to develop and field a family of stealthy, strike fighter aircraft for the Navy, Air Force, Marine Corps, and U.S. allies, with maximum commonality to minimize costs. The carrier suitable version will complement the Navy's F/A-18 E/F. The conventional takeoff and landing version will primarily be an air-to-ground replacement for the Air Force's F-16 and A-10 aircraft, and will complement the F-22A. The short takeoff and vertical landing version will replace the Marine Corps' F/A-18 and AV-8B aircraft.

Dollars in millions

	Fiscal Year		
	2005	2006	2007
Funding/Request	$0.000	$0.000	$869.700
Potential Excess			
Potential Rescission, Restriction, or Reduction			$869.700

Reason for Reduction
The Air Force's fiscal year 2007 procurement request for the JSF could be reduced by $869.700 million because the program's plan to enter production is premature. A delay in funding production would allow the program time to gain much needed knowledge, reducing risks, and providing a greater opportunity for a more successful program outcome. The investment risk is high, as DOD plans to increase spending from about $100 million a month for production in 2007 to over $500 million a month just 2 years later. In a March 2006 report (1), we recommended that DOD delay JSF investment in production aircraft until sufficient testing has at least demonstrated the basic airframe design of each JSF variant in important parts of the flight envelope and limit production quantities until a fully integrated aircraft demonstrates through flight testing the required capabilities.

At the start of low rate initial production in 2007, the program will have completed less than 1 percent of the flight test program and none of the three JSF variants will have a production representative prototype built and in flight testing. The first demonstration of a production-representative airframe that includes the latest design changes to reduce airframe weight is scheduled for late 2007--after production has been initiated--with first flight of the short takeoff and vertical landing variant. All three variants will not be in flight testing until 2009. However, current JSF schedules are showing delivery of early test aircraft could be later than the planned delivery date. Several key test events to demonstrate the aircraft's flying qualities in the intended operational environment are not scheduled until 2009 or later. Also, two major ground tests of the airframe's structural integrity--fatigue and static testing--will be in their very early stages or not have started when production begins and not scheduled to be completed until 2009-2010 timeframe. The cost of discovering design problems during production could be significant because design changes needed in one variant could also ripple through the other two variants.

In addition to late design testing, many of the mission systems planned for JSF will not be available for initial flight testing either. It will not be until 2011 that a fully integrated and configured JSF is undergoing flight tests. JSF's expected performance is largely dependent on demonstrating software. The program plans to develop over 19 million lines of code but when production begins it will have completed less than 35 percent of the software needed for the system's functionality. Because the program will lack key design and testing knowledge, DOD plans to use cost reimbursement contracts for initial production orders, meaning the government will pay for any cost overruns.

(1) GAO, Joint Strike Fighter: DOD Plans to Enter Production before Testing Demonstrates Acceptable Performance, GAO-06-356 (Washington, D.C.: Mar. 15, 2006).

P.O. Comments
The JSF acquisition strategy provides the most effective balance of technical risk, financial resources and Service operational needs. It is structured to provide test data necessary to support DOD reviews and related incremental investment decisions. Technical maturity, test accomplishments and operational effectiveness are key considerations at each acquisition decision point. Warfighting capability results from performance of key mission systems, not from flying the aircraft in its full flight envelope. Critical design reviews for the conventional take-off and landing and short take-off and landing variants were completed in February 2006, concluding that while some moderate technical risks exist the designs display appropriate maturity. Factory rollout of the first test aircraft also occurred in February, with assembly times much less than planned and exceptional quality demonstrated in fabrication, assembly, and mate. First flight of that aircraft is planned late this fiscal year. Six of fifteen flight test aircraft and two static articles are in some stage of manufacture. Demonstrated manufacturing process outcomes justify high confidence in design and weight predictions for all variants. Multiple system and software integration facilities that will flight certify many subsystems for production are in operation. Hardware/software integration for multiple subsystems (e.g., radar) in labs is occurring years sooner than in legacy programs. The JSF acquisition strategy, including software development, executes a spiral capability approach.

GAO Response
According to the program office, the JSF acquisition strategy is structured to provide test data necessary to support investment decisions. Despite the substantial investment, however, the key flight test event to support the decision to enter low rate production in 2007 is the JSF's first flight. This first aircraft however is not representative of what will be produced. In its comments, the program largely provided information on the JSF's development progress. The program office description of the JSF's design maturity is similar to that of a product entering the system demonstration phase of development and not production. System demonstration phase is intended to verify through flight testing that the system will work as intended. The JSF program is only in its fifth year of a 12-year development, but starting production with nearly 7 years of system demonstration and testing remaining leaves a high probability that, because it is not flying before buying, it will incur costly design changes and delay getting needed capability to the warfighter. The program points out in its comments that the warfighting capability for the JSF results from performance of key mission systems. We agree and this is why we believe it is vitally important to flight test a fully configured and integrated aircraft with mission systems before producing aircraft. Until this takes place we believe investing in production is a financial risk, a similar risk that other programs have accepted with disappointing results. Once expensive tooling is put in place, suppliers are brought on board, a large manufacturing workforce is hired, and overhead is significant so that small changes in the design can be significantly more costly than if identified and fixed before this costly infrastructure is put in place. With the JSF plan, the risk to DOD and the taxpayers increases quickly as spending for production goes from about $100 million a month in 2007 to over $500 million a month just 2 years later.

Point of Contact
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Joint Strike Fighter (JSF), Air Force, Aircraft Advance Procurement, 2007

Line 2

Program Overview
The JSF program goals are to develop and field a family of stealthy, strike fighter aircraft for the Navy, Air Force, Marine Corps, and U.S. allies, with maximum commonality to minimize costs. The carrier suitable version will complement the Navy's F/A-18 E/F. The conventional takeoff and landing version will primarily be an air-to-ground replacement for the Air Force's F-16 and A-10 aircraft, and will complement the F/A-22. The short takeoff and vertical landing version will replace the Marine Corps' F/A-18 and AV-8B aircraft.

Dollars in millions

	Fiscal Year		
	2005	2006	2007
Funding/Request	$0.000	$118.400	$145.300
Potential Excess			
Potential Rescission, Restriction, or Reduction			$145.300

Reason for Reduction
The Air Force's fiscal year 2007 advanced procurement request for the JSF could be reduced by $145.300 million because the program's plan to enter production is premature. A delay in funding production would allow the program time to gain much needed knowledge, reducing risks, and providing a greater opportunity for a more successful program outcome. The investment risk is high, as DOD plans to increase spending from about $100 million a month for production in 2007 to over $500 million a month just 2 years later. In a March 2006 report (1), we recommended that DOD delay JSF investment in production aircraft until sufficient testing has at least demonstrated the basic airframe design of each JSF variant in important parts of the flight envelope and limit production quantities until a fully integrated aircraft demonstrates through flight testing the required capabilities.

At the start of low rate initial production in 2007, the program will have completed less than 1 percent of the flight test program and none of the three JSF variants will have a production representative prototype built and in flight testing. The first demonstration of a production-representative airframe that includes the latest design changes to reduce airframe weight is scheduled for late 2007--after production has been initiated--with first flight of the short takeoff and vertical landing variant. All three variants will not be in flight testing until 2009. However, current JSF schedules are showing delivery of early test aircraft could be later than the planned delivery date. Several key test events to demonstrate the aircraft's flying qualities in the intended operational environment are not scheduled until 2009 or later. Also, two major ground tests of the airframe's structural integrity--fatigue and static testing--will be in their very early stages or not have started when production begins and not scheduled to be completed until 2009-2010 timeframe. The cost of discovering design problems during production could be significant because design changes needed in one variant could also ripple through the other two variants.

In addition to late design testing, many of the mission systems planned for JSF will not be available for initial flight testing either. It will not be until 2011 that a fully integrated and configured JSF is undergoing flight tests. JSF's expected performance is largely dependent on demonstrating software. The program plans to develop over 19 million lines of code but when production begins it will have completed less than 35 percent of the software needed for the system's functionality. Because the program will lack key design and testing knowledge, DOD plans to use cost reimbursement contracts for initial production orders, meaning the government will pay for any cost overruns.

(1) GAO, Joint Strike Fighter: DOD Plans to Enter Production before Testing Demonstrates Acceptable Performance, GAO-06-356 (Washington, D.C.: Mar. 15, 2006).

P.O. Comments
The JSF acquisition strategy provides the most effective balance of technical risk, financial resources and Service operational needs. It is structured to provide test data necessary to support DOD reviews and related incremental investment decisions. Technical maturity, test accomplishments and operational effectiveness are key considerations at each acquisition decision point. Warfighting capability results from performance of key mission systems, not from flying the aircraft in its full flight envelope. Critical design reviews for the conventional take-off and landing and short take-off and landing variants were completed in February 2006, concluding that while some moderate technical risks exist the designs display appropriate maturity. Factory rollout of the first test aircraft also occurred in February, with assembly times much less than planned and exceptional quality demonstrated in fabrication, assembly, and mate. First flight of that aircraft is planned late this fiscal year. Six of fifteen flight test aircraft and two static articles are in some stage of manufacture. Demonstrated manufacturing process outcomes justify high confidence in design and weight predictions for all variants. Multiple system and software integration facilities that will flight certify many subsystems for production are in operation. Hardware/software integration for multiple subsystems (e.g., radar) in labs is occurring years sooner than in legacy programs. The JSF acquisition strategy, including software development, executes a spiral capability approach.

GAO Response
According to the program office, the JSF acquisition strategy is structured to provide test data necessary to support investment decisions. Despite the substantial investment, however, the key flight test event to support the decision to enter low rate production in 2007 is the JSF's first flight. This first aircraft however is not representative of what will be produced. In its comments, the program largely provided information on the JSF's development progress. The program office description of the JSF's design maturity is similar to that of a product entering the system demonstration phase of development and not production. System demonstration phase is intended to verify through flight testing that the system will work as intended. The JSF program is only in its fifth year of a 12-year development, but starting production with nearly 7 years of system demonstration and testing remaining leaves a high probability that, because it is not flying before buying, it will incur costly design changes and delay getting needed capability to the warfighter. The program points out in its comments that the warfighting capability for the JSF results from performance of key mission systems. We agree and this is why we believe it is vitally important to flight test a fully configured and integrated aircraft with mission systems before producing aircraft. Until this takes place we believe investing in production is a financial risk, a similar risk that other programs have accepted with disappointing results. Once expensive tooling is put in place, suppliers are brought on board, a large manufacturing workforce is hired, and overhead is significant so that small changes in the design can be significantly more costly than if identified and fixed before this costly infrastructure is put in place. With the JSF plan, the risk to DOD and the taxpayers increases quickly as spending for production goes from about $100 million a month in 2007 to over $500 million a month just 2 years later.

Point of Contact
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Joint Strike Fighter (JSF), Aircraft Initial Spares Procurement, 2007

Line 69

Program Overview
The JSF program goals are to develop and field a family of stealthy, strike fighter aircraft for the Navy, Air Force, Marine Corps, and U.S. allies, with maximum commonality to minimize costs. The carrier suitable version will complement the Navy's F/A-18 E/F. The conventional takeoff and landing version will primarily be an air-to-ground replacement for the Air Force's F-16 and A-10 aircraft, and will complement the F-22A. The short takeoff and vertical landing version will replace the Marine Corps' F/A-18 and AV-8B aircraft.

Dollars in millions

	Fiscal Year		
	2005	2006	2007
Funding/Request	$0.000	$0.000	$98.084
Potential Excess			
Potential Rescission, Restriction, or Reduction			$98.084

Reason for Reduction
The Air Force's fiscal year 2007 procurement request for JSF initial spares could be reduced by $98.084 million because it is premature to the program's needs. Buying spares before the design has been demonstrated to be mature increases the risks of costly modifications or obsolescence. The program plans to enter production more than 2 years before all three JSF variants have completed some flight testing of the aircraft's basic design and 4 years before a fully configured and integrated aircraft is expected to be flight tested. If the program begins low rate initial production in 2007, the program will have completed less than 1 percent of the flight test program and none of the three JSF variants will have a production representative prototype built and in flight testing. Starting production before ensuring the design is mature through flight testing significantly increases the risk of costly design changes that will push the program over cost and behind schedule. A delay in funding production would allow the program time to gain much needed knowledge, reducing risks, and providing a greater opportunity for a more successful program outcome. In a March 2006 report (1), we recommended that DOD delay JSF investment in production aircraft until sufficient testing has at least demonstrated the basic airframe design of each JSF variant in important parts of the flight envelope and limit production quantities until a fully integrated aircraft demonstrates through flight testing the required capabilities.

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P.O. Comments
The JSF acquisition strategy provides the most effective balance of technical risk, financial resources and Service operational needs. It is structured to provide test data necessary to support DOD reviews and related incremental investment decisions. Technical maturity, test accomplishments and operational effectiveness are key considerations at each acquisition decision point. Warfighting capability results from performance of key mission systems, not from flying the aircraft in its full flight envelope. Critical design reviews for the conventional take-off and landing and short take-off and landing variants were completed in February 2006, concluding that while some moderate technical risks exist the designs display appropriate maturity. Factory rollout of the first test aircraft also occurred in February, with assembly times much less than planned and exceptional quality demonstrated in fabrication, assembly, and mate. First flight of that aircraft is planned late this fiscal year. Six of fifteen flight test aircraft and two static articles are in some stage of manufacture. Demonstrated manufacturing process outcomes justify high confidence in design and weight predictions for all variants. Multiple system and software integration facilities that will flight certify many subsystems for production are in operation. Hardware/software integration for multiple subsystems (e.g., radar) in labs

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An Air Force Association Special Report

Delivering Combat Capability at Home and Abroad

Why can the US aerospace industry deliver systems for the foreign market more rapidly than it can for the United States Air Force?

By Lt. Gen. Dick Scofield, USAF (Ret.)

September 2004

Additional Observations

The Defense Acquisition System of the 1970s would have to be judged a success. It produced a high level of combat capabilities in a relatively short period, infusing systems with the latest technologies. Moreover, the F-15s and F-16s of that period lent themselves to upgrading with a series of new configurations in the 1980s. It was this evolutionary process that allowed Lockheed Martin and Boeing to provide the proven combat capability that we have in today's Air Force and that we have made available to our friends and allies overseas.

I find it most interesting that there are significant common attributes between the early 1970s programs (F-15A, A-10, F-16A) and the current direct commercial sale programs (F-15K, F-16 Block 60), both of which led to quick delivery of capability.

These common attributes can be looked at within the framework of the evaluation criteria established at the start of the study:

- Mind-set or "culture"
- Leadership
- Total program perspective
- Clarity and stability of requirements
- Test and evaluation
- Stability of funding

Mind-set or "Culture"

There was an aeronautical enterprise that preceded the start of the programs in the early 1970s—one that was engaged in the identification of new capabilities consistent with emerging, maturing technologies. These technologies were the catalyst which provided the basis for determining what was possible in the near term while allowing for capability growth in the future. In the late 1960s and early 1970s, Air Force development planning experts at ASD, working with industry planners and senior government officials, were able to have viable candidates ready to fill new operational requirements in a timely manner. In the case of the DCS programs today, industry business development people played the same role in identifying those capabilities that could be fielded quickly, taking advantage of today's maturing technologies.

In addition, the Air Force laboratories in the late 1960s and early 1970s, working with their parent product division, were developing a number of technologies that could have future potential, without worrying about specific operational concepts and specific weapon system applications. At the same time, the product divisions, working through the development planning auspices, were acutely aware of industry independent research and development (IR&D) activities. In many cases, there were also manufacturing technology (ManTech) initiatives being pursued within industry under the Air Force's ManTech program. All of the efforts were mindful of the long-term future program perspectives and the need to bring to maturity the technologies that would allow development programs to proceed at an appropriate pace with manageable risk once initiated. These same kinds of activities, although fewer in number and more focused on specific weapon systems, are also part of industry activities leading up to a direct commercial sale to a foreign government.

Leadership

Air Force and Pentagon leadership created an environment for the execution of the F-15A, A-10, and F-16A programs that encouraged the program directors to take charge of their programs, to be the leader of the program team (including the contractor and supporting government agencies). This included clear direction on roles and responsibilities of all of the program participants and identifying who had authority for making programmatic decisions and who would assist as staff "advisors." While not specifically written down anywhere (other than in the original DODD 5000.1), the leadership of the Air Force established the environment through their operational relationship with the program directors of each program, respecting their abilities and authorities to make the right long-term decisions for the Air Force, consistent with program priorities, while also holding them accountable. Close examination of the F-15K and F-16 Block 60 DCS programs shows the same environment today—a single program manager responsible for making the right programmatic decisions, consistent with the best long-term direction of the program and the future operational capability of his respective systems.

Total Program Perspective

The F-15A and F-16A programs both demonstrated that we can develop and field capability quickly if we focus on developing capability that is consistent with relatively mature technologies and leave the immature "advanced" technologies to follow-on models utilizing the spiral development approach. The A-10 was never envisioned to be anything other than a sound close air support aircraft. Air Force officials therefore made their decisions within the context of delivering that fundamental capability quickly. The F-15 and F-16 programs have both demonstrated over the years the principle of building a capable platform and then adapting the subsystems to fit the mission needs and the operator's desires. This has been consistently demonstrated in numerous FMS programs as well as in newer, more-advanced models for USAF over the past 30 years. This same perspective applies to the current DCS programs at both contractors. Both have fully integrated programs that provide not only new advanced capability but also provide for the necessary testing, training, and support to make the systems operationally effective once delivered to the foreign air forces. In the case of the DCS programs, the task of identifying and agreeing to all of the program requirements up front was made easier by the amount of proven technology existing at the start of the programs. However, this also demonstrates the principle of clearly

32 identifying the scope up front, then sticking with it, incorporating new requirements in future new efforts.

Clarity and Stability of Requirements
As has been mentioned above, the existence of the aeronautical enterprise in the late 1960s allowed for a good understanding of executable program requirements that would lead to satisfying a set of USAF operational performance requirements. The business development activities preceding the start of the DCS programs accomplished the same thing for the foreign countries. The most interesting conclusion that one can draw from this is: Establishing and limiting one's self to a manageable set of technologies and capabilities does allow for quicker fielding of operational capability once the development work begins. It also has been demonstrated over the years that it is possible to establish new requirements which can be addressed through new technologies at the appropriate point in time.

Test and Evaluation (T&E)
The task of proving the capability of a weapon system, prior to actually using it in combat, falls to the test and evaluation process. All five programs (F-15A, A-10, F-16A, F-15K, F-16 Block 60) had/have a high degree of concurrency between development, primary systems integration, and production. I would observe that, by limiting technology incorporation to relatively mature technology, one is able to better establish the necessary test criteria at the start of the program. This not only contributes to providing the right system performance but also establishes common expectations for success, increasing the probability of success for both the system and the program. In these five programs, the T&E activities played/play a critical function of identifying and, in many cases, resolving system deficiencies early in the development cycle. The A-10 program clearly demonstrated that the T&E community could contribute to the success of the program by being a team player as well as an objective evaluator of performance. I would suspect that the T&E community would play a similar role in the current DCS programs.

Stability of Funding
In addition to the characteristics of the five programs of interest already discussed, the level of stability of the necessary funding for development has to be considered a major contributor to the success of the early development programs and will be a major contributor to resolving any issues that surface in the DCS programs. My judgment is that it is nearly impossible to measure the direct impact on a program associated with year-to-year funding cuts because of the dynamics that occur on highly integrated systems and programs when one tries to remove selective pieces without an adequate systems engineering analysis. However, I think it is relatively easy to see the benefits of maintaining funding stability. One only has to look at what happens to weapon system prices when the government commits to multiyear contracts with associated funding profiles. The C-17 program restructure that occurred in the 1994-95 time frame is a clear example.

With regard to FMS funding stability, former Air Force Security Assistance Center commander Brig. Gen. Jeffrey R. Riemer recently reminded me of the management flexibility delegated to him:

> *In addition to stable requirements and funding, the other difference between US and FMS program management was my ability on FMS programs to reprogram dollars within a country's portfolio. With customer approval, which is normally achieved very quickly, I was able to move dollars from one case to another to maximize efficient use of the country's money.*
>
> *In our US system, PEOs have similar groupings of portfolios, but, with Congressional restrictions on reprogramming between and within appropriations, it ties their hands in being able to quickly reprogram dollars. It also puts those dollars in jeopardy, which, in turn, generates delays and scrap and rework if the funds are lost.*
>
> *As an FMS program manager, I had a stable requirement, stable funding, the ability to move funding to where it was needed to produce the requested capability on cost and on time, and, once the decision to buy a given quantity of a system was decided, the development and production portions of the program were executed as planned. This allows the government industry team to focus on program execution rather than the numerous what-if-drills associated with our US programs.*

Recommendations

Those of us who have operated within this acquisition system over the past three decades know that it has cycles, moving in one or another direction according to external pressure and demands. All signs are that we are now at one of those points in the cycle when we need to change course. We need to go back to the future in order to do a better job of delivering future generations of aircraft.

This paper has attempted to look at those tactical aircraft programs of the last 35 years that have delivered combat capability quickly, once the development program was approved, directed, and funded. The historical data from the F-15A, A-10, and F-16A programs developed in the early 1970s and the current data from the F-15K and F-16 Block 60 direct commercial sale

programs would say that there are four fundamental program characteristics that contributed directly to the speed of delivery.

- *USAF developed a thorough pre-system acquisition activity in which technology, operational concepts, and system performance requirements were clearly established and agreed to. This activity involved the developer (USAF in the early 1970s and the contractor for DCS programs) and the operational user. This usually resulted in the best understanding of what was needed to achieve the necessary capability and was doable in the quickest amount of time, as well as what could be fielded with follow-on versions of the basic capability. In this case, that meant subsequent models of the same airframe.*

- *Once the development program was approved and initiated, changes were kept to a minimum to allow for early fielding of the basic capability while future capabilities and technologies were built into the program plans for future versions of the basic system. The F-15 and F-16 certainly establish the precedent for this approach. Each started with a solid airframe design, tailored to that portion of the operational requirement (and flight charteristics associated with those requirements) for whch it was being developed. Both airframes facilitated the growth in capabilities because of the flexibility and soundness of the airframe design. It takes discipline to develop the basic capability and then grow the increased capability, but it can be done as part of a well-thought-out pre-system acquisition planning activity.*

- *The programs were/are managed with a small management team, and the data and reporting requirements were/are minimized. This involved delegating the decision-making authority (and responsibility) to the program director and his program office team and relying on them to make the proper management decisions consistent wih the program direction and priorities. At the same time, their reporting requirements were limited to only major program issues or threshold breaches. The data from the F-15A/A-10/F-16A would suggest that it is absolutely essential to reduce the number of people involved in the day-to-day execution of the development program to only those individuals within the program office who have been charged with the responsibility of managing the program. This is further demonstrated in the structure of the relatively small contractor teams at both Boeing (F-15K) and Lockheed Martin (F-16, Block 60).*

- *Program management teams were provided the planned resources, as well as the authority and responsibility, to execute the program as planned. This may be the most important consideration in achieving timely completion of the development phase of the program. In each of the cited USAF programs from the early 1970s and DCS programs of today, the funding commitments—by Congress in the USAF case and foreign countries in the DCS case—supported not only the development activities but also allowed for early production ramp-up, program efficencies, and reduced total program costs.*

The challenge is to take these characteristics and use them to rethink the current acquisition system with the objective of developing and fielding combat capability, utilizing the proven spiral development approach that was so clearly demonstrated on the F-15 and F-16 programs from the early 1970s through today. 33

I would suggest that we use Packard's DODD 5000.1 of 1971 as a starting point, given that this document was the basis of the system that has governed major acquisitions for the past three decades. This DODD established three major considerations to determine if the DAS was operating successfully—the mode of operations, the conduct of the program, and the shape of the program. They are as valid today as they were then.

Marvin R. Sambur, assistant secretary of the Air Force for acquisition, has made organizational and policy changes that could set the stage for such a change. The restoration of program executive officer responsibilities and authorities at the product center commander level is a significant step toward a return to the operating model of the early 1970s. Creation of "enterprises" such as the aeronautical enterprise at Wright-Patterson begins to address capability issues affecting future air combat capability. With the PEO serving as the enterprise commander, he now has the ability to conduct development planning as it was done in the early 1970s, formulating alternatives that can be considered early in the requirements phase. Sambur's initiatives on technology transition, collaborative requirements, and seamless verification are essential to constructing a more agile and responsive acquisition system.

However, there is a need to take additional major steps if the acquisition system is to be made to work the way it did for USAF in the early 1970s (and in the FMS and DCS cases of the past 30 years). That major step, as I see it, is to separate the Defense Acquisition System from the requirements generation system, though the two can be integrated within the Planning, Programming, Budgeting, and Execution (PPBE) process.

Let me suggest a possible framework.

The Defense Acquisition System is shown in **Fig. 13** (p. 34), as extracted from DODI 5000.2. However, it's not easy to tell where acquisition starts and requirements stop, especially when the oversight bar at the bottom shows requirements can continually work their way into a program long after the start of the acquisition process. The fact that there are "integrated decision meetings" going on after Milestone B is not consistent with the approach identified in Packard's original system or with the operating model of the F-15, A-10, and F-16 programs.

Some would say that the chart was only intended to convey the message that requirements come first and can evolve as new technologies and concepts evolve, and that those requirements would be approved for incorporation in future increments. In other words, it is not a technically accurate description of the situation. We can, and should, make it technically accurate and, at the same

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DOD ACQUISITION OUTCOMES

A Case for Change

Statement of Katherine V. Schinasi, Managing Director
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GAO-06-257T

Mr. Chairman and members of the subcommittee:

I am pleased to be here today to discuss why and how to get a better return from the Department of Defense's (DOD) weapon system investments. U.S. weapons are the best in the world, but the programs to acquire them frequently take significantly longer and cost more money than promised and often deliver fewer quantities and other capabilities than planned. It is not unusual for estimates of time and money to be off by 20 to 50 percent. When costs and schedules increase, quantities are cut, and the value for the warfighter—as well as the value of the investment dollar—is reduced.

DOD's planned investment in research, development, and procurement of major weapon systems is approximately $1.3 trillion for its current portfolio, with over $800 billion of that investment yet to be made. The planned annual investment is expected to rise from around $149 billion in fiscal year 2005 to $178 billion in fiscal year 2011. Marquee programs include the Army's Future Combat Systems; the Missile Defense Agency's suite of land, sea, air, and space systems; the Navy's advanced ships, such as the DD(X) Destroyer; the Air Force's Transformational Satellite Communications System; and the Joint Strike Fighter. Programs like these—and the Global Information Grid that is designed to interconnect them—are likely to dominate the budget and doctrinal debate well into the next decade. Not only do these programs represent huge technological leaps over their predecessors, DOD is proposing to deliver them faster.

The persistent nature of acquisition problems has perhaps made decision makers complacent about cost growth, schedule delays, and quantity reductions in weapon system programs. But fiscal realities, coupled with the larger scale of acquisitions, will not allow budgets to accommodate the typical margins of error. Thus, we must either make tough decisions now to increase the chances for programs to be executable within fiscal realities or brace ourselves for more draconian decisions later driven by those fiscal realities. The means to make the thoughtful decisions are known.

My statement today highlights the risks of conducting business as usual and identifies some of the solutions we have found in successful acquisition programs and organizations.

The Case for Change

The way DOD develops and produces its major weapons systems has had disappointing outcomes. There is a vast difference between DOD's budgeting plans and the reality of the cost of its systems. Performance, if it is defined as the capability that actually reaches the warfighter, often falls short, as cost increases result in fewer quantities of produced systems and schedule slips. Performance, if it is defined as an acceptable return on investment, has not lived up to promises.

Table 1 illustrates seven programs with a significant reduction in buying power; we have reported similar outcomes in many more programs. For example, the Air Force initially planned to buy 648 F/A-22 Raptor tactical aircraft at a program acquisition unit cost of about $125 million (fiscal year 2006 dollars). Technology and design components matured late in the development of the aircraft, which contributed to cost growth and schedule delays. Now, the Air Force plans to buy 181 aircraft at a program acquisition unit cost of about $361 million, an almost 189 percent increase.

Table 1: Examples of DOD Programs with Reduced Buying Power

Program	Initial investment	Initial quantity	Lastest investment	Latest quantity	Percent of unit cost increase
Joint Strike Fighter	$189. 8 billion	2,866 aircraft	$206.3 billion	2,458 aircraft	26.8%
Future Combat Systems	$82.6 billion	15 systems	$127.5 billion	15 systems	54.4%
F/A-22 Raptor	$81.1 billion	648 aircraft	$65.4 billion	181 aircraft	188.7%
Virginia Class Submarine	$53.7 billion	30 submarines	$80.4 billion	30 submarines	49.7%
Evolved Expendable Launch Vehicle	$15.4 billion	181 vehicles	$28.0 billion	138 vehicles	137.8%
Space Based Infrared System High	$4.1 billion	5 satellites	$10.6 billion	5 satellites	160.2%
Expeditionary Fighting Vehicle	$8.1 billion	1,025 vehicles	$11.1 billion	1,025 vehicles	35.9%

Source: DOD (data); GAO (analysis and presentation).

Furthermore, the conventional acquisition process is not agile enough for today's demands. Congress has expressed concern that urgent warfighting requirements are not being met in the most expeditious manner and has put in place several authorities for rapid acquisition to work around the process. The U.S. Joint Forces Command's Limited Acquisition Authority and the Secretary of Defense's Rapid Acquisition Authority seek the ability to get warfighting capability to the field faster. According to U.S. Joint Forces Command officials, it is only through Limited Acquisition Authority that the command has the authority to satisfy the unanticipated, unbudgeted, urgent mission needs of other combatant commands. With a formal process that requires as many as 5, 10, or

15 years to get from program start to production, such experiments are needed to meet the warfighters' needs.

Today we are at a crossroad. Our nation is on an unsustainable fiscal path. Long-term budget simulations by GAO, the Congressional Budget Office, and others show that, over the long term, we face a large and growing structural deficit due primarily to known demographic trends and rising health care costs. Continuing on this unsustainable fiscal path will gradually erode, if not suddenly damage, our economy, our standard of living, and ultimately our national security. Federal discretionary spending, along with other federal policies and programs, will face serious budget pressures in the coming years stemming from new budgetary demands and demographic trends. Defense spending falls within the discretionary spending accounts. Further, current military operations, such as those in Afghanistan and Iraq, consume a large share of DOD resources and are causing faster wear on existing weapons. Refurbishment or replacement sooner than planned is putting further pressure on DOD's investment accounts.

At the same time DOD is facing these problems, programs are commanding larger budgets. DOD is undertaking new efforts that are expected to be the most expensive and complex ever and on which DOD is heavily relying to fundamentally transform military operations. And it is giving contractors increased program management responsibilities to develop requirements, design products, and select major system and subsystem contractors. Table 2 shows that just 5 years ago, the top five weapon systems cost about $291 billion combined; today, the top five weapon systems cost about $550 billion.

Table 2: Total Cost of DOD's Top Five Programs in Fiscal Years 2001 and 2006 (in 2006 dollars)

2001		2006	
Program	**Cost**	**Program**	**Cost**
F/A-22 Raptor aircraft	$65.0 billion	Joint Strike Fighter	$206.3 billion
DDG-51 class destroyer ship	$64.4 billion	Future Combat Systems	$127.5 billion
Virginia class submarine	$62.1 billion	Virginia class submarine	$80.4 billion
C-17 Globemaster airlift aircraft	$51.1 billion	DDG-51 class destroyer ship	$70.4 billion
F/A-18E/F Super Hornet fighter aircraft	$48.2 billion	F/A-22 Raptor aircraft	$65.4 billion
Total	**$290.8 billion**	**Total**	**$550.0 billion**

Source: DOD (data); GAO (analysis and presentation).

If these megasystems are managed with traditional margins of error, the financial consequences can be dire, especially in light of a constrained discretionary budget.

Success for acquisitions means making sound decisions to ensure that program investments are getting promised returns. In the commercial world, successful companies have no choice but to adopt processes and cultures that emphasize basing decisions on knowledge, reducing risks prior to undertaking new efforts, producing realistic cost and schedule estimates, and building-in quality in order to deliver products to customers at the right price, the right time, and the right cost. At first blush, it would seem DOD's definition of success would be very similar: deliver capability to the warfighter at the right price, the right time, and the right cost. However, this is not happening within DOD. In an important sense, success has come to mean starting and continuing programs even when cost, schedule, and quantities must be sacrificed.

DOD knows what to do to improve acquisitions but finds it difficult to apply the controls or assign the accountability necessary for successful outcomes. To understand why these problems persist, we must look not just at the product development process but at the underlying requirements and budgeting processes to define problems and find solutions.

A Knowledge-Based Process Can Lead to Better Outcomes

Over the last several years, we have undertaken a body of work that examines weapon acquisition issues from a perspective that draws upon lessons learned from best product development practices. Leading commercial firms expect that their program managers will deliver high-quality products on time and within budget. Doing otherwise could result in the customer walking away. Thus, those firms have created an environment and adopted practices that put their program managers in a good position to succeed in meeting these expectations. Collectively, these practices comprise a process that is anchored in knowledge. It is a process in which technology development and product development are treated differently and managed separately. The process of developing technology culminates in discovery—the gathering of knowledge—and must, by its nature, allow room for unexpected results and delays. Leading firms do not ask their product managers to develop technology. Successful programs give responsibility for maturing technologies to a science and technology organizations, rather than the program or product development managers. The process of developing a product culminates in delivery, and, therefore, gives great weight to design and production. The firms demand—and receive—specific knowledge about a new product before production begins. A program does not go forward unless a strong business case on which the program was originally justified continues to hold true.

Successful product developers ensure a high level of knowledge is achieved at key junctures in development. We characterize these junctures as knowledge points. These knowledge points and associated indicators are defined as follows:

- **Knowledge point 1**: Resources and needs match. This point occurs when a sound business case is made for the product—that is, a match is made between the customer's requirements and the product developer's available resources in terms of knowledge, time, money, and capacity. Achieving a high level of technology maturity at the start of system development is an important indicator of whether this match has been made. This means that the technologies needed to meet essential product requirements have been demonstrated to work in their intended environment.

- **Knowledge point 2**: Product design is stable. This point occurs when a program determines that a product's design is stable— that is, it will meet customer requirements, as well as cost, schedule and reliability targets. A best practice is to achieve design stability at the system-level critical design review, usually held midway through development. Completion of at least 90 percent of engineering drawings at the system design review provides tangible evidence that the design is stable.

- **Knowledge point 3**: Production processes are mature. This point is achieved when it has been demonstrated that the company can manufacture the product within cost, schedule, and quality targets. A best practice is to ensure that all key manufacturing processes are in statistical control—that is, they are repeatable, sustainable, and capable of consistently producing parts within the product's quality tolerances and standards—at the start of production.

A result of this knowledge-based process is evolutionary product development, an incremental approach that enables developers to rely more on available resources rather than making promises about unproven technologies. Predictability is a key to success as successful product developers know that invention cannot be scheduled and its cost is difficult to estimate. They do not bring technology into new product development unless that technology has been demonstrated to meet the user's requirements. Allowing technology development to spill over into product development puts an extra burden on decision makers and provides a weak foundation for making product development estimates. While the user may not initially receive the ultimate capability under this approach, the initial product is available sooner and at a lower, more predictable cost.

There is a synergy in this process, as the attainment of each successive knowledge point builds on the preceding one. Metrics gauge when the requisite level of knowledge has been attained. Controls are used to attain a high level of knowledge before making additional significant investments. Controls are considered effective if they are backed by measurable criteria and if decision makers are required to consider them before deciding to advance a program to

the next level. Effective controls help decision makers gauge progress in meeting cost, schedule, and performance goals and ensure that managers will (1) conduct activities to capture relevant product development knowledge, (2) provide evidence that knowledge was captured, and (3) hold decision reviews to determine that appropriate knowledge was captured to move to the next phase. The result is a product development process that holds decision makers accountable and delivers excellent results in a predictable manner.

A hallmark of an executable program is shorter development cycle times, which allow more systems to enter production more quickly. DOD itself suggests that product development should be limited to about 5 years. Time constraints, such as this, are important because they serve to limit the initial product's requirements. Limiting product development cycle times to 5 years or less would allow for more frequent assimilation of new technologies into weapon systems, speeding new technology to the warfighter, hold program managers accountable, as well as make more frequent and predictable work in production, where contractors and the industrial base can profit by being efficient.

Despite Policy, DOD Is Not Employing a Knowledge-Based Process

DOD's policy adopts the knowledge-based, evolutionary approach used by leading commercial companies that enables developers to rely more on available resources rather than making promises about unproven technologies. The policy provides a framework for developers to ask themselves at key decision points whether they have the knowledge they need to move to the next phase of acquisition. For example, DOD Directive 5000.1 states that program managers "shall provide knowledge about key aspects of a system at key points in the acquisition process," such as demonstrating "technologies in a relevant environment ... prior to program initiation." This knowledge-based framework can help managers gain the confidence they need to make significant and sound investment decisions for major weapon systems. In placing greater emphasis on evolutionary product development, the policy sets up a more manageable environment for achieving knowledge.

However, the longstanding problem of programs beginning development with immature technologies is continuing to be seen on even the newest programs. Several programs approved to begin product development within only the last few years began with most of their technologies immature and have already experienced significant development cost increases. In the case of the Army's Future Combat Systems, nearly 2 years after program launch and with $4.6 billion invested, only 1 out of more than 50 critical technologies is considered mature and the research and development cost estimate has grown by 48 percent.

In March 2005, we reported that very few programs—15 percent of the programs we assessed—began development having demonstrated high levels of technology maturity. Acquisition unit costs for programs leveraging mature technologies increased by less than 1 percent, whereas programs that started development with immature technologies experienced an average acquisition unit cost increase of nearly 21 percent over the first full estimate.

Establishing a Sound Business Case Depends on Disciplined Requirements and Funding Process

The decision to start a new program is the most highly leveraged point in the product development process. Establishing a sound business case for individual programs depends on disciplined requirements and funding processes. Our work has shown that DOD's requirements process generates more demand for new programs than fiscal resources can support. DOD compounds the problem by approving so many highly complex and interdependent programs. Moreover, once a program is approved, requirements can be added along the way that increases costs and risks.

Once too many programs are approved to start, the budgeting process exacerbates problems. Because programs are funded annually and department wide, cross-portfolio priorities have not been established, competition for funding continues over time, forcing programs to view success as the ability to secure the next funding increment rather than delivering capabilities when and as promised. As a result, there is pressure to suppress bad news about programs, which could endanger funding and support, as well as to skip testing because of its high cost. Concurrently, when faced with budget constraints, senior officials tend to make across-the-board cuts to all programs rather than make the hard decisions as to which ones to keep and which ones to cancel or cut back. In many cases, the system delivers less performance than promised when initial investment decisions were made.

So, the condition we encounter time after time describes a predictable outcome. The acquisition environment encourages launching product developments that embody more technical unknowns and less knowledge about the performance and production risks they entail. A new weapon system is encouraged to possess performance features that significantly distinguish it from other systems and promises the best capability. A new program will not be approved unless its costs fall within forecasts of available funds and, therefore, looks affordable. Because cost and schedule estimates are comparatively soft at the time, successfully competing for funds encourages the program's estimates to be squeezed into the funds available. Consequently, DOD program managers have incentives to promote performance features and design characteristics that rely on immature technologies and decision makers lack the knowledge they need to make good decisions.

The Path to Better Decisions

A path can be laid out to make decisions that will lead to better program choices and better outcomes. Much of this is known and has been recommended by one study or another. GAO itself has issued hundreds of reports. The key recommendations we have made have been focused on the product development process:

- constraining individual program requirements by working within available resources and by leveraging systems engineering;
- establishing clear business cases for each individual investment;
- enabling science and technology organizations to shoulder the technology burden;
- ensuring that the workforce is capable of managing requirements trades, source selection, and knowledge-based acquisition strategies; and
- establishing and enforcing controls to ensure that appropriate knowledge is captured and used at critical junctures before moving programs forward and investing more money.

As I have outlined above, however, setting the right conditions for successful acquisitions outcomes goes beyond product development. We are currently examining how to bring discipline to the Department's requirements and budgetary process and the role played by the program manager.

As we conduct this work, we will be asking

- who is currently accountable for acquisition decisions;
- who should be held accountable;
- how much deviation from the original business case is allowed before the entire program investment is reconsidered; and
- what is the penalty when investments do not result in meeting promised warfighter needs?

We can make hard, but thoughtful, decisions now or postpone them, allowing budgetary realities to force draconian decisions later.

Mr. Chairman, this concludes my prepared statement. I would be happy to respond to any questions that you or other members of the subcommittee may have.

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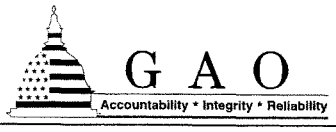
DEFENSE ACQUISITIONS

DOD Wastes Billions of Dollars through Poorly Structured Incentives

Statement of David M. Walker
Comptroller General of the United States



GAO-06-409T

April 5, 2006

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Highlights

Highlights of GAO-06-409T, a testimony before the Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate

DEFENSE ACQUISITIONS

DOD Wastes Billions of Dollars through Poorly Structured Incentives

Why GAO Did This Study

With DOD spending over $200 billion annually to acquire products and services that include everything from spare parts to the development of major weapon systems, our numerous, large, and mounting fiscal challenges demand that DOD maximize its return on investment and provide the warfighter with needed capabilities at the best value for the taxpayer. In an effort to encourage defense contractors to perform in an innovative, efficient, and effective way, DOD gives its contractors the opportunity to collectively earn billions of dollars through monetary incentives known as award and incentive fees. Using these incentives properly—in concert with good acquisition practices—is a key to minimizing waste, maximizing value, and getting our military personnel what they need, when and where they need it.

The subcommittee asked GAO to testify on DOD's use of award and incentive fees and the role they play in the acquisition system. This statement highlights the risks of conducting business as usual and identifies the actions DOD needs to take to use these fees more effectively. DOD concurred or partially concurred with the seven recommendations GAO made in a previously issued report on award and incentive fees. GAO looks forward to seeing DOD turn these promised steps into actual policy and practice.

www.gao.gov/cgi-bin/getrpt?GAO-06-409T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Katherine Schinasi at (202) 512-4841 or schinasik@gao.gov.

What GAO Found

DOD's use of award and incentive fees is an issue at the nexus of two areas that GAO has designated "high risk" for DOD—contract management and weapon system acquisition. Contract management has been a long-standing business management challenge for DOD because it often cannot assure that it is using sound business practices to acquire the goods and services the warfighter needs. For weapon system acquisitions, the persistent and long-standing nature of acquisition problems has perhaps made a range of key decision makers complacent about cost growth, schedule delays, quantity reductions, and performance shortfalls. DOD's strategies for incentivizing its contractors, especially for weapon system development programs, reflect the challenges in these areas.

DOD programs routinely engage in award-fee practices that do not hold contractors accountable for achieving desired outcomes and undermine efforts to motivate contractor performance, such as

- evaluating contractors on award-fee criteria that are not directly related to key acquisition outcomes (e.g., meeting cost and schedule goals and delivering desired capabilities to the warfighter);
- paying contractors a significant portion of the available fee for what award-fee plans describe as "acceptable, average, expected, good, or satisfactory" performance; and
- giving contractors at least a second opportunity to earn initially unearned or deferred fees.

As a result, DOD has paid out an estimated $8 billion in award fees on contracts in GAO's study population, regardless of whether acquisition outcomes fell short of, met, or exceeded DOD's expectations. Despite paying billions of dollars, DOD has not compiled data or developed performance measures to evaluate the validity of its belief that award and incentive fees improve contractor performance and acquisition outcomes.

These issues, along with those GAO has identified in DOD's acquisition and business management processes, present a compelling case for change. By implementing the recommendations GAO has made on award and incentive fees, DOD can improve incentives, increase transparency, and enhance accountability for the fees it pays. At the same time, by working more broadly to improve its acquisition practices, DOD can set the right conditions for getting better acquisition outcomes and making more efficient use of its resources in what is sure to be a more fiscally constrained environment.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss the Department of Defense's (DOD) use of monetary incentives known as award and incentive fees. With DOD spending over $200 billion annually to acquire products and services that include everything from spare parts to the development of major weapon systems, our numerous, large, and mounting fiscal challenges demand that DOD maximize its return on investment and provide the warfighter with needed capabilities at the best value for the taxpayer. In an effort to encourage defense contractors to perform in an innovative, efficient, and effective way, DOD gives its contractors the opportunity to collectively earn billions of dollars through monetary incentives known as award and incentive fees. Using these incentives properly, in concert with sound acquisition practices, is a key to minimizing waste, maximizing value, and getting our military personnel what they need, when and where they need it. Unfortunately, DOD has not used these incentives effectively. How they have been used and how we believe they should be used is the focus of my statement today.

To put the issues related to DOD's use of award and incentive fees in context, I want to step back and look at some of the broader management challenges that confront DOD. The department is facing a significant number of recurring problems in managing its major weapon acquisitions. Although U.S. weapons are the best in the world, DOD's acquisition process for weapons programs consistently yields undesirable consequences—dramatic cost increases, late deliveries to the warfighter, and performance shortfalls. These problems occur, in part, because DOD tends to consistently overpromise and underdeliver in connection with major acquisition efforts. In addition, DOD's weapons programs do not capture, early on, the requisite knowledge that is needed to efficiently and effectively manage program risks. For example, programs lack clearly defined and stable requirements, move forward with unrealistic program cost and schedule estimates, use immature technologies in launching product development, and fail to solidify design and manufacturing processes at appropriate junctures in development. As a result, wants are not always distinguished from needs; expectation gaps are the norm; problems often surface late in the development process; and fixes tend to be much more costly than if they were caught earlier.

Cost increases incurred while developing new weapon systems typically mean that DOD cannot produce as many of those weapons as intended nor can it be relied on to deliver them to the warfighter when promised and with the initially advertised capabilities. In addition, military operations in

Afghanistan and Iraq are consuming a large share of DOD resources and causing the department to invest more money sooner than expected to replace or fix existing weapons. Meanwhile, DOD is intent on transforming military operations and currently has its eye on multiple megasystems that are expected to be the most expensive and complex ever. These new desires and long-standing acquisition and contract management challenges are running head-on into the nation's current imprudent and unsustainable fiscal path. At the same time, DOD's numerous business management weaknesses continue to result in reduced efficiencies and effectiveness that waste billions of dollars every year. These business management weaknesses touch on all of DOD's major business operations, ranging from the department's inadequate management of its overall business transformation effort to decades-old financial management and information technology problems to various contracting and selected supply chain challenges. In fact, all these areas and more are on GAO's 2005 "high-risk" list of programs and activities that need urgent attention and fundamental transformation to ensure that our national government functions in the most economical, efficient, and effective manner possible.

DOD's use of award and incentive fees is an issue at the nexus of two of these high-risk areas—DOD contract management and DOD weapon system acquisition. Contract management has been a long-standing business management challenge for the department. DOD is the government's largest purchaser, yet it is often unable to assure that it is using sound business practices to acquire the goods and services needed to meet the warfighter's needs. For example, we have found that DOD has not used various contracting tools and techniques effectively—such as performance-based service contracting, multiple-award task order contracts, purchase cards, and, most recently, award and incentive fees. For DOD weapon system acquisitions, we have found the persistent and long-standing nature of acquisition problems has perhaps made a range of key players both in the Pentagon and the Congress complacent about cost growth, schedule delays, quantity reductions, and performance shortfalls in weapon system programs. DOD's strategies for incentivizing its contractors, especially on weapon system development programs, reflect this complacency and are symptomatic of the lack of discipline, oversight, transparency, and accountability in DOD's acquisition process. As a result, DOD programs routinely engage in practices that undermine efforts to motivate positive contractor performance and that do not hold contractors accountable for achieving desired acquisition outcomes, such as meeting cost and schedule goals and delivering desired capabilities to the warfighter.

Specifics follow:

- DOD generally does not evaluate contractors based on award-fee criteria that are directly related to key acquisition outcomes. In addition, the link between the elements of contractor performance that are included in the criteria and these outcomes is not always clear. As a result, DOD paid out an estimated $8 billion in award fees over the life of the contracts in our study population (from their inception through our data collection phase),[1] regardless of whether acquisition outcomes fell short of, met, or exceeded DOD's expectations.

- DOD programs engage in practices that undermine efforts to motivate excellent contractor performance by regularly paying contractors a significant portion of the available fee for what award-fee plans describe as "acceptable, average, expected, good, or satisfactory" performance. Although the definition of this level of performance varies by contract, these definitions are generally not related to outcomes. About half of the contracts in our sample, allowed 70 percent or more of the available fee to be paid for this level of performance.

- DOD award fee practices do not promote accountability. DOD programs gave contractors on about half of the award-fee contracts in our study population at least a second opportunity to earn an estimated $669 million in initially unearned or deferred fees.

Taken together, DOD's acquisition, business, and contract management practices are contrary to the purpose of performance-based contracting concepts and have resulted and, if not corrected in both form and practice, will continue to result in wasting billions of dollars in taxpayer funds. My statement today will focus on what steps DOD must take to strengthen the link between monetary incentives and acquisition outcomes and by extension increase the transparency and accountability of DOD programs for fees paid and of contractors for results achieved. This testimony draws upon our recently issued report on DOD's use of award and incentive fees as well as the GAO High-Risk series and our body of work on weapon system acquisitions.

[1]Estimates of total award fees earned are based on all evaluation periods held from the inception of our sample contracts through our data collection phase, not just those from fiscal years 1999 through 2003. The oldest award fee contracts in our sample were signed in fiscal year 1991 For some contracts, the data collection phase ended as early as November 2004. For at least one contract, data collection was not complete until April 2005.

GAO's many acquisition-related reports over the years raise serious questions about the reasonableness, appropriateness, and affordability of DOD's current investment plans; the soundness of the acquisition process which implements those plans; and the effectiveness of the practices DOD uses to manage its contractors, including the use of award and incentive fees. These reports collectively present a compelling case for change.

Appendix I contains information about the scope and methodology for GAO-06-66, *Defense Acquisitions: DOD Has Paid Billions in Award and Incentive Fees Regardless of Acquisition Outcomes*. The work was conducted in accordance with generally accepted government auditing standards.

Background

Federal agencies, including DOD, can choose among numerous contract types to acquire products and services. One of the characteristics that vary across contract types is the amount and nature of the fee that agencies offer to the contractor for achieving or exceeding specified objectives or goals. Of all the contract types available, only award- and incentive-fee contracts allow an agency to adjust the amount of fee paid to contractors based on the contractor's performance.[2]

Federal acquisition regulations state that award- and incentive-fee contracts should be used to achieve specific acquisition objectives, such as delivering products and services on time or within cost goals and with the promised capabilities. For award-fee contracts, the assumption underlying the regulation is that the likelihood of meeting these acquisition objectives will be enhanced by using a contract that effectively motivates the contractor toward exceptional performance. Typically, award-fee contracts emphasize multiple aspects of contractor performance in a wide variety of areas, such as quality, timeliness, technical ingenuity, and cost-effective management.[3] These areas are

[2]Other contract types do not provide this same level of control over fees and profits. The two most prevalent DOD contract types (based on the number of contract actions) are firm-fixed-price and cost-plus-fixed-fee. Under firm-fixed-price contracts, DOD and the contractor agree on a price and the contractor assumes full responsibility for all costs and the resulting profit or loss. Under cost-plus-fixed-fee contracts, DOD provides payment for the contractor's allowable incurred costs, to the extent prescribed in the contract, and the contractor receives a fee that was negotiated and fixed at the inception of the contract.

[3]Award-fee contracts are intended to be flexible, so award-fee plans allow contracting and program officials to change the fee criteria in these areas and the weight given to each criterion from evaluation period to evaluation period.

susceptible to judgmental and qualitative measurement and evaluation, and as a result, award-fee criteria and evaluations tend to be subjective.[4] Table 1 provides a description of the general process for evaluating the contractor and determining the amount of award fee earned.

Table 1: General Process for Determining Award-Fee Amounts

1	DOD officials provide input on the contractor's performance for an evaluation period that just ended.
2	Program officials compile data and prepare briefing or summary for award-fee evaluation board.[a]
3	Award-fee evaluation board convenes meeting; contractor has option to submit a self-assessment and brief the board.
4	Award-fee evaluation board considers all the input and recommends a fee rating for the contractor.
5	Fee-determining official (usually outside the program) makes an initial fee determination and notifies contracting officer.[b]
6	Contracting officer notifies contractor of initial determination; contractor has the option to appeal the decision to the fee-determining official.
7	Fee-determining official makes final determination, including whether to roll over unearned fee, and notifies contracting officer.[c]
8	Contracting officer issues final determination to contractor and processes a contract modification authorizing payment.

Sources: Army Contracting Agency Award Fee Handbook, Air Force Award Fee Guide, Navy/Marine Corps Award Fee Guide (data); GAO (analysis).

[a] Award-fee evaluation board members may include personnel from key organizations knowledgeable about the award-fee evaluation areas, such as: engineering, logistics, program management, contracting quality assurance, legal, and financial management; personnel from user organizations and cognizant contract administration offices; and the local small business office in cases where subcontracting goals are important. On major weapons programs, the boards are generally made up of personnel from the program office.

[b] The fee-determining official is generally at a higher level organizationally than those directly involved in the evaluation of the contractor (e.g. award-fee board members). For instance, this official can be the program executive officer for a weapons system acquisition contract or a garrison commander on a base support services contract.

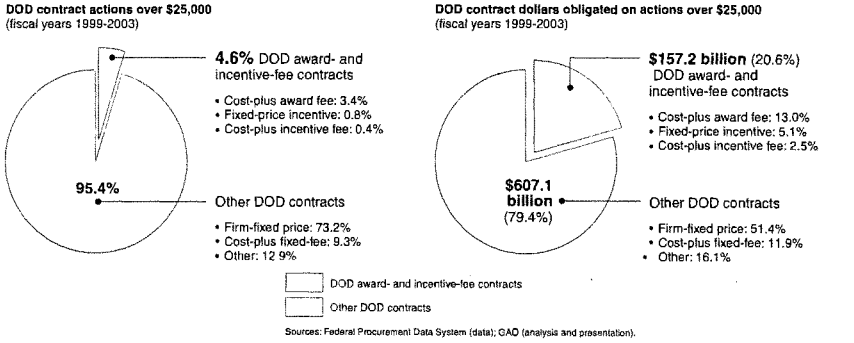
[c] Rollover is the practice of moving unearned award fee from one evaluation period to a subsequent evaluation period or periods, thus providing the contractor an additional opportunity to earn previously unearned fee.

[4] The Navy Award Fee Guide suggests that objective measures also be utilized, to the maximum extent possible, to support the subjective evaluation of the contractor's performance.

Prevalence and Use of Award and Incentive Fees

From fiscal year 1999 through fiscal year 2003, award- and incentive-fee contract actions[5] accounted for 4.6 percent of all DOD contract actions over $25,000. However, when taking into account the dollars obligated—award- and incentive-fee contract actions accounted for 20.6 percent of the dollars obligated on actions over $25,000, or over $157 billion, as shown in figure 1. Our sample of 93 contracts includes $51.6 billion, or almost one-third, of those obligated award- and incentive-fee contract dollars.[6] These obligations include award- and incentive-fee payments as well as other contract costs.

Figure 1: Prevalence of Award- and Incentive-Fee Contracts, Fiscal Years 1999-2003



Sources: Federal Procurement Data System (data); GAO (analysis and presentation).

[5]Contract actions include any action related to the purchasing, renting, or leasing of supplies, services, or construction. Contract actions include definitive contracts; letter contracts; purchase orders; orders made under existing contracts or agreements; and contract modifications, which would include the payment of award and incentive fees.

[6]These contracts were selected as part of a probability sample of 93 contracts from a study population of 597 DOD award-fee and incentive-fee contracts that were active between fiscal years 1999 and 2003 and had at least one contract action coded as cost-plus-award-fee, cost-plus-incentive-fee, fixed-price-award-fee, or fixed-price incentive valued at $10 million or more during that time.

DOD utilized the contracts in our sample for a number of purposes. For example, research and development contracts accounted for 51 percent (or $26.4 billion) of the dollars obligated against contracts in our sample from fiscal years 1999 through 2003; while non-research-and-development services accounted for the highest number of contracts in our sample. Further, we estimate that most of the contracts and most of the dollars in our study population are related to the acquisition of weapon systems.

DOD has the flexibility to mix and match characteristics from different contract types. The risks for both DOD and the contractor vary depending on the exact combination chosen, which, according to the Federal Acquisition Regulation, should reflect the uncertainties involved in contract performance. Based on the results from our sample, about half of the contracts in our study population were cost-plus-award-fee contracts. The theory behind these contracts is that although the government assumes most of the cost risk, it retains control over most or all of the contractor's potential fee as leverage. On cost-plus-award-fee contracts, the award fee is often the only source of potential fee for the contractor. According to defense acquisition regulations, these contracts can include a base fee—a fixed fee for performance paid to the contractor—of anywhere from 0 to 3 percent of the value of the contract;[7] however, based on our sample results, we estimate that about 60 percent of the cost-plus-award-fee contracts in our study population included zero base fee.[8] There is no limit on the maximum percentage of the value of the contract that can be made available in award fee, although the 20 percent included in the Space-Based Infrared Radar System High development contract we examined was outside the norm. The available award fees on all the award-fee contracts in our study population typically ranged from 7 to 15 percent of the estimated value of the contract.

A System in Need of Reform

DOD's use of award and incentive fees is symptomatic of an acquisition system in need of fundamental reform. DOD's historical practice of routinely paying its contractors nearly all of the available award fee creates an environment in which programs pay and contractors expect to

[7]The two F/A-22 development contracts in our sample included a 4 percent base fee. The program office received a deviation from the Defense Federal Acquisition Regulation Supplement, which allows for a maximum of 3 percent base fee.

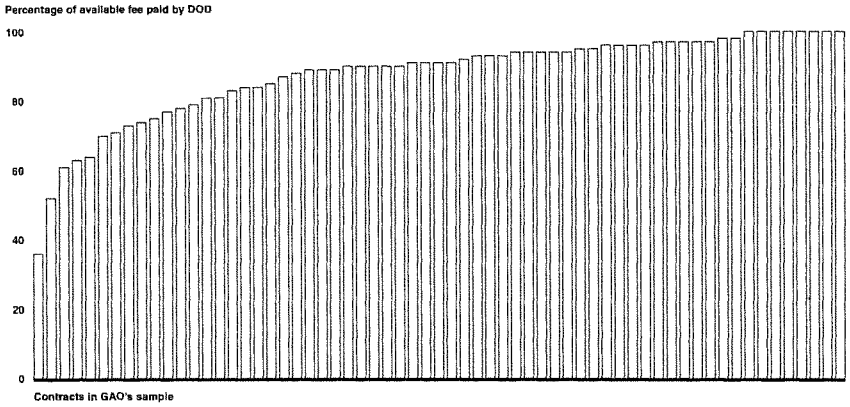
[8]The 95 percent confidence interval surrounding this estimate ranges from 46 percent to 73 percent.

receive most of the available fee, regardless of acquisition outcomes. This is occurring at a time when DOD is giving contractors increased program management responsibilities to develop requirements, design products, and select major system and subsystem contractors. Based on our sample, we estimate that for DOD award-fee contracts, the median percentage of available award fee paid to date (adjusted for rollover)[9] was 90 percent, representing an estimated $8 billion in award fees for contracts active between fiscal years 1999 and 2003. Estimates of total award fees earned are based on all evaluation periods held from the inception of our sample contracts through our data collection phase, not just those from fiscal years 1999 through 2003.[10] Figure 2 shows the percentage of available fee earned for the 63 award-fee contracts in our sample.

[9]When calculating the percentage of award fee paid (i.e. percentage of award fee paid = total fee paid to date / (total fee pool – remaining fee pool)), we included rolled-over fees in the remaining fee pool when those fees were still available to be earned in future evaluation periods.

[10]The oldest award fee contracts in our sample were signed in fiscal year 1991. For some contracts, the data collection phase ended as early as November 2004. For at least one contract, data collection was not complete until April 2005.

Figure 2: Percentage of Available Fee Paid to Date for 63 Award-Fee Contracts in GAO's Sample



Sources: DOD submissions to GAO and contract documentation (data); GAO (analysis and presentation).

The pattern of consistently high award-fee payouts is also present in DOD's fee decisions from evaluation period to evaluation period. This pattern is evidence of reluctance among DOD programs to deny contractors significant amounts of fee, even in the short term. We estimate that the median percentage of award fee earned for each evaluation period was 93 percent and that the contractor received 70 percent or less of the available fee in only 9 percent of the evaluation periods and none of the available fee in only 1 percent of the evaluation periods.

A Case for Change: Moving Toward Outcome-Based Award-Fee Criteria

Recommendations	DOD response
• Move toward more outcome-based award-fee criteria that are both achievable and promote accountability for **positive acquisition outcomes**	• DOD issued a policy memo on March 29, 2006, emphasizing the need to link award fees to desired program outcomes.

Award fees have generally not been effective at helping DOD achieve its desired acquisition outcomes, in large part, because award-fee criteria are not linked to desired acquisition outcomes, such as meeting cost and

schedule goals and delivering desired capabilities. Instead, DOD programs structure award fees to focus on the broad aspects of contractor performance, such as technical and management performance and cost control, that they view as keys to a successful program. In addition, elements of the award-fee process, such as the frequency of evaluations and the composition of award-fee boards, may also limit DOD's ability to effectively and impartially evaluate the contractor's progress toward acquisition outcomes. Most award-fee evaluations are time-based, generally every six months, rather than event-based; and award-fee boards are made up primarily of individuals directly connected to the program. As a result of all these factors, DOD programs frequently paid most of the available award fee for what they described as improved contractor performance, regardless of whether acquisition outcomes fell short of, met, or exceeded DOD's expectations.

High award-fee payouts on programs that have fallen or are falling well short of meeting their stated goals are also indicative of DOD's failure to implement award fees in a way that promotes positive performance and adequate accountability. Several major development programs—accounting for 52 percent of the available award-fee dollars in our sample and 46 percent of the award-fee dollars paid to date—are not achieving or have not achieved their desired acquisition outcomes, yet contractors received most of the available award fee. These programs—the Comanche helicopter, F/A-22 and Joint Strike Fighter aircraft, and the Space-Based Infrared System High satellite system—have experienced significant cost increases, technical problems, and development delays, but the prime systems contractors have received 85, 91, 100, and 74 percent of the award fee, respectively to date (adjusted for rollover), totaling $1.7 billion (see table 2).

Table 2: Program Performance and Award-Fee Payments on Selected DOD Development Programs

Acquisition outcomes	Comanche reconnaissance attack helicopter	F/A-22 Raptor tactical fighter aircraft	Joint Strike Fighter tactical fighter aircraft	Space-Based Infrared System High
Research and development cost increase over original baseline	$3.7 billion 41.2 percent	$10.2 billion 47.3 percent	$10.1 billion 30.1 percent	$3.7 billion 99.5 percent
Acquisition cycle time increase over original baseline	33 months 14.8 percent	27 months 13.3 percent	11 months 5.9 percent	More than 12 months[a]
Number of program rebaselines	1[b]	14	1	3
Total award fee paid to prime systems contractor	$202.5 million paid through 2004	$848.7 million	$494.0 million	$160.4 million[c]
Percentage of award fee paid to prime systems contractor (adjusted for rollover)[d]	85 percent of available fee	91 percent	100 percent	74 percent
Total award fee paid to prime engine contractor	No engine contractor	$115 million paid through 2004	$35.8 million	No engine contractor
Percentage of award fee paid to prime engine contractor (adjusted for rollover)[d]	N/A	89 percent of the available fee	100 percent	N/A

Sources: DOD submissions to GAO, contract documentation, and GAO-05-301 (data); GAO (analysis and presentation).

[a] The Air Force Space Command has not specified the acquisition cycle time for the Space-Based Infrared Radar System High program; however, the delivery of the first two satellites has been delayed by more than a year.

[b] Overall, there were five rebaselines for the Comanche program; however, only one occurred after development start. The Comanche program was canceled in 2004.

[c] The program also utilizes incentive fees tied to cost and mission successes. The award fee paid does not include fee earned through mission success incentives. To date, the contractor has earned $3 million in these fees and could earn over $70 million over the life of the contract.

[d] When calculating the percentage of award fee paid to date (i.e., percentage of award fee paid to date = total fee paid to date / (total fee pool – remaining fee pool)), we included rolled-over fees in the remaining fee pool when those fees were still available to be earned in future evaluation periods. For instance, even though tha Joint Strike Fighter prime contractor has not been paid 100 percent of the award fee that was made available for each evaluation period, it retains the ability to potentially earn all of this unearned fee at a later date. By reflecting the continued availability of this unearned fee in the percentage calculation, it becomes clear that the contractor has, in essence, earned 100 percent of the total award fee to date.

DOD can ensure that fee payments are more representative of program results by developing fee criteria that focus on its desired acquisition outcomes. For instance, DOD's Missile Defense Agency attempted to hold contractors accountable for program outcomes on the Airborne Laser program. On this program, DOD revised the award-fee plan in June 2002 as part of a program and contract restructuring. The award-fee plan was changed to focus on achieving a successful system demonstration by December 2004. Prior to the restructuring, the contractor had received 95 percent of the available award fee, even though the program had experienced a series of cost increases and schedule delays. Importantly, the contractor did not receive any of the $73.6 million award fee available under the revised plan because it did not achieve the key program outcome—successful system demonstration.[11]

A Case for Change: Motivating Excellent Contractor Performance and Promoting Accountability

Recommendations	DOD response
• Ensure that award-fee structures are motivating excellent contractor performance by only paying award fees for above satisfactory performance	• While DOD stated that award fee arrangements should be structured to encourage the contractor to earn the preponderance of fee by providing excellent performance, it maintains that paying a portion of the fee for satisfactory performance is appropriate to ensure that contractors receive an adequate fee on contracts. In its March 29, 2006 policy memo, DOD reiterated this position and emphasized that less than satisfactory performance is not entitled to any award fee.
• Issue DOD guidance on when rollover is appropriate	• In its March 29, 2006 policy memo, DOD provided guidance and placed several limitations on the use of rollover.

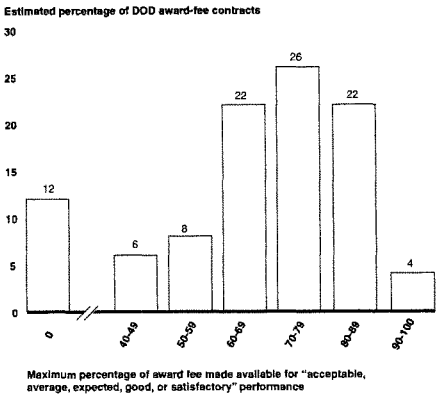
DOD programs routinely engage in award-fee practices that are inconsistent with the intent of award fees, reduce the effectiveness of these fees as motivators of performance, compromise the integrity of the fee process, and waste billions in taxpayer money. Two practices, in particular, paying significant amounts of fee for "acceptable, average, expected, good, or satisfactory" performance and providing contractors multiple opportunities to earn fees that were not earned when first made

[11]According to DOD, the contract was restructured again in May 2004 and the cost ceiling was increased from about $2 billion to $3.6 billion and the period of performance of the contract was extended more than 3 years, from June 2005 to December 2008.

available, undermine the effectiveness of fees as a motivational tool and marginalize their use in holding contractors accountable for acquisition outcomes.

Although DOD guidance and federal acquisition regulations state that award fees should be used to motivate excellent contractor performance, most DOD award-fee contracts pay a significant portion of the available fee for what award-fee plans describe as "acceptable, average, expected, good, or satisfactory" performance. Although the definition of this level of performance varies by contract, these definitions are generally not related to outcomes. Some plans for contracts in our sample did not even require the contractor to meet all of the minimum standards or requirements of the contract to receive one of these ratings. Some plans also allowed for fee to be paid for marginal performance. Even fixed-price-award-fee contracts, which already include a normal level of profit in the price, paid out award fees for satisfactory performance. Figure 3 shows the maximum percentage of award fee paid for "acceptable, average, expected, good, or satisfactory" performance and the estimated percentage of DOD award-fee contracts active between fiscal years 1999 through 2003 that paid these percentages.

Figure 3: Maximum Percentage of Award Fee Available for "Acceptable, Average, Expected, Good, or Satisfactory" Performance and the Estimated Percentage of DOD Contracts That Paid These Percentages



Sources: Award-fee plans and contract documentation (data); GAO (analysis and presentation).

Note: Sampling errors for percentages in this figure do not exceed plus or minus 13 percentage points.

The use of rollover is another indication that DOD's management of award-fees lacks the appropriate incentives, transparency, and accountability necessary for an effective pay-for-performance system. Rollover is the process of moving unearned available award fee from one evaluation period to a subsequent evaluation period, thereby providing the contractor an additional opportunity to earn that previously unearned award-fee. We estimate that 52 percent of DOD award-fee contracts rolled over unearned fees into subsequent evaluation periods,[12] and in 52 percent[13] of these periods, at least 99 percent of the unearned fee was rolled over. Overall, for DOD award-fee contracts active between fiscal

[12]The 95 percent confidence interval for this estimate ranges from 40 percent to 64 percent.

[13]The 95 percent confidence interval for this estimate ranges from 34 percent to 69 percent.

years 1999 through 2003, we estimate that the total dollars rolled over across all evaluation periods that had been conducted by the time of our review was $669 million.

A Case for Change: Ensuring Practice Is Consistent with Policy

Recommendations	DOD response
• Requiring appropriate approving officials to review new contracts to make sure award-fee criteria reflect desired acquisition outcomes and award-fee structures motivate excellent contractor performance by only providing fees for above satisfactory performance	• DOD plans to conduct an analysis to determine what the appropriate approving official level should be for new contracts utilizing award fees and issue additional guidance if needed by June 1, 2006.

The inconsistent application of DOD's existing policies on award fees and weapon system development reinforce the need for increased transparency and accountability in DOD's management of award fees. Although DOD award-fee guidance and federal acquisition regulations state that award fees should be used to motivate excellent contractor performance, most DOD award-fee contracts still pay a significant portion of the available fee for what award-fee plans describe as "acceptable, average, expected, good, or satisfactory" performance.[14] Air Force, Army, and Navy guidance that states rollover should rarely be used in order to avoid compromising the integrity of the award-fee evaluation process; however, about half of the contracts in our study population used rollover.

[14]According to FAR 16.404(a)(1), in a fixed-price-award-fee contract, the fixed price (including normal profit) will be paid for satisfactory contract performance. Award fee earned (if any) will be paid in addition to that fixed price. According to FAR 16.405-2(a)(2), a cost-plus-award-fee contract should include an award amount that is sufficient to provide motivation for excellence in such areas as quality, timeliness, technical ingenuity, and cost-effective management.

A Case for Change: Developing and Sharing Proven Incentive Strategies

Recommendations	DOD response
• Develop a mechanism for capturing award- and incentive-fee data within existing data systems, such as the Defense Acquisition Management Information Retrieval system	• DOD will conduct an analysis of existing systems and determine which, if any, is best suited, to capture this type of data and at what cost. DOD expects to complete the study by June 1, 2006.
• Develop performance measures to evaluate the effectiveness of award and incentive fees as a tool for improving contractor performance and achieving desired program outcomes	• DOD will review and identify possible performance measures and determine the appropriate actions by June 1, 2006.
• Develop a mechanism to share proven incentive strategies for the acquisition of different types of products and services with contracting and program officials across DOD	• In its March 29, 2006 policy memo, DOD tasked Defense Acquisition University to develop an online repository for award- and incentive-fee policy information, related training courses, and examples of good award fee arrangements.

Very little effort has gone into determining whether DOD's current use of monetary incentives is effective. Over the past few years, officials including the Undersecretary of Defense for Acquisition Technology and Logistics and the Assistant Secretary of the Air Force for Acquisition expressed concerns that contractors routinely earn high percentages of fee while programs have experienced performance problems, schedule slips, and cost growth. However, DOD has not compiled information, conducted evaluations, shared lessons learned, or used performance measures to judge how well award and incentive fees are improving or can improve contractor performance and acquisition outcomes. The lack of data is exemplified by the fact that DOD does not track such basic information as how much it pays in award and incentive fees. Such information collection across DOD is both necessary and appropriate.

Conclusions

DOD's use of award-fee contracts, especially for weapon system development, reflects the fundamental lack of knowledge and program instability that we have consistently cited as the main reasons for DOD's poor acquisition outcomes. DOD uses these fees in an attempt to mitigate the risks that it creates through a flawed approach to major weapon system development. The DOD requirements, acquisition, budgeting, and investment processes are broken and need to be fixed. DOD's requirements process generates much more demand for new programs than fiscal resources can reasonably support. The acquisition environment encourages launching product developments that promise the best capability, but embody too many technical unknowns and too little

knowledge about the performance and production risks they entail. However, a new program will not be approved unless its costs fall within forecasts of available funds and, therefore, looks affordable. Further, because programs are funded annually and departmentwide, cross-portfolio priorities have not been established, competition for funding continues over time, forcing programs to view success as the ability to secure the next funding increment rather than delivering capabilities when expected and as promised.

The business cases to support weapon system programs that result from these processes are in many cases not executable because the incentives inherent in the current defense acquisition system are not conducive to establishing realistic cost, schedule, and technical goals. As a result, DOD has to date not been willing to hold its programs or its contractors accountable for achieving its specified acquisition outcomes. Instead, faced with a lack of knowledge and the lack of a sound business case, DOD programs use award-fee contracts, which by their very nature allow DOD to evaluate its contractors on a subjective basis. This results in billions of dollars in wasteful payments because these evaluations are based on contractors' ability to guide programs through a broken acquisition system, not on achieving desired acquisition outcomes.

Implementing our recommendations on award and incentive fees will not fix the broader problems DOD faces with its management of major weapons or service acquisitions. However, by implementing our recommendations, DOD can improve incentives, increase transparency, and enhance accountability for the fees it pays. In particular, moving toward more outcome-based award-fee criteria would give contractors an increased stake in helping DOD to develop more realistic targets upfront or risk receiving less fee when unrealistic cost, schedule, and performance targets are not met. To make this new approach to incentives function as intended, DOD would also need to address the more fundamental issues related to its management approach, such as the lack of a sound business case, lack of well-defined requirements, lack of product knowledge at key junctions in development, and program instability caused by changing requirements and across-the-board budget cuts. Working in concert, these steps can help DOD set the right conditions for more successful acquisition outcomes and make more efficient use of its resources in what is sure to be a more fiscally constrained environment as the nation approaches the retirement of the "baby boom" generation.

Recent DOD Actions

Last week, DOD issued a policy memorandum on award-fee contracts that takes steps towards addressing several of the recommendations made in our report, and the department has indicated that further actions are planned to address the remaining recommendations. This guidance is a positive first step, but, like so many prior DOD concurrences, its effectiveness will ultimately be determined by how well it is implemented. Identifying who will be responsible for ensuring it is carried out and how progress will be monitored and measured are key ingredients that are missing in the new guidance. We continue to believe that DOD must designate appropriate approving officials to review new contracts to ensure that award-fee criteria are tied to desired acquisition outcomes; fees are used to promote excellent performance; and the use of rollover provisions in contracts is the exception not the rule. Changing DOD award-fee practices will also require a change in culture and attitude. The policy memorandum's position that it is appropriate to pay a portion of the available award fee for satisfactory performance to ensure that contractors receive an "adequate fee on contracts" is indicative of DOD's resistance to cultural change. Finally, we encourage the department to fully implement our remaining recommendations including developing a mechanism to capture award- and incentive-fee data and developing performance measures to evaluate the effectiveness of these fees.

Mr. Chairman and Members of the Committee, this concludes my prepared statement. I would be happy to answer any questions you may have at this time.

Appendix I: Scope and Methodology

In this statement, we examine fixed-price and cost-reimbursable award- and incentive-fee contracts, as well as contracts that featured combinations of these contract types. These contracts were selected as part of a probability sample of 93 contracts from a study population of 597 DOD award-fee and incentive-fee contracts that were active between fiscal years 1999 and 2003 and had at least one contract action coded as cost-plus-award-fee, cost-plus-incentive-fee, fixed-price-award-fee, or fixed-price incentive valued at $10 million or more during that time. Unless otherwise noted, the estimates in this statement pertain to (1) this population of award- and incentive-fee contracts, (2) the subpopulation of award-fee contracts, or (3) the evaluation periods associated with contracts described in (1) or (2) that had been completed at the time of our review. In the sample, 52 contracts contained only award-fee provisions; 27 contracts contained only incentive-fee provisions; and 14 contracts included both. Estimates of total award fees earned and total award fees that contractors received at least two chances to earn are based on all evaluation periods held from the inception of our sample contracts through our data collection phase,[1] not just those from fiscal years 1999 through 2003. Because the estimates in this report are derived from a probability sample, they are subject to sampling error. All percentage estimates from our review have margins of error not exceeding plus or minus 10 percentage points unless otherwise noted. All numerical estimates other than percentages (such as totals and ratios) have margins of error not exceeding plus or minus 25 percent of the value of those estimates.

[1]For some contracts, the data collection phase ended as early as November 2004. For at least one contract, data collection was not complete until April 2005.

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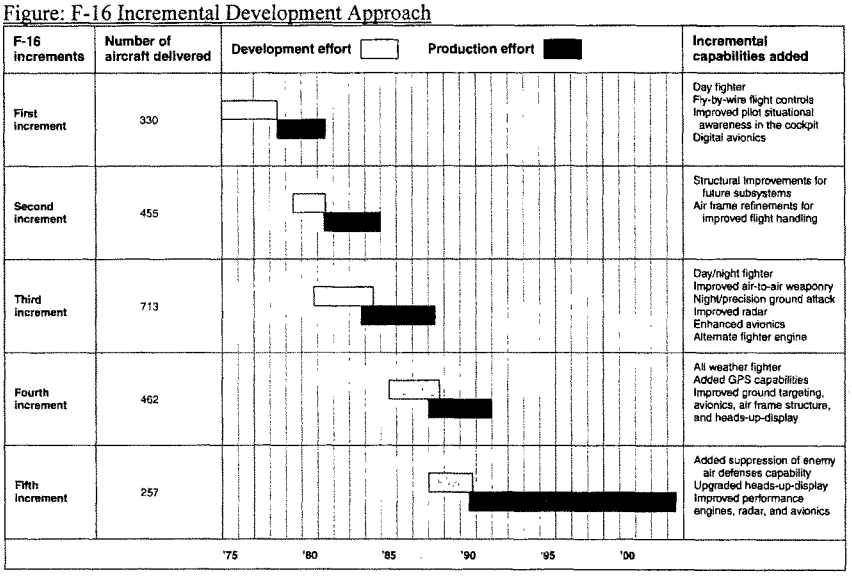
F-16 Incremental Approach Played Key Role in Successful Outcomes
The F-16 fighter program, the Air Force's JSF predecessor, successfully evolved capabilities over the span of 25 years, delivering increasingly more capabilities quickly and often, as technologies became available and were demonstrated. Structuring the program into separate and manageable increments based on what is achievable now and in the future allowed more predictable cost and delivery estimates.

Over the past 3 decades, the Air Force successfully procured more than 2,200 F-16s. The F-16 acquisition approach allowed the timely and affordable delivery of aircraft and capability to meet the warfighter's needs, including the recapitalization of aging aircraft. By using an incremental approach to develop the aircraft, the program was able to quickly deliver new and improved capabilities to the warfighter and increase the aircraft's capability as new technologies were matured and added to the aircraft. The first increment, developed during the late 1970s, provided a "day fighter" aircraft with basic air-to-air and air-to-ground capabilities. By limiting development to what was doable the developer delivered new and useful military capability to the warfighter in less than 4 years. With each subsequent increment, new technology was used to improve the engine, radar, structure, avionics, and other systems that allow the aircraft today to perform close air support, ground attack, air defense, and suppression of enemy defense missions. This incremental or evolutionary approach also enriched the fighter aircraft industrial base capabilities by extending the life of the production over the length of this incremental approach.

In contrast, JSF's fully configured design represents a quantum leap in capability that far exceeds the capability of legacy systems that JSF is intended to replace. While the program is using a block structure—where each block adds capabilities over the proceeding block—the blocks are part of a single development effort, and DOD is on contract with the developer to deliver the warfighter the full capability. The program's block structure provides for an escalating capability, but DOD already plans to buy 96 percent of JSF aircraft with the ultimate capability (block 3). Unlike the approach used with the F-16, this risky approach will likely be like past programs that have encountered significant increases in cost and time, not allowing DOD to quickly recapitalize the aging legacy aircraft.

The two figures on the following page show the F-16 incremental approach and the JSF single-step approach. They show the F-16 limited initial capability but bought sufficient quantities to begin recapitalizing the legacy fighter force within 4 years of the start of development. On the other hand, the JSF is buying basically the final or full configuration, which is beyond its current ability to develop and deliver in a short period of time.

Figure: F-16 Incremental Development Approach



Source: DOD (data); GAO (analysis and presentation).

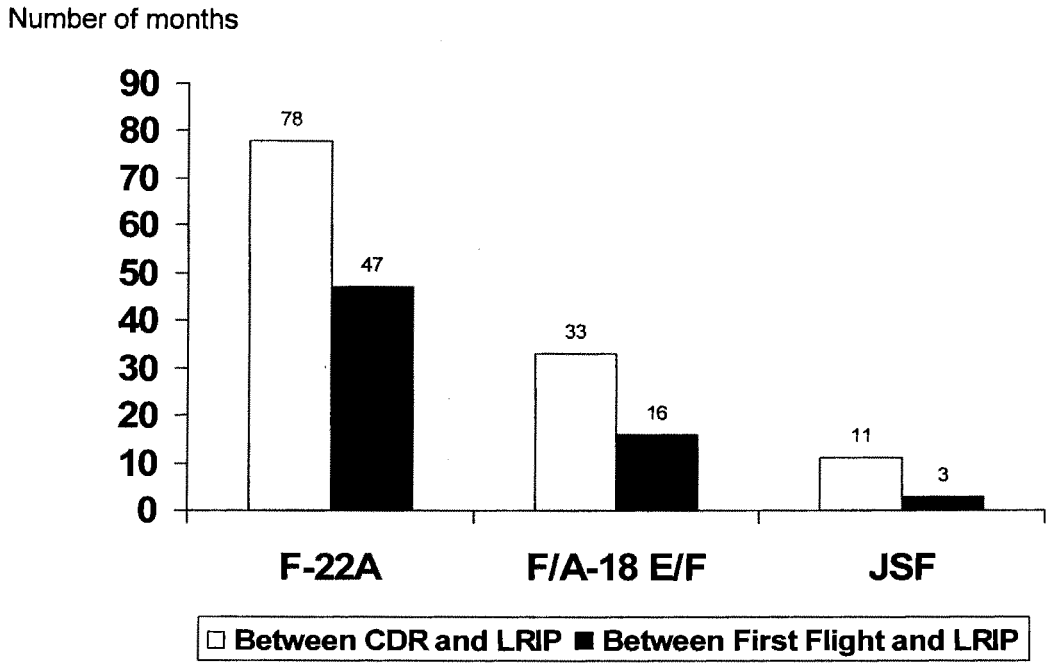
Note: This gives the number of aircraft delivered to the U.S. Air Force only, no foreign military sales or other allied government sales included.

Table: Planned JSF Blocks

Block and capabilities added	Number of planned JSF aircraft procurements
Block 0: Fleet introduction and training Envelope expansion.	23
Block 1: Initial warfighting capability Basic warfighter needs–interdiction and initial air-to-air missions. Includes a flight-qualified, low-observable air frame with basic functionality,initial logistics support and baseline missiles and bombs.	47
Block 2: Expanded mission capability Additional functionality for close air support, moving targets, electronic attack, and air interdiction. Ability to fuse information from other JSFs and increased logistics support with advanced prognostics capabilities. Additional bombs and missiles.	58
Block 3: Enhanced warfighting capability Warfighters' desired capability. Concludes avionics development, including ability to fuse information from other platforms or sensors for increased situational awareness Suppression and destruction of enemy air defenses and deep strike capabilities and qualifies additional weapons.	2,331

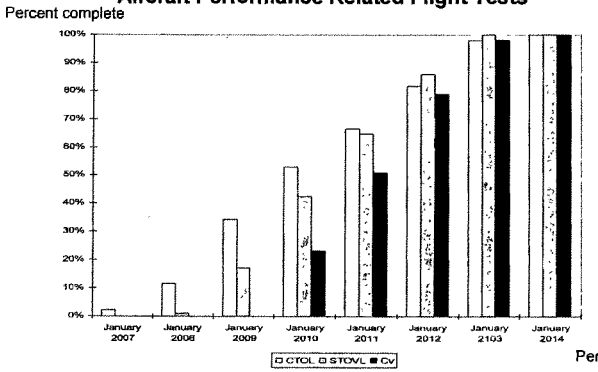
Source: DOD (data); GAO (analysis and presentation).

Development Time Before Low Rate Initial Production

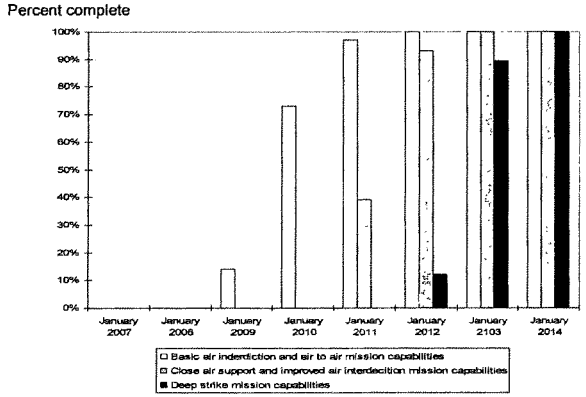


Planned Flight Test Program

Aircraft Performance Related Flight Tests



Mission Capability Related Flight Tests



Department of Defense

Selected Acquisition Reports (SARs)

(As of December 31, 2005)

The Department of Defense (DoD) has released details on major defense acquisition program cost, schedule, and performance changes since the September 2005 reporting period. This information is based on the Selected Acquisition Reports (SARs) submitted to the Congress for the December 2005 reporting period.

SARs summarize the latest estimates of cost, schedule, and performance status. These reports are prepared annually in conjunction with the President's budget. Subsequent quarterly exception reports are required only for those programs experiencing unit cost increases of at least 15 percent or schedule delays of at least six months. Quarterly SARs are also submitted for initial reports, final reports, and for programs that are rebaselined at major milestone decisions.

The total program cost estimates provided in the SARs include research and development, procurement, military construction, and acquisition-related operation and maintenance (except for pre-Milestone B programs which are limited to development costs pursuant to 10 USC §2432). Total program costs reflect actual costs to date as well as future anticipated costs. All estimates include anticipated inflation allowances.

The current estimate of program acquisition costs for programs covered by SARs for the prior reporting period (September 2005) was $1,539,048.8 million. After adding the costs for two new programs ARH (Armed Reconnaissance Helicopter) and JLENS (Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System) and subtracting the costs for final reports on a completed program (LHD 1 Amphibious Assault Ship), a restructured program (TSAT (Transformational Satellite Communications System)), the completed Fire Unit portion of Patriot PAC-3 (Patriot Advanced Capability), and the completed MK 1 portion of SSDS (Ship Self Defense System) from the September 2005 reporting period, the adjusted current estimate of program acquisition costs was $1,517,182.4 million.

	Current Estimate ($ in Millions)
September 2005 (85 programs)	**$ 1,539,048.8**
Plus two new programs (ARH and JLENS)	+10,719.7
Less final reports on a completed program (LHD 1), a restructured program (TSAT), the completed Fire Unit portion of Patriot PAC-3, and the completed MK 1 portion of SSDS	-32,586.1
September 2005 Adjusted (85 programs)	**$ 1,517,182.4**

Changes Since Last Report:

Economic		$ +21,194.6
Quantity		+446.6
Schedule		+5,627.0
Engineering		+2,325.6
Estimating		+2,589.5
Other		+17.8
Support		+7,521.9
	Net Cost Change	$ +39,723.0
Plus initial procurement cost estimates for DD(X) Destroyer (previous reports limited to development costs per 10 USC §2432)		+27,813.3
December 2005 (85 programs)		**$1,584,718.7**

For the December 2005 reporting period, there was a net cost increase of $39,723.0 million billion or +2.6% for programs that have reported previously, resulting in a new current estimate of $1,584,718.7 million. The net cost increase was due primarily to the application of higher escalation rates (+$21,194.6 million), an increase in support requirements (+$7,521.9 million), a net stretch-out of development and procurement schedules (+$5,627.0 million), higher program cost estimates (+$2,589.5 million), additional engineering changes (hardware/software) (+$2,325.6 million), and a net increase of planned quantities to be purchased (+$446.6 billion). Further details of the most significant changes are summarized below by program.

The National Defense Authorization Act (NDAA) for FY 2006 made changes to the Nunn-McCurdy unit cost reporting statute for DoD major defense acquisition programs (10 USC §2433). The primary change was the addition of 30% and 50% unit cost thresholds against the original baseline estimate approved at System Development and Demonstration (Milestone B). The existing 15% and 25% unit cost thresholds were retained against the current baseline estimate. For the December 2005 reporting period:

- DoD has one program with a Nunn-McCurdy unit cost breach of more than 15% but less than 25% to the current baseline estimate. Notification and unit cost breach information will be provided to the Congress for this program.

  GMLRS (Guided Multiple Launch Rocket System)

- DoD has three programs with Nunn-McCurdy unit cost breaches of more than 25% to the current baseline estimate. Notification and unit cost breach information will be provided to the Congress for these programs, and the USD(AT&L) will consider whether to certify that the programs should continue.

  ASDS (Advanced SEAL Delivery System) (*no certification -- program cancelled*)
  Global Hawk
  NPOESS (National Polar-Orbiting Operational Environmental Satellite System)

- DoD has 11 programs with Nunn-McCurdy unit cost breaches of more than 30% but less than 50% to their original baseline estimate. Notification and unit cost breach information will be provided to the Congress for these programs.

  ATIRCM/CMWS (Advanced Threat Infrared Countermeasure/Common Missile Warning System)
  C-130 AMP (Avionics Modernization Program)
  Chem Demil (Chemical Demilitarization) CMA (Chemical Materials Agency)
  Chem Demil CMA Newport
  EFV (Expeditionary Fighting Vehicle)
  F/A-18
  JASSM (Joint Air-to-Surface Standoff Missile)
  JPATS (Joint Primary Aircraft Training System)
  JSF (Joint Strike Fighter)
  MH-60S
  SSN 774 (Virginia Class)

- DoD has 25 programs with Nunn-McCurdy unit cost increases of more than 50% to their original baseline estimate. However, these increases are not Nunn-McCurdy breaches since NDAA permits the original baseline estimate to be revised to the current baseline estimate as of January 6, 2006.

  AEHF (Advanced Extremely High Frequency)
  AMRAAM (Advanced Medium Range Air to Air Missile)
  ASDS (Advanced SEAL Delivery System)
  Black Hawk Upgrade
  Bradley Upgrade
  C-17A
  CH-47F
  EELV (Evolved Expendable Launch Vehicle)
  F-22A
  FCS (Future Combat Systems)
  FMTV (Family of Medium Tactical Vehicles)
  Global Hawk
  GMLRS (Guided Multiple Launch Rocket System)
  Javelin
  JSOW (Joint Standoff Weapon)
  H-1 Upgrades
  Longbow Apache
  LPD 17
  MH-60R
  Minuteman III GRP (Guidance Replacement Program)
  NPOESS (National Polar-Orbiting Operational Environmental Satellite System)
  SBIRS (Spaced Based Infrared Radar System) High
  T-45TS
  Trident II Missile
  V-22

[Annex 2: Subsequent to the hearing, on May 26, 2006, Senator McCain submitted the following additional information for the record:]

Congress of the United States

Washington, DC 20515

March 23, 2006

Honorable David M. Walker
Comptroller General of the United States
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Walker:

To date the Department of Defense (DOD) has invested over $1.2 billion to fund an alternate engine program for the Joint Strike Fighter (JSF). In 2005, the JSF program awarded a $2.4 billion contract for system development and demonstration of an alternate engine. The alternate engine program provides for a competition between engine manufacturers in expectation of future cost savings, performance improvements, and other benefits. In the fiscal year 2007 budget request, DOD has proposed canceling the JSF's alternate engine program. DOD has indicated that there is no cost benefit or savings with an engine competition for the JSF and there is low operational risk with going solely with a single engine supplier. The proposed cancellation of the alternate engine program has been a subject of great debate.

As a result, we request that the Government Accountability Office (GAO) initiate a review with emphasis on the rationale behind the proposal to terminate the program and the analyses accomplished to support DOD's proposal, including the life cycle cost savings, benefits, and risks assessed. We further request that the GAO provide us an initial assessment of their findings in a letter no later than April 12, 2006 and a final report within 60 days of receipt of our letter. Please contact Mr. Stanley R. O'Connor, Jr., Senate Committee on Armed Services (202-224-6852), or Mr. John F. Sullivan, House Committee on Armed Services (202-225-6380), to resolve any questions you may have in preparing this report.

Sincerely yours,

Curt Weldon
Chairman
Subcommittee on Tactical Air
and Land Forces
Committee on Armed Services
United States House of Representatives

John Warner
Chairman
Committee on Armed Services
United States Senate

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United States Government Accountability Office
Washington, DC 20548

May 22, 2006

The Honorable John Warner
Chairman
Committee on Armed Services
United States Senate

The Honorable Curt Weldon
Chairman
Subcommittee on Tactical Air and Land Forces
Committee on Armed Services
House of Representatives

Subject: *Tactical Aircraft: DOD's Cancellation of the Joint Strike Fighter Alternate Engine Program Was Not Based on a Comprehensive Analysis*

The Department of Defense (DOD) expects to purchase about 2,400 Joint Strike Fighter (JSF) aircraft, with potential international sales of 2,000 to 3,500 aircraft. When the number of aircraft engines and spare parts expected to be purchased is considered—along with the lifetime support needed to sustain the engines—the future financial investment will be significant. DOD implemented the JSF alternate engine development program in 1996 to provide competition between two engine manufacturers in an effort to achieve cost savings, improve performance, and gain other benefits.

Since then, DOD has invested $1.2 billion in the alternate engine program, and, in August 2005, it awarded a $2.4 billion contract for system development and demonstration of an alternate engine. However, in its fiscal year 2007 budget submission, DOD proposed canceling the alternate engine program. Concerned whether this decision was based on sound analysis, you asked us to review DOD's rationale for canceling the program and the analysis supporting it, including the life cycle savings, benefits, and risks assessed.

To determine DOD's rationale for and analysis supporting the decision to cancel the alternate engine program, we obtained and discussed data from the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Office of the Director of Program Analysis and Evaluation; and Air Force and Navy acquisition offices. We also interviewed officials from the Office of the Director, Operational Test and Evaluation, and the F-22A engine office, the predecessor engine for the JSF engine. We reviewed the data, analyses, assumptions, and results of two prior

program management advisory group studies[1] and the justification briefing provided to Congress by the department. The advisory group studies and briefing were identified as the analytical underpinnings of the decision. We also met with the Air Force executive who co-led both advisory groups and was the Air Force's propulsion product group manager. Finally, the JSF program office stated that it was not involved in the termination proposal. In performing this review, we used data and information from that office collected on other assignments. We performed our review from March to April 2006 in accordance with generally accepted government auditing standards.

SUMMARY

DOD's decision to cancel the JSF alternate engine program was driven by the need to identify sources of funding in order to pay for other priorities within the department. In making the decision, the department did not conduct a new and comprehensive analysis, but instead relied on selective elements of two prior studies done in 1998 and 2002. In supporting the decision to cancel, officials focused only on the potential up-front savings in engine procurement costs. They did not, however, consider the full long-term savings that might accrue from competition for providing support for maintenance and operations over the life cycle of the engine. Both prior studies had recommended proceeding with the alternate engine program, despite the lack of significant procurement cost savings, because of a number of other benefits competition was likely to provide. Also in supporting the decision to cancel, officials cited favorable progress made by the primary JSF engine and its predecessor F-22A engine as reducing operational risks from a single source. However, the primary JSF engine has completed only a small portion of its ground tests and has not yet been flown, while the F-22A engine has completed about 10 percent of its hours needed for system maturity and is not currently meeting some reliability goals. Further, experts from one early study concluded that the commonality with the F-22A engine is of limited benefit for reducing development risk of the JSF engine.

DOD'S RATIONALE FOR TERMINATING THE ALTERNATE ENGINE PROGRAM

The decision for canceling the JSF alternate engine program was driven by budget needs outside the JSF program. The decision was a consequence of budget-cutting exercises to meet Office of the Secretary of Defense (OSD) spending targets and to begin implementing Quadrennial Defense Review (QDR) decisions. The alternate engine program was deemed to have a lesser priority than other major DOD activities and programs. DOD officials and the justification briefing stated that the rationale for canceling the program was no net cost savings from competing engine buys and minimum operational risk from relying on a single source.

[1] Advisory groups composed of DOD and foreign partner representatives from the technical, operational, and financial communities were established under the aegis of the Assistant Secretary of the Navy for Research, Development, and Acquisition to review technical and programmatic issues of the alternate engine program, determine its costs and benefits, and make recommendation for either continuing or terminating the program.

Funding for the alternate engine was included in the Navy's and Air Force's initial 2007 budget submissions, according to the services' acquisition officials. However, because of budget constraints, OSD directed the military services to identify alternative sources for reducing the fiscal year 2007 future years defense budget. Both services proposed the termination of the alternate engine program. DOD officials estimated that canceling the program would result in savings of about $2 billion over the remaining 8 years of the alternate engine development program, which could then be used to fund higher-priority programs. In recent testimony, the Under Secretary of Defense for Acquisition, Technology, and Logistics stated that the department ultimately concluded that maintaining two engine suppliers for the JSF program was not the most efficient use of its resources. Department officials also noted that the primary engine development program was progressing well, making a second engine program unnecessary. On the basis of its assessments of the progress of the primary engine for the JSF, the F-22A engine (which served as the basis for the primary JSF engine), and past fighter engine experience, officials deemed operational risks associated with a single engine supplier acceptable.

DOD'S DECISION TO CANCEL THE ENGINE COMPETITION WAS BASED ON INSUFFICIENT COST, SAVINGS, AND PERFORMANCE DATA

DOD did not conduct an up-to-date, comprehensive analysis of the total life cycle costs, savings, and benefits to support its decision to terminate the JSF's alternate engine development program. Instead, DOD officials used two prior studies and considered the savings from engine procurement only, excluding potential life cycle cost savings associated with supporting, operating, and maintaining the fleet. These officials also stated that the operational risk from relying on a single supplier is reduced by favorable test and operational experiences with the primary JSF and F-22A engines. However, this assessment is based on:

- limited ground testing of the primary JSF engine and no actual flight test results;
- experience with the F-22A engine, which has only completed about 10 percent of the operational flight hours needed to achieve system maturity and which has still not achieved its reliability goal; and
- comparisons with the F-22A engine, which will likely have different operational uses than the JSF engine.

DOD's Decision Is Not Supported by a Current and Comprehensive Analysis of Costs and Benefits

DOD officials stated that the decision to cancel the JSF alternate engine program is based largely on studies conducted in 1998 and 2002 by program management advisory groups. These groups recommended that DOD proceed with the alternate engine program, noting that the recommendation was made independent of the services' abilities to fund the program. The advisory groups determined that developing an alternate JSF engine had significant benefits in the areas of contractor responsiveness, industrial base, readiness, and international relations. They also reported finding marginal benefits in the areas of cost savings and additional engine

growth capabilities (ability to add future engine improvements), and no benefit to reducing development risk without restructuring the program. Table 1 provides a summary of the program management advisory group study results.

Table 1: 1998 and 2002 Program Management Advisory Group Study Findings on the Benefits of an Alternate Engine Program

	Beneficial		Marginal		No value	
Factor assessed	**1998**	**2002**	**1998**	**2002**	**1998**	**2002**
Costs			✖	✖		
Development risk reduction					✖	✖
Engine growth potential			✖	✖		
Fleet readiness	✖	✖				
Industrial base	✖	✖				
International implications	✖	✖				
Other considerations[a]	✖	✖				
Overall	✖	✖				

Source: DOD (data); GAO (analysis and presentation).

[a] Other considerations include contractor responsiveness, improved design solutions, and competition at the engine subsystem level.

DOD's current conclusion that net savings from an alternate engine program would be negligible at best was largely based on a break-even analysis in the 2002 study that calculated how many engines would need to be purchased at prices reflecting savings from competition to recover the costs incurred to develop the second source. The analysis used the total projected costs of the alternate engine development program, an estimated $2.8 billion at that time.[2] However, DOD has now invested about one-third of that total since the 2002 study. Excluding these sunk costs and basing the break-even analysis on development costs to go from this point forward would reduce the engine costs that would need to be recovered through cost savings associated with ongoing competition between engine suppliers. For example, on the basis of the estimated development costs to go and using the same assumptions and data as the 2002 study, we estimate that achieving 20 percent savings from competition would allow a break-even point to occur at about 1,700 engines—not 2,500, as projected in the 2002 study. An earlier break-even point in the purchase of engines would increase the potential for savings over the life of the program.

Officials indicated that DOD's decision did not consider all the costs and savings over the projected 30-year life cycle of the weapon system. A life cycle cost-benefit analysis would consider all the potential costs and savings associated with the competition, including operations and support, over the expected life of the system. DOD did not analyze the potential impact that a second supplier and supply chain could have on long-term support costs for buying spares, engine parts, and maintenance services. Given that a large percentage of a fighter aircraft's total life cycle costs are incurred after it has been acquired and fielded, potential savings from competition could be significant. Competition could also yield savings through reliability improvements. The 1998 study stated that a 10 percent improvement in

[2] Dollars are fiscal year 2002 constant for comparison with the 2002 DOD break-even analysis.

reliability could allow the user to omit one heavy maintenance cycle of the engine, saving $3 billion in operating and support costs, and concluded that the costs for developing the alternate engine would likely be recovered through production and operational cost savings. The 2002 study did not quantify potential operations and support savings, but supported the earlier study's conclusions on the benefits from competition.

Finally, DOD officials indicated that the decision to cancel the engine competition did not fully consider the other, less quantifiable benefits that were strongly considered by the program management advisory groups in recommending the continuation of the program in 1998 and 2002. These studies concluded an alternative engine program would

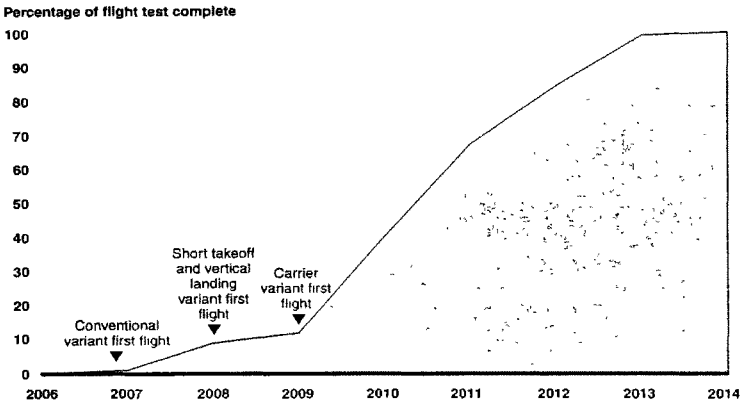
- maintain the industrial base for fighter engine technology,
- enhance readiness,
- instill contractor incentives for better performance,
- ensure an operational alternative if the current engine developed problems, and
- enhance international participation.

Many of these were important benefits realized by past competitions such as that for the Air Force's F-16 engines. While these benefits are difficult to quantify, the Air Force engine manager who co-led both advisory group studies explained that they are valuable when trying to manage significant numbers of fighter-type engines to ensure combat readiness. He told us that problems are magnified when trying to manage a single engine system, which can require substantial manpower and extra hours to keep aircraft flying when engine problems occur. In his opinion, the benefits of a dual-source engine would outweigh the costs. He stated that he had not seen anything that would change this conclusion since the last advisory group study was conducted.

More Engine Performance Data Are Needed to Reduce Operational Risks

Despite DOD officials' assertions that testing to date has reduced risks, there has not been sufficient testing to demonstrate that the primary JSF engine will perform as expected. At the time of the decision to cancel the alternate engine, the primary JSF engine had only completed about 4,600 hours of ground tests—about one-third of the hours planned—and had not yet been flight-tested in a JSF aircraft. The first flight of the conventional takeoff and landing variant aircraft is not expected until October 2006. First flight of the short takeoff and vertical landing variant is scheduled for early 2008, and the carrier variant in early 2009. The first dedicated operational testing that will measure the JSF's operational effectiveness and suitability is scheduled for 2011. Specific propulsion flight testing starts out slowly and begins to increase significantly beginning in 2009 (see fig. 1).

Figure 1: Planned Propulsion Performance Flight Testing and First Flights for the Three JSF Variants



Source: GAO analysis of DOD testing data.

The maturity of the JSF engine is also reflected in the program's contract strategy, in which initial production orders for the JSF engines will be on a cost reimbursement basis. This type of contract is used when the uncertainties involved in contract performance do not permit costs to be estimated with sufficient accuracy to use any type of fixed-price contract. This places the risk from the uncertainties with the buyer—in this case, DOD. The program plans to transition to fixed-price-type contracts for the engine when processes stabilize and the system matures, sometime before full-rate production begins in 2013. This will shift more risk to the contractor.

DOD officials also cite the good performance to date of the F-22A engine as reducing the risk from relying on a single source, but this argument has several qualifications. First, although the JSF primary engine is a derivative of the F-22A engine, the F-22A has completed only about 20,000 operational engine hours; this represents about 10 percent of the 200,000 hours considered sufficient for system maturity. F-22A program engine officials noted that while overall performance has been good, the F-22A engine is currently not meeting several reliability goals. For example, the engine's mean time between maintenance actions was expected to be 100 hours on average at its initial service release in 2002. However, as of April 2006, the engine was experiencing an average of 60 hours between maintenance actions. The program projects that at system maturity in 2010, the F-22A engine mean time between maintenance actions will be about 100 hours, but that is only 50 percent of its performance requirement for 200-hour mean time between maintenance actions. Officials also cited four other reliability goals, two that are currently being met and two that are not being met.

Second, the two aircraft have different missions and operational concepts that may produce different stresses on the engines. The single-engine JSF aircraft is being designed to rapidly transition between different air-to-surface and air-to-air missions while still airborne. The JSF aircraft design has three variants, each with a different operational concept. In contrast, the dual-engine F-22A will primarily be an air-to-air fighter that will fly at high speed and high altitude. Both test and engine officials stated that the operational environment for the JSF may put more stress on the plane's engine than the operational environment for the F-22A puts on its engine. According to engine officials, the fact that the JSF relies on a single engine for its performance magnifies any potential problems that it may incur and increases the maintenance needed to sustain its readiness.

Third, the 1998 study stated there was limited commonality between the F-22A engine and the JSF engine configurations and for that reason there was limited reduction in development risk achieved from F-22A experience. The study stated the development risk for the JSF engine was commensurate with a new fighter engine, and of particular concern were the high temperature and short takeoff and vertical landing integration requirements. Engine and acquisition officials we talked to had differing views on the degree of commonality between the two engines and impacts on development risk. We note that the development effort on the JSF primary engine is expected to cost $5.8 billion, indicating a substantial development effort.

CONCLUSIONS

The relative advantages and disadvantages of the JSF alternate engine program can change significantly depending upon the factors assessed and considered. In deciding to terminate the program in 2007, DOD did not conduct a current and comprehensive study of the costs and benefits of the alternate program. It relied on selected elements of two older studies that reviewed the JSF alternate engine program in 1998 and 2002. It focused on the estimated savings to be accrued from the reduced price to buy engines based on competition between two sources. It did not consider the benefits, including potential cost savings, that might be derived from competition during the life of the JSF program—future engine buys, spare parts, maintenance, reliability improvements, support improvements, industrial base benefits, and other longer-term factors. The two prior studies both concluded that these benefits would be substantial and sufficient reason to continue the program. In addition, the decision was based on a break-even analysis for the total investment cost (sunk costs as well as costs to go) of the alternate engine program. Sunk costs should be excluded from the break-even analysis upon which the decision is based, thereby lowering the number of engines required to break even. In deciding to cancel the competition, DOD determined that it could not afford this program, given other needs in DOD and the government. It had to find money for other budget priorities, and the alternate engine program was not accorded a high enough priority. The question remains whether a more current, comprehensive, and independent study including all costs, benefits, and risks—not just up-front procurement costs—would result in a different answer that would cause DOD to reconsider its decision to cancel the

alternate engine program and instead afford it a higher priority and cause it to continue the JSF engine competition.

AGENCY COMMENTS AND OUR EVALUATION

DOD provided us with written comments on a draft of this report. The comments appear in the enclosure to this letter.

In summary, DOD believes the report is misleading in a number of respects in that there are many important issues that deserve more thoughtful and balanced consideration than the information presented in our report. It highlights these in its comments, which include its beliefs that (1) data showing savings from competition do not exist and (2) certain higher costs would exist if the competitive alternate engine program continued. We agree that there is a mix of factors that can increase and decrease costs as well as influence readiness and the industrial base. However, as pointed out in DOD comments, there is currently a paucity of empirical data about the costs and benefits of this program; therefore we think the issues raised by DOD in its letter need to be considered within an overall and comprehensive analysis of the life cycle costs and benefits of a competitive alternate JSF engine program.

Our tasking, from both the Senate Armed Services Committee and the House Armed Services Tactical Air and Land Forces Subcommittee, was to review DOD's rationale for canceling the program and the analysis supporting that decision. It was not our tasking to perform the analysis for DOD. Our conclusions were that DOD had not conducted a current and comprehensive study of the costs and benefits of an alternate engine program over the entire life of the JSF. Instead of undertaking a new study, DOD relied on selective elements of two older studies, both of which concluded that significant benefits, beyond price savings in the acquisition program, justified continuing the alternate engine program. DOD supported and funded the alternate engine program in prior years but now believes the program is not cost-beneficial and presents a low risk if canceled. We found that the affordability pressures caused by other more pressing demands on the DOD budget this year caused DOD to look for sources of funding. As a result, DOD viewed the alternate engine program as a lesser priority within the agency.

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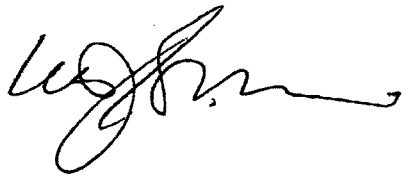
We are sending copies of this letter to the Honorable Donald H. Rumsfeld, Secretary of Defense; the Honorable Michael W. Wynne, Secretary of the Air Force; and the Honorable Donald C. Winter, Secretary of the Navy. We will make copies available to other interested parties upon request. The letter is also available at no charge on the GAO Web site at http://www.gao.gov.

Please contact me at (202) 512-4841 if you or your staffs have any questions. Contact points for our offices of Congressional Relations and Public Affairs may be found on the last page of this report. Other major contributors to this letter were Mike Hazard, Matt Lea, Bruce Fairbairn, and Gary Middleton.

Sincerely yours,



Michael J. Sullivan, Director
Acquisition and Sourcing Management

Enclosure

Enclosure

Comments from the Department of Defense

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION
TECHNOLOGY
AND LOGISTICS

MAY 16 2006

Mr. Michael J. Sullivan
Director, Acquisition and Sourcing Management
U.S. Government Accountability Office
441 G Street
N.W. Washington, D.C. 20548

Dear Mr. Sullivan:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, "Tactical Aircraft: DoD's Cancellation of the Joint Strike Fighter Alternate Engine Program Was Not Based on a Comprehensive Analysis" dated May 5, 2006 (GAO Code 120548/GAO-06-717R).

The GAO offered no recommendations; however, the Department would like to provide a written response (enclosure).

The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Mark D. Schaeffer
Acting Director
Defense Systems

Enclosure:
As stated

Enclosure

GAO DRAFT REPORT - DATED MAY 5, 2006
GAO CODE 120548/GAO-06-717R

"TACTICAL AIRCRAFT: DoD's Cancellation of the Joint Strike Fighter Alternate Engine Program Was Not Based on a Comprehensive Analysis"
(GAO Code 120548)

DEPARTMENT OF DEFENSE (DoD) COMMENTS

In examining the JSF second engine supplier issue, GAO's draft report to Senator Warner was misleading in a number of respects and left out important information that runs counter to the draft report conclusions.

The draft report concluded that the Department of Defense did not conduct a current and comprehensive analysis of the costs and benefits of maintaining two engine suppliers. Central to this argument was the claim that DoD focused on the high investment and procurement costs of establishing two suppliers and did not examine the "full long-term savings which might accrue from competition. . . ." The draft report's argument would lead one to believe that there are data providing evidence of Operations and Support (O&S) savings from competition when, in fact, such data do not exist.

We do know that some O&S costs will be *higher* with two suppliers of engines—a fact not mentioned in the draft report to Senator Warner. Although the Pratt & Whitney and General Electric engines are designed to have identical external interfaces to the aircraft, making them interchangeable, the two internal designs are significantly different. Most of the engine parts are unique, including the fans, turbines, combustors, and compressors. Use of the two types of engines would require establishing two separate spares pipelines for fleet and depot-level maintenance, providing additional training and tools for maintenance personnel, creating two separate depot capabilities (thereby increasing non-recurring costs and recurring unit repair costs since each repair line would handle fewer units), and making future modifications for growth, reliability improvements, safety enhancements, and obsolescence management on two different engines.

The draft report critiques DoD for not considering the O&S savings from buying engine spares from two suppliers instead of one supplier. This argument, also used in testimony by GE Aviation President and CEO Scott Donnelly, is misleading. Engine spares are not purchased in a competitive environment, since, for example, DoD would not buy spares made by Pratt & Whitney to support the GE engine. Therefore, we do not expect competition to significantly affect the price of engine spare parts.

Enclosure

If we do face engine problems in the future, we believe that fixing any problems with the original engine will cost less than developing and producing a second engine (which might develop its own unique problems). To date, the performance of the Pratt & Whitney engine has been excellent, giving us confidence in its reliability. The 2002 RAND study, *Military Jet Engine Acquisition*, noted the key performance requirements that led all three contractors to select the F119 derivative were "very high reliability for the single-engine Navy JSF variant and sufficient non-augmented thrust for the short takeoff and vertical landing JSF variant."

The draft report does not mention why it is so difficult to achieve a net cost savings from engine competition, despite considerable discussion on this point with DoD officials. In addition to the upfront *development* cost of at least $2.4 billion, several key factors work to increase *procurement* costs. Producing a given amount of engines with two suppliers instead of one supplier reduces the advantage from "learning curve" effects (whereby costs decrease as a company produces more units) and from "rate effects" (whereby fixed costs are spread over production units). Our experience with the F404 engine in early-model F/A-18s illustrates the point; the average unit costs of this engine did not decrease after competition was introduced.

Finally, the draft report mischaracterizes DoD's rationale for terminating the alternative engine program. The draft report states, "The alternative engine program was deemed to have a lesser priority than other major DoD activities and programs." A more accurate description would address DoD's process of weighing the upfront costs of paying for a second supplier against the risk of relying on a single engine supplier. While DoD recognizes that there are benefits to having two engine sources, the risk of a single engine supplier for JSF was judged manageable compared to other risks the Department faces.

In summary, GAO's draft report to Senator Warner focuses on benefits that cannot be supported by empirical data. The draft report criticizes DoD for ignoring O&S savings but does not specify what those savings are, how they might be achieved, and how they would outweigh the known costs—in investment, procurement, and O&S—of maintaining two engine suppliers. We hope you'll agree that this response raises important issues that deserve more thoughtful and balanced consideration in your draft report.

(120548)

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2007

TUESDAY, JULY 25, 2006

U.S. SENATE
SUBCOMMITTEE ON AIRLAND,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

F–22A MULTIYEAR PROCUREMENT PROPOSAL

The subcommittee met, pursuant to notice, at 9:34 a.m. in room SR–222, Russell Senate Office Building, Senator John McCain (chairman of the subcommittee) presiding.

Committee members present: Senators McCain, Warner, Inhofe, Chambliss, Bill Nelson, and Dayton.

Committee staff member present: Charles S. Abell, staff director.

Majority staff members present: Ambrose R. Hock, professional staff member; Gregory T. Kiley, professional staff member; Stanley R. O'Connor, Jr., professional staff member; and Scott W. Stucky, general counsel.

Minority staff members present: Creighton Greene, professional staff member; and Peter K. Levine, minority counsel.

Staff assistants present: Micah H. Harris and Benjamin L. Rubin.

Committee members' assistants present: Christopher J. Paul, assistant to Senator McCain; John A. Bonsell, assistant to Senator Inhofe; Clyde A. Taylor IV, assistant to Senator Chambliss; Stuart C. Mallory, assistant to Senator Thune; Frederick M. Downey, assistant to Senator Lieberman; William K. Sutey, assistant to Senator Bill Nelson; and Luke Ballman, assistant to Senator Dayton.

OPENING STATEMENT OF SENATOR JOHN MCCAIN, CHAIRMAN

Senator MCCAIN. Good morning.

As we all know, and we should have this hearing in the context of the fact that there is increased cost for defense—projected costs—and, at the same time, there are going to be reductions in defense spending which will cause some very difficult decisions to be made in the years ahead. I've been concerned about multiyear procurement, because it locks in the funding for a certain weapons system when we have others which obviously have increasing costs. For example, the Army now projects $160 billion for its Future Combat Systems (FCS); whereas, its original cost was projected to be at $90 billion. We have seen, last year, 9 of the 11 major weap-

ons systems developed behind schedule, over cost, and yet all received incentive bonuses, an incredible and bizarre situation if there ever was one.

So, we meet today to discuss the issue of the multiyear procurement for the F–22 aircraft, whether it will result in "substantial savings," whether the minimum need of the aircraft will be expected to remain substantially unchanged during the contract period, and why the Air Force would request funding at required levels to avoid contract cancellation. As we all know, since its inception, this program has been subject to two Nunn-McCurdy violations and has been rebaselined 14 times to avoid additional breaches. The research and development cost growth alone over the original baseline is $10.2 billion, which is a 43.7-percent increase over the original baseline. There's every reason to think that the $225 million in supposed savings will be swallowed whole the next time this program is rebaselined. So, the substantial savings estimate the Air Force is hanging its hat on to justify this is difficult to justify.

I want to emphasize that this program began—I have the numbers here someplace—but the numbers that were originally intended have dramatically shrunk as the cost per aircraft has dramatically increased. It's not unusual for an Air Force weapons system, but when we lock in a multiyear procurement system, I think it's important to examine the history of this particular system. I am certainly not convinced that, given the increased costs of all weapons systems, as we are seeing, and already projected decreases in defense procurement spending, that this multiyear procurement is justified.

[The prepared statement of Senator McCain follows:]

PREPARED STATEMENT BY SENATOR JOHN MCCAIN

Recently, I read an article that described the Army's $160 billion bill for its Future Combat Systems. This article noted that "combined with rising manpower costs and combat operations in Iraq and Afghanistan that have consumed lives and equipment, the Service stands on the edge of a deep, deep hole. Budget shortfalls for the Service could exceed $20 billion annually. The Service had a $56 billion shortfall in its equipment accounts when combat in Iraq began in 2003." Lieutenant General Melcher, Director of Army Programs, reportedly estimates that after 3 years and a series of extraordinary supplemental appropriations bills, the Army has not even cut that figure in half.

The Army is not alone when it comes to budget woes. The Navy has similar problems in ship construction and the need to recapitalize naval aviation.

For the Air Force, numerous major programs are experiencing technical problems, scheduling delays, and severe cost overruns. Service needs are rapidly becoming unaffordable. Indeed, the future is not rosy when it comes to budget outlays for defense. In fact, we are entering a 10-year cycle where reduced budget outlays for defense are expected.

Weapons procurement for all of the Department of Defense (DOD) is expected to cost approximately $1.5 trillion between 2006 and 2009, with more than half of these expenditures yet to be made. In addition, the Senate unanimously voted, 98–0, that the preponderance of funding for conflicts in Afghanistan and Iraq will need to be requested through the annual budget, rather than emergency supplemental requests. Such a change could lead to dynamics in the budget process that are difficult to predict.

In such trying times, one would like to see procurement proposals from the Services that make budgetary sense. For such sense, one should not look to the Air Force's current F–22 multiyear procurement (MYP) proposal.

What one will find there is déjà vu.

Just as it did on the Boeing tanker lease proposal, the Air Force is once again ignoring the law—and engaging in gimmickry to justify its request to purchase 60 additional F–22A Raptors under an MYP.

Entering into a multiyear defense procurement contract is a serious matter. It allows the DOD to commit to spending funds that have not yet been appropriated. For this reason, before Congress makes such a commitment, Congress (at least ostensibly) evaluates seriously the risks arising from such a purchase—in this case, risks attendant to the multiyear commitment of about $10 billion over 3 years. This is because, in approving an MYP, Congress sacrifices budgetary flexibility and control over the contract period. For this reason, Congress enacted title 10, section 2306b, of the United States Code.

This statute sets forth, among other things, six criteria, which the agency must satisfy before entering into a multiyear contract for any given program. These conditions include substantial savings, stable requirement, stable funding, stable design, realistic contract cost and cost avoidance estimates, and the promotion of national security. Basically, these requirements help Congress evaluate the risks involved in allowing the DOD to commit itself to performance under a multiyear contract, rather than a series of annual contracts, for the purchase of a given asset.

The Air Force and the Office of the Secretary of Defense have not established that all the criteria required under the Federal multiyear procurement statute have been satisfied. All of the independent experts testifying before the subcommittee today, notably the Comptroller General of the United States, will state that at least four of the six criteria set forth in section 2306b have not been met by the Air Force:

- The proposed multiyear procurement of F–22s will not result in "substantial savings" over a series of annual contracts.
- The minimum need for this aircraft cannot be expected to remain substantially unchanged during the contemplated contract period.
- There can be no reasonable expectation that the Air Force will request funding at required levels to avoid contract cancellation.
- There are serious concerns about whether the design of the aircraft is in fact stable and that its technical risks are excessive.

Of the Air Force's failed showing in meeting all the criteria, the one that concerns me the most is the requirement for the Air Force to demonstrate "substantial savings." Several critical points need to be addressed.

First, according to Comptroller General Walker, since its inception, this program has been subject to two Nunn-McCurdy violations and has been rebaselined 14 times just to avoid additional breaches. The research and development cost growth alone (over the original baseline) is $10.2 billion (for an increase of 47.3 percent over the original baseline). Against this backdrop, there is every reason to think that the $225 million in supposed savings will be swallowed whole the next time this program is rebaselined. So, the "substantial savings" estimate the Air Force is hanging its hat on to justify its multibillion F–22 MYP proposal is, at best, illusory.

Similarly, the Institute for Defense Analysis (IDA) savings calculation does not account for the $1.7 billion in additional procurement dollars needed to implement the Air Force's proposal of adding 4 aircraft to the total purchase and slowing the annual production rate to 20 aircraft, over a longer schedule. In other words, it takes as its starting point the F–22 production profile as given. IDA's failure to take into account the $1.7 billion needed to implement the Air Force's proposal can be expected to diminish IDA's savings number.

Next, according to a recent Government Accountability Office (GAO) report, "the Air Force's multiyear procurement justification package sent to Congress on May 16, 2006, stated that an additional $674 million is needed to fully fund the multiyear program being proposed." So I ask: Where is the $225 million in savings if we will already be $674 million in the hole with this multiyear proposal?

Also, even if the IDA's savings estimates are true and attainable, they don't constitute "substantial savings" within the meaning of the Federal multiyear procurement statute. IDA's report states that the historical average for cost savings is 8 percent. According to recent testimony provided by the Congressional Research Service (CRS), contract proposals that are deemed to satisfy this requirement have historically seen savings of about 10 percent. This multiyear procurement proposal purportedly achieves savings at a new, low rate of about 2.2 percent. While $225 million is certainly a great deal of money, it is not "substantial savings" within the meaning of the Federal law that this procurement proposal must comply with before it can go forward. If we allow this MYP proposal to go forward so far below the bar, we will be on the fast track to rendering the "substantial savings" requirement virtually meaningless.

Finally, it appears to me that the Air Force has no credibility on what true cost savings will be.

- On March 28, 2006, Lieutenant General Hoffman, military deputy to the Air Force acquisition executive, originally said a multiyear contract would save $500 million. But this figure has changed several times and now has been cut in half. Furthermore, independent experts now doubt if there will be any cost savings in an F–22 multiyear procurement.
- A recent DOD Inspector General investigation found that the Air Force apparently presented Congress false information on the C–130J multiyear contract termination costs. An important fact is the F–22A program manager was among those responsible for apparently exaggerating the termination costs—the same office that prepared the estimated savings for executing the F–22 multiyear contract.
- Last year, Congress authorized and appropriated enough money for 24 F–22 aircraft; the Air Force can only afford 22 aircraft with those funds. Just yesterday, the Air Force submitted a reprogramming request regarding Lot 6 of the F–22 that provides for the purchase of an additional aircraft—going from 22 to 23 for fiscal year 2006, when we originally fully funded 24 in the fiscal year National Defense Authorization and Appropriation Acts. Furthermore, the Senate Armed Services Committee has made multiple requests for an explanation of the reduced F–22 buy—and no response has been forthcoming. Perhaps Secretary Wynne can clear this up today.

The bottom line is this: allowing the proposed MYP here would effectively permit the Air Force to be held unaccountable—to end-run good government provisions in Federal law that Congress specifically designed to ensure accountability in our Government's contracting procedures.

Can the taxpayer afford to place its trust in the Air Force acquisition system when stealthy F–22 aircraft disappear before they are built, yet after money has been authorized and appropriated? How we buy F–22 is not subject to our unfettered discretion. If we choose to buy them under a multiyear contract, we must do so in compliance with the law and best budgetary practices. This MYP proposal does neither.

I would hope that the Air Force will rethink its position and collaborate with the committee in developing a procurement approach that is both lawful and fiscally sound.

Senator MCCAIN. Senator Nelson?

STATEMENT OF SENATOR BILL NELSON

Senator BILL NELSON. Thank you, Mr. Chairman. It's a privilege for me to fill in as the ranking member today for Senator Lieberman.

We have the situation, as you've stated, that the original Air Force proposal was to buy the final 60 F–22 aircraft under a 3-year multiyear contract, but using an incremental funding approach in structuring that contract. All four defense committees have now rejected that proposal. But then, they go to the floor, and both defense authorization bills now include the approval of the Air Force to enter into the multiyear contract. I did not vote to support Senator Chambliss and his amendment on the floor when the Senate considered the Defense Authorization Act, but the Senate approved Senator Chambliss's amendment, 70 to 28. I still have some concerns about it and I hope that we're going to talk about it today.

While the estimate of some $235 million in savings is certainly a nontrivial sum of money, it represents a small portion of the resources of the Government that it will be committing for the next 3 years to the program. So, there are some other concerns.

In this morning's Washington Post, "A think tank that endorsed a 3-year contract for a troubled jet fighter program is run by a former military officer with extensive ties to one of the program's subcontractors. The Institute for Defense Analyses' (IDA) Presi-

dent, Dennis Blair, is a member of the board of a subcontractor for the F–22 Raptor. Mr. Blair holds options to buy tens of thousands of shares of the company's stock, EDO Corporation."

It's my understanding that IDA has no policy on conflicts of interest by its officers.

So, we need to dig into this, Mr. Chairman, and I'm looking forward to it.

Senator MCCAIN. Thank you very much.

Senator Inhofe.

Senator INHOFE. Thank you, Mr. Chairman, and thank you, Secretary Wynne, Secretary Finley, and Mr. Walker.

Secretary Wynne, I especially appreciate your comments that were in your written statement, when you said that our joint warriors are the best in the world, but they can only be as good as the tools we give them. As I stated last month, my goal on this committee in the future is to try to get us in a position where our kids—and I don't care if it's on the ground, in the air, in the sea—have the best equipment when they go out and, keeping in mind that we are the best, we should be the best possible stewards of the taxpayers' money. But, right now, they don't have the best.

It's so frustrating to me—I know members of this committee are tired of hearing me say this—that over and over and over again we have stated that there are some countries who go to battle with better equipment than we have. The chairman just mentioned the FCS. The reason for the FCS is to try to bring us up so that we do have the best.

Right now, our cannon on the ground is not as good as some five other countries are making, including South Africa. General Jumper—I've said this several times—when he was a two-star, back in 1998, when we had been downgrading the military during the 1990s, we dropped our procurement and our modernization programs down. At the same time, the Chinese were increasing their procurement by 1,000 percent in the same decade—General Jumper stood up and had the courage to say that the best strike vehicles we had, the F–15 and the F–16, are not as good as some that our prospective opponents could have.

At that time we were talking about the SU–27. It was deployed and working. The SU–30 was not yet in the air and working, but contracts were being made. The Chinese bought several of these.

I say that because one of the six criterias that we're talking about is national defense. We're not debating that. I don't think Mr. Walker or any of the rest of them are debating that particular criteria as one that is in contention. But the bottom line is, we have a desperate need to get this thing fielded in the numbers that can give our fighters the best opportunities.

Secretary Wynne, I want to read a quote you had that I appreciate very much, "The F–22's dominant combat capabilities will provide the U.S. forces with overwhelming air superiority in any scenario, and its robust employment capabilities, both air-to-air and air-to-ground, will afford joint combatant commanders with options for asymmetric engagement that do not exist with legacy fighters."

So, we're not debating, today, whether we need it, and whether we're going to buy it, it's just the system that we're using and what

kind of savings we can have. Some of us on this panel believe that if it's $225 million or it's $325 million, that is something that is substantial. We'll have a chance to talk about that in a little more detail. I think the vote on the Senate floor of 70 to 28 was in favor of the American taxpayer.

So, the debate is not about design issues, which have already been corrected and don't even need to affect the lots under consideration in the multiyear. The debate is not about previous plans to buy 56 F–22s over 2 years, or 60 aircraft over 3 years, utilizing split funding. The Senate Armed Services Committee (SASC), the Senate Appropriations Committee, the House Armed Services Committee, and the House Appropriations Committee all agreed to purchase the F–22 in three lots over 3 years. So, we keep talking about this thing. It's 56 in 2 years, and that's already settled, as I understand it.

So, the only real question is whether we allow ourselves the savings achieved through a multiyear purchase. Again, I think that we should.

But one thing I do want to say, and I respect all my fellow Senators, but to bring up this article that comes out the night before a hearing in the Washington Post—and it's filled with lies—that's one more thing that this is not about. It's not about waiting until the day before a hearing and then coming out with something as they came out with this morning. The article in the Washington Post this morning is nothing but smoke and is filled with lies. For example, it states, "After receiving the IDA's endorsement, the Air Force decided to lock itself into a new 3-year contract for the jet." That's simply not true. We know it's not true. Both the Quadrennial Defense Review (QDR) and the President's budget recommended the multiyear contract. Additionally, it states, "Largely on the strength of IDA's conclusions about future cost savings from the multiyear procurement, the Air Force decided to buy 60 more planes than the previous contract demanded." That's a lie. It's four more planes. The Office of the Secretary of Defense (OSD) increased the number of planes by four over fiscal year 2006, as a part of their QDR plan to help the Department stabilize the fifth-generation fighter industrial base and smooth the transition to the F–35.

So, I'm sure that there are a lot of people who are rejoicing in the fact that some things were leaked to the Washington Post so that it allowed them to come out with a bunch of lies right before this hearing.

[The information referred to follows:]

The Washington Post

Tuesday, July 25, 2006

Leader of Panel That Endorsed Jet Program Has Ties to Contractor

By R. Jeffrey Smith and Renae Merle
Washington Post Staff Writers

A think tank that endorsed a three-year contract for a troubled jet fighter program is run by a former military officer with extensive ties to one of the program's subcontractors, according to internal Pentagon documents and corporate statements.

The endorsement came from the Institute for Defense Analyses (IDA), a federally financed research center whose president, Dennis C. Blair, is a member of the board of a subcontractor for the F-22 Raptor fighter program, EDO Corp. EDO developed a missile launcher for the F-22 and has held contracts worth at least $38 million that are part of the program, according to its news releases.

After receiving the IDA's endorsement, the Air Force decided to lock itself into a new three-year contract for the jet.

Blair holds options to buy tens of thousands of shares of EDO stock, although he has exercised only a small portion,

See JET, D3, Col. 5

Panel That Endorsed Troubled F-22 Has Ties to Subcontractor

JET, From D1

according to Securities and Exchange Commission filings. In an interview, Blair said he was heavily involved in the preparation of the report endorsing the multi-year procurement as the chairman of an internal review committee that approved its final form.

"I am at the top of that process," Blair said. But he chose not to recuse himself because his link to EDO was not of sufficient "scale" to require it, he said.

IDA has no policy on conflicts of interest by its officers, Blair added. "We evaluate each one as it comes," he explained, saying he makes any recusal decisions himself.

Critics of the multi-year procurement say the Air Force's decision to proceed with it was based on a flawed IDA analysis contradicted by other auditors, such as the Government Accountability Office and the Congressional Research Service, which concluded that the plane was unqualified for such a contract.

Danielle Brian, executive director of the independent Project on Government Oversight, which has been critical of the F-22 project, said that "institutions like IDA carry tremendous weight in advising the government on how to spend taxpayer dollars," adding, "But in the end, the government is not getting the independent analysis it is paying for" because of the absence of any rules barring conflicts of interest at such centers.

Blair, a retired Navy admiral who formerly commanded the U.S. Pacific Command, responded: "My review was not affected at all by my association with EDO, and the report was a good one. I had never, at EDO, worried about the F-22 contract."

The $65 billion F-22 program, one of the most expensive fighter programs ever undertaken by the Pentagon, has been plagued by cost overruns and technical problems, including a cockpit door that got stuck, trapping a pilot, and front landing gear that retracted when it was not supposed to, crashing a plane on its nose.

The plane was originally conceived in the mid-1980s for use in dogfights with Soviet fighters but has been extensively modified since then.

Largely on the strength of the IDA's conclusions about future cost savings from a multi-year procurement, the Air Force decided to buy 60 more planes than a previous contract demanded. The extra procurement will cost around $10.8 billion, even as the Air Force is spending more than $100 million on improvements to existing planes.

A spokesman for the F-22's lead

The Air Force decided to buy 60 more F-22 Raptors than a previous contract demanded.

contractor, Lockheed Martin Corp., said the multi-year contract "provides more stability to the F-22 program suppliers, which allows them to offer lower prices."

"The government has made a significant investment in the F-22 development, and taxpayers should have the opportunity to take advantage of the benefits."

The IDA has a staff of 800 that mostly works for the Pentagon. In its report, labeled "For Official Use Only" and titled "F-22A Multiyear Procurement Business Case Analysis," its analysts concluded that the Air Force could "achieve substantial cost savings" with a new, multiyear contract, but not as much as the Air Force had claimed.

Lockheed Martin cited that conclusion in arguing on Capitol Hill for legislation giving the Pentagon authority to sign such a contract. The legislation was introduced in the Senate by Saxby Chambliss (R-Ga.), whose state includes a major manufacturing plant for the F-22, and it passed in a 79-28 vote.

Sen. John McCain (R-Ariz.), who will chair a Senate Armed Services subcommittee hearing this morning on the F-22, opposed the multi-year procurement and plans to question a series of witnesses about IDA's conclusions.

Air Force Secretary Michael W. Wynne, in testimony prepared for the hearing, said the IDA study provided an "independently verified savings estimate" of $225 million, or $3.75 million per aircraft, over three years.

Blair said that during the IDA review he chaired, the initial savings estimate was changed, but he said he could not recall whether it was raised or lowered.

Senator INHOFE. Thank you, Mr. Chairman.

Senator MCCAIN. Senator Chambliss.

Senator CHAMBLISS. Thank you, Mr. Chairman, and thank you for holding this hearing. You and I talked about this both on the

floor during debate, before and after, and I appreciate the opportunity to once again talk about the merits of the most sophisticated weapons system that we have ever seen manufactured anywhere in the world.

Having been a fan of this weapons system since long before any nut or bolt of the F–22 was made in my State, I am now enjoying the pleasure of representing the plant in which this great weapons system is assembled. We're very proud, at Marietta, of the job the folks have done over a long period of time, from the stage of initial discussion of this sophisticated weapons system to the point now to where we are seeing it flown over the skies of Washington, DC, and over any number of other areas where we have some sophisticated operations going on.

We've also been through a number of stages. Mr. Chairman, you mentioned that there have been problems, and certainly there have been with this weapons system. It's because of the sophistication of it and because of the assets that have been required to be put on this airplane. We had an original idea back in the 1980s of what this airplane ought to look like, and gradually that goalpost has been moved, and probably for the right reason, because we all know that buying additional attack aircraft, buying additional bombers, is going to be very difficult. Now we have a weapons system that allows us to penetrate enemy territory, not to fire once, not to fire twice, but to fire three times before the enemy ever knows we're there. That's one of the reasons that the pilots that I have talked to love this airplane. It's a great flying machine, in addition to that. Now, with its added capability of being able to carry additional weapons that can penetrate enemy lines and save the lives of Americans, it certainly is one of the greatest weapons systems that we will ever see in our inventory. I look forward to the witnesses talking about that.

As I said on the floor, I hate to go against my chairman, who I respect so much, as well as the chairman of the full committee, relative to an amendment that, frankly, the contractor was not sure ought to be introduced. I just couldn't let this opportunity go by to save a minimum of $235 million and secure this asset that is so desperately needed by the Air Force, as I fully expect our witnesses to talk about, and to give us an asset that will allow us to take out, air-to-air, any adversary that is on the horizon.

So, as we are here today talking about this, I share the thoughts of Senator Inhofe. I think it's rather ironic that in today's paper we see an article that's critical of this, and it talks about this hearing today. I suspect we all know where that came from.

Senator MCCAIN. Where would that be?

Senator CHAMBLISS. I'll be interested to see what that reporter says, because I intend to ask him about it. But, obviously, I think staff that doesn't appreciate this contract is probably where it came from, Senator. We look forward to maybe finding that out.

Senator MCCAIN. Which staff would you be referring to?

Senator CHAMBLISS. I have no idea, but I'm going to ask.

Senator MCCAIN. You just said you have a pretty good idea.

Senator CHAMBLISS. Yes, sir, I think it came from staff, that it was probably leaked to the press.

Senator MCCAIN. Which staff?

Senator CHAMBLISS. I have no idea, but I intend to ask, Senator, as to where it came from, because, frankly, the information in that article is not just incorrect, but it's immaterial. It has nothing to do with the weapons system, it has nothing to do with the Air Force going through a QDR justifying, from a business perspective, the requirements of a multiyear contract. I hope that we can find out exactly where it came from, Senator, and be assured that I will share with you any information I find out about that.

But I look forward to our witnesses being here this morning to talk about not only the weapons system itself, but the fact that it does meet all the criteria for a multiyear. Obviously, a strong voice coming out of the House and a strong voice out of the Senate has indicated that this multiyear is not only appropriate, but it's needed, and it does save the taxpayers money.

So, Mr. Chairman, thank you for holding this hearing this morning. I look forward to the testimony of the witnesses.

Senator MCCAIN. Thank you.

Senator Dayton, do you have——

Senator DAYTON. Nothing, Mr. Chairman, thank you.

Senator MCCAIN. I welcome the witnesses: Secretary Wynne, Comptroller General Walker, and Secretary Finley.

We'll begin with you, Secretary Wynne.

STATEMENT OF HON. MICHAEL E. WYNNE, SECRETARY OF THE AIR FORCE

Secretary WYNNE. Thank you very much, Mr. Chairman.

Mr. Chairman, members of the committee, thank you for the opportunity to discuss the F–22 multiyear proposal, as contained in the President's budget, currently in review by Congress.

As I testified previously, the budget, as presented, represented a series of settlements and proposals to connect desires with budget realities. One of the settlements reflected the Air Force's desire to preserve a warm fifth-generation fighter line, the F–22, until a second fifth-generation fighter line, the Joint Strike Fighter (JSF), or F–35, became active. We believe this to be a prudent course in this uncertain world. We mightily strive to be convincing to extend the F–22 at the then-planned rate of 28 aircraft per year. This was rebutted as to quantity required, primarily because of the increase in warfighting capability that each F–22 brings to the battle models. Thus, the quantity that the Department would authorize is 183 aircraft. The Air Force goal of bridging was met by buying the remaining units at a reduced rate of 20 per year. The Air Force appreciated the bridge between fighter lines but we lamented the increase in cost per unit that this represented. The purpose, then, of this multiyear request is to offset a portion of this increase. The Department appreciated the reduced rate of production, as it freed up instant resources in fiscal year 2007 to apply to higher priorities.

This led to a second dilemma which was split funding, a funding technique that further reduced the 2007 obligations, which were again applied elsewhere in the budget.

As the deliberations continue here in Congress, the funding is currently restored to eliminate the concept of split funding, which

I used in this chart, by the way, when I testified before the SASC in November.

This adjustment, if sustained, will require rephasing of the F–22 funding that was in the fiscal year 2007 Program Objective Memorandum (POM), during the fiscal year 2008 POM, to fully fund the F–22 program to 183 units. This is our plan.

The bottom line of this discussion is that this is a stretch-out of the F–22A in order to attempt to maintain a fifth-generation fighter-line availability in a very uncertain environment, requesting a multiyear authorization to reduce the acquisition cost to the maximum extent possible to offset the cost of this slowdown. A side benefit will be to stabilize the end of life for this program.

Multiyear authorizations stem from, number one, a stable product. In our back-to-basics approach, we have stabilized the configuration of the F–22A. I have inquired, as well, to the contractor who verified a stable product. This supports the firm fixed-price approach that we have taken.

Number two, adequate market. The Air Force is fully committed to the 60 F–22As in consideration. As I mentioned, we actually seek more, but have been told to suppress our appetite.

Seventy-four F–22As have been delivered to Tyndall, in Florida; Langley, in Virginia; and Edwards and Nellis Air Force Bases across the Air Force, and the first aircraft for the fifth base, Elmendorf, is rolling off the assembly line next week. The F–22A has performed magnificently during exercise, both in and out of the continental United States, dominating the current-generation fighters, yet integrating seamlessly with groundbased special operations. This underscores our excitement and why we desire more.

Some have said, "Delay the multiyear buy until next year." But with 183 as the total program cap, there is, frankly, no next year, at 20 per year.

Adequate funding. We intend to rephase the funding to fully fund these 60 aircraft in the fiscal year 2008 submittal.

Substantial savings. The Air Force seeks to maximize the savings, and is incentivized by the need to offset, to the maximum extent possible, to stretch out costs.

At present levels, the estimate for savings ranges around a quarter-billion dollars. This is good news, in that on a per-unit basis this is, in fact, in the range of the F–18 multiyear. The Air Force would, of course, like greater savings, and will negotiate hard to achieve greater savings than this.

I thank you for your interest in our Air Force and appreciate your continued push for us to get the best deal for the taxpayer across the board. I stand ready to respond to your questions.

[The prepared statement of Secretary Wynne follows:]

PREPARED STATEMENT BY HON. MICHAEL W. WYNNE

Mr. Chairman and distinguished members of the committee, thank you for the opportunity to appear before you today to reiterate the benefits of the F–22A and the multiyear procurement (MYP) strategy. Our joint warriors are the best in the world. However, they can only be as effective as the tools we give them. Within today's fiscal constraints, we must fight the global war on terror and protect the homeland while transforming the force and maintaining an appropriate level of risk. The Air Force is committed to balancing the health of today's force with the modernization and recapitalization necessary for the capabilities of the future. The Air Force ap-

preciates all the support this committee has provided to the warfighter and the ongoing operations around the world.

Our primary fighter modernization and recapitalization program is the F–22A Raptor. The F–22A is operational today and ready for combat. The F–22A is a fifth-generation fighter aircraft that delivers joint air dominance (JAD) to counter persistent and emerging national security challenges. Given its vast improvements in every aspect—speed, all-aspect stealth, integrated avionics, maneuverability, supercruise, and an adaptable architecture—the F–22A is America's insurance policy against future threats to joint air dominance and represents a best value capability for the American taxpayer. The F–22A is the only aircraft in the world that ensures air dominance and operational access for the entire joint force. It guarantees an asymmetric advantage the U.S. surface forces have enjoyed for over 50 years—freedom from attack, freedom to maneuver, freedom to attack.

Fourth generation fighters (F–15, F/A–18) are able to survive and operate against legacy threats, such as SA–3s, SA–6s, but are overmatched against newer, currently fielded surface-to-air systems such as the SA–10, SA–20, and aircraft such as the F–10, as well as potential future threats such as the SA–21. The F–22A can autonomously complete the kill chain against all current and projected threats. The F–22A delivers unmatched lethality and survivability for gaining and maintaining air dominance—the number one, must have requirement to successfully conduct joint and coalition operations across the spectrum of conflict. The F–22A achieved an 80:1 kill ratio against legacy fourth generation fighters in joint exercise Northern Edge 2006 (NE06) in Alaska. F–15s and F–18s had an 8:1 ratio. The F–22A joint integration and multi-role capability was demonstrated in NE06 as it seamlessly integrated with joint Special Operations Forces. In addition, F–22A maintenance reliability during NE06 was 97 percent, flying 102 of 105 sorties. The F–22A is the only weapons system with the unique combination of air, ground, and nontraditional intelligence, surveillance, and reconnaissance (ISR) capabilities that enable operations across the full spectrum of conflict, including homeland defense and irregular and unconventional warfare.

The F–22A program emerged from early development challenges to demonstrate success after success. Based upon the F–22A's demonstrated design stability, the Office of the Secretary of Defense (OSD) granted approval for the F–22A to enter full rate production in April 2005. In December 2005, the F–22A achieved initial operational capability (IOC) having successfully completed all developmental testing, and initial and follow-on operational test and evaluation. The Air Force Operational Test and Evaluation Center report stated, "F–22 is mission capable in the air-to-ground role." Currently, there are 74 F–22As delivered, operating from 4 Air Force bases (AFBs) to include 34 combat-coded aircraft at Langley AFB VA. The F–22A on-schedule deliveries continue at a rate of approximately two per month. Its performance continues to meet or exceed key performance parameters and spiral modernization will further enhance its air-to-air and air-to-ground target engagement capability.

To support the Quadrennial Defense Review (QDR) and preparation of the fiscal year 2007 President's budget (PB), the Department performed a JAD study. The JAD study examined options for varying levels within the strike fighter mix. The Department looked at the war scenarios and cost implications of buying fewer variants of F–35s, increasing and decreasing the number of F–22As, and buying more legacy aircraft at the expense of fewer fifth-generation platforms. The results of these analyses directed the Air Force to "restructure the F–22A program and extend production through fiscal year 2010 with a multiyear acquisition contract to ensure the Department does not have a gap in the fifth-generation stealth capabilities." As a result, the fiscal year 2007 PB added $1.05 billion to the Future Years Defense Plan (FYDP) to procure a total of 183 F–22A aircraft and requested congressional authority for an MYP for up to 60 F–22A aircraft (20 per year in Lots 7, 8, and 9) and a companion MYP for the F119 engines. The Air Force has long maintained that 381 Raptors will ultimately be required to meet the needs of the warfighter. This number of F–22As provides adequate capability to meet national security requirements to defend the homeland and support two near-simultaneous major combat operations, or their equivalent, with acceptable risk and a sustainable operations tempo. However, the QDR analysis reflected the need to address competing defense priorities and fiscal realities. As a result, 183 F–22As is the current program of record.

On May 16, 2006, the Air Force submitted the MYP justification package to the congressional defense committees. Based on independent analysis, the Air Force justification shows that the proposed F–22A MYP meets all requirements of subsections (a) (1) through (6) of section 2306b of title 10, U.S.C., including a substantial savings of approximately $225 million. The Air Force has demonstrated readi-

ness to enter into the MYP by successfully accelerating production deliveries of 37 F–22A aircraft between 2004 and 2006 to return the program to the original contract schedule while achieving an overall reduction in the unit flyaway costs of over 23 percent over the same time period (Lots 3–5).

Recently the Government Accountability Office (GAO) released a report that raises questions about whether the proposed F–22A MYP meets the six criteria required by 10 U.S.C. 2306b. The GAO expresses particular concern over three criteria relating to the existence of substantial savings, the expectation of future funding requests as required to avoid contract cancellation, and the presence of a stable design without excessive technical risks.

The proposed F–22A MYP meets all three of these criteria:

1. Substantial savings: An MYP over three production lots offsets cost increases resulting from reductions in the previously planned annual production rate. Implementation of the proposed MYP contract will yield significant cost savings/cost avoidance over a series of successive single year procurements. The Institute of Defense Analyses' (IDA) independent business case analysis (BCA) estimated the cost to purchase 60 F–22A aircraft and associated engines in three lots under an MYP contract, and the cost to purchase 60 F–22A aircraft and associated engines in three annually procured lots. The BCA also described the benefit of MYP to the defense industrial base, allowing prime contractors to enter into longer-term agreements with suppliers, with resulting improvements in efficiency, training, and tooling. The Air Force and DOD consider the independently verified savings estimate of $225 million or $3.75 million per aircraft over 3 years to be substantial. This cost savings per aircraft is comparable to the $3.82 million per aircraft for the F/A–18 E/F MYP.

The Department's decision to extend the F–22A production line 1 year by adding Lot 9 without substantially increasing the total program quantity reduced the previously planned quantities of Lots 7 and 8. While this did affect previous estimates of the unit cost for Lots 7 and 8, this decision was necessary to stabilize the fifth-generation fighter industrial base, smooth the transition to F–35 production, and preserve future investment options. This decision is unrelated to the proposed MYP contract and does not affect compliance with the title 10 requirements for substantial savings as compared to annual contracts for the same quantities.

2. Stability of funding requested: The Air Force is committed to fully fund and procure all 60 aircraft through the proposed MYP. This commitment was reaffirmed by the DOD in the QDR decision to continue the F–22A program and emphasizes the criticality of the F–22A to overall DOD planning.

3. Design stability: The development program for the F–22A is complete and the design is stable. F–22A IOC was declared on December 15, 2005. The F–22A has demonstrated over 14,000 developmental test, training, and operational flight hours. The existence of a separate and ongoing modernization program does not affect this demonstrated design stability. Like all weapon systems, the F–22A will continue to undergo a modernization program as long as it is in the Air Force inventory. MYP has been approved under similar circumstances for candidate programs with anticipated upgrades, including the F/A–18E/F and UH–60 programs. The F–22A has already proven its air-to-ground capabilities and as recently as June 2006, the F–22A demonstrated a 34 of 34 success rate while dropping precision munitions.

In addition to the criteria above, the proposed F–22A MYP meets the remaining three criteria as well:

4. Stable Requirement: The F–22A requirement has been consistently validated and remains a top Air Force priority. The F–22A operational requirements document, 304–83–I/II/IIIA, dated February 17, 2004, was approved by the Joint Requirements Oversight Council and signed by the Chief of Staff of the Air Force. The QDR supports restructuring the F–22A program and extending production through calendar year 2011 with a multiyear acquisition contract to ensure the Department does not have a gap in the production of its fifth-generation tactical fighter aircraft. The fiscal year 2007 PB documents this decision and requests funding to support the planned fleet size of 183 aircraft. The F–22A MYP proposes a constant production rate of 20 aircraft per year for 3 years. This requirement will remain unchanged. Procuring an aircraft with a stable requirement under an MYP enables better use of limited taxpayer resources.

5. Realistic Cost Estimate: The Fiscal Year 2005 Defense Appropriations Conference Report directed that a federally-funded research and development center be tasked to conduct an independent cost estimate (ICE) of the F–22A aircraft production program to recalibrate F–22A cost models. IDA completed the ICE and provided a better understanding of F–22A procurement costs. The program's cost estimates have also been closely scrutinized by the OSD Cost Analysis Improvement Group and the Air Force Cost Analysis Agency. The estimated cost of the F–22A MYP and the associated savings were independently verified by the DOD chartered IDA BCA study. While most MYP estimates are conducted as internal Service estimates, the F–22A MYP estimate was independently verified.

6. Promotes National Security: The F–22A is the Air Force's highest priority acquisition program. There is no alternative aircraft in production offering comparable capabilities to the F–22A. The F–22A is a complex weapon system with over a decade of development, and represents the best option to replace legacy fighters dedicated to air-to-air, suppression of enemy air defenses, destruction of enemy air defenses, and homeland defense. With its unmatched combination of stealth, integrated avionics, and supercruise, the F–22A is the keystone of the Air Force's Global Strike concept of operations. The F–22A's dominant combat capabilities will provide U.S. forces with overwhelming air superiority in any scenario, and its robust employment capabilities (both air-to-air and air-to-ground) will afford joint combatant commanders with options for asymmetric engagement that do not exist with legacy fighters. Procurement of the F–22A through the proposed MYP supports the objectives of the National Security Strategy and greatly enhances the effectiveness of the joint force.

The F–22A is ready to defend America's global interests with its formidable capabilities and is critical for national security as indicated from recent studies. Congressional approval of the proposed MYP for the F–22A to begin in Lot 7 is essential not only to achieve the substantial savings of $225 million over the next 3 years, but also to stabilize America's fifth-generation fighter production supplier base to provide a smooth transition to the production of the F–35. I look forward to working with this committee to best satisfy our warfighter needs in the future.

Senator MCCAIN. Thank you very much.

Mr. Walker, welcome.

STATEMENT OF HON. DAVID M. WALKER, COMPTROLLER GENERAL OF THE UNITED STATES

Mr. WALKER. Thank you, Mr. Chairman and members of the subcommittee. I appreciate the opportunity to be here today to discuss the Department of Defense's (DOD) proposal to buy 60 F–22s under a multiyear contract.

I'll note for the record at the outset, we've already contracted to purchase 122, so this is not an issue of whether or not we're going to buy F–22As, it's a matter of how many and on what basis.

Our review indicates that DOD's proposal to add 2 years to the production period of the remaining F–22As, and to procure the planes under a 3-year multiyear contract, will cost the taxpayers $1.7 billion more than called for to procure the last two annual lots, as compared with the amount previously provided in the fiscal 2006 budget.

The Air Force has reported to Congress that it believes that the F–22A program meets the criteria set forth in section 2306(b) of title 10 of the U.S. Code, for a multiyear contract. We have serious concerns regarding whether all the criteria have been satisfied; in particular, the substantial savings criteria, but also two others.

First, the timing of the proposal, near the end of the F–22A's acquisition period, reduces the ability of the program to achieve substantial savings. Savings are currently estimated to be about $225 million, or 2.7 percent of the remaining procurement cost, if 56 ad-

ditional aircraft are purchased, a savings that, in terms of the percentage of cost, is far below historic estimates of savings for other multiyear contracts.

Second, the Air Force is proposing to buy 4 additional aircraft, for 60 in total, at an added cost of $674 million to the taxpayers in order to save an additional $10 million under the multiyear contract; however, it has not fully funded the proposal.

In addition, to satisfy other needs in DOD, F–22A quantities have been unstable for the last 2 years, reducing quantities from 279 aircraft to 179 in fiscal year 2006, and now proposing to increase quantities to 183 in the fiscal year 2007 budget. If quantities continue to fluctuate downward, it could result in additional cost. For example, according to the Air Force, cancellation costs alone could be as much as $201 million, a sum currently unfunded in the multiyear proposal. This does not count additional termination charges that could be incurred if there's a premature termination of the contract. This financial risk, when compared to the savings projected from a multiyear contract, raises additional questions and serious concerns about the prudence of a multiyear contract.

Furthermore, I have no idea where the information came from that resulted in the article this morning, and I don't know whether or not the assertions in the article are true. However, if they are true, there is no question that the independence of the study would be highly questionable. Therefore, in my view, I think it's important to understand whether or not they are true, because, if they are true, I do not believe it's a study that either DOD or Congress should rely upon.

This raises a larger question. What are the independent standards that so-called independent think tanks and contractors have to meet in order to be able to be deemed to be independent? In my view, Mr. Chairman, they should have to meet generally accepted governmental auditing standards for independent standards or some other generally accepted standard, or else we don't know what we're getting for taxpayer dollars.

Candidly, Mr. Chairman, from a broad perspective, the F–22A program is illustrative of a number of systemic problems in DOD's acquisition system. First, the F–22A was approved in an environment with no clear agreement on enterprisewise priorities and without adequate consideration of current and likely future threats and resource constraints. Second, the requirements and key program specifications were not fixed when the program began and have changed numerous times over its decade-long development. Third, key procurement decisions were made without adequate consideration of technology and other program risks, with costly consequences. Finally, in this program, as, unfortunately, with many others in DOD, there have been significant incentive and award-fees paid, as you mentioned, despite the fact that we have large cost overruns and huge schedule delays. This program, no matter how positive the weapon system is—and it is truly impressive—is a case study in what's wrong with DOD's acquisition system. One must ask who's looking out for the taxpayers.

In conclusion, the Air Force's decision to extend production for 2 years for industrial-based purposes has further increased the length and cost of the F–22A program. We are not sure what the

Air Force's rationale was for extending production, and how it specifically relates to maintaining the industrial base so as to warrant an increased cost to the taxpayer of at least $1.7 billion. At the same time, our Nation's large and growing long-term fiscal imbalance requires the Federal Government, including DOD, to begin to make hard choices between its unlimited wants and its true needs. In this context, we continue to believe that Congress needs to reevaluate a range of existing Federal programs and policies, including the F–22A program, based on current and credible future threats, current and expected future national budget levels and priorities, and the warfighter's many true needs. As it stands now, the restructured F–22A program would increase cost if you end up going with this new schedule. The time to make tough choices between the DOD's program wants and expected resources is now.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Walker follows:]

PREPARED STATEMENT BY DAVID M. WALKER

Mr. Chairman and members of the subcommittee: I am pleased to be here today to discuss the Department of Defense's (DOD) proposal to buy 60 F–22As under a multiyear contract. GAO has recommended that the Air Force prepare a new business case for the F–22A program to justify the substantial changes planned in the mission roles and the quantities to be acquired—a recommendation that has yet to be implemented. Additionally, we share Congress's concerns over DOD's wherewithal to acquire the F–22A and other key assets in light of current and expected resource constraints. Over the past several years, it has become increasingly clear that DOD must reassess what is affordable and separate its many wants from its real needs. DOD must make tough acquisition choices in order for the country to begin to address the large and growing fiscal imbalance it faces.

My statement today—which is based on our recent report on the F–22A program [1]—will highlight our key concerns with moving forward with F–22A procurement, as DOD proposes. Our work was performed in accordance with generally accepted Government auditing standards.

SUMMARY

Our review indicates that DOD's proposal to add 2 years to the production period of the remaining F–22As and to procure the planes under a 3-year multiyear contract will cost about $1.7 billion more than called for to procure the last two annual lots as compared to the amount previously provided in the fiscal year 2006 budget. The primary reasons cited for this change to the program are industrial base health and the need to preserve the F–22A production line until production of the Joint Strike Fighter (JSF) begins. The Air Force has reported to Congress that the F–22A program meets the criteria set forth in section 2306b of title 10, U.S.C., for a multiyear contract. We have serious concerns regarding whether all of the criteria have been satisfied (i.e. substantial savings, sufficient funding, and stable quantities).

First, the timing of the proposal—near the end of the F–22A's acquisition—reduces the ability of the program to achieve substantial savings. Savings are currently estimated to be about $225 million or 2.7 percent of remaining procurement cost if 56 additional aircraft are purchased—a savings that, in terms of percentage of costs, is far below historic estimates of savings for other multiyear contracts. Second, the Air Force is proposing to buy 4 additional aircraft—60 in total—at an added cost of $674 million in order to save an additional $10 million under the multiyear contract; however, it has not funded the proposal. Finally, to satisfy other needs in DOD, F–22A quantities have been unstable over the last 2 years reducing quantities from 279 aircraft to 179 in the fiscal year 2006 budget and increasing quantities to 183 aircraft in the fiscal year 2007 budget. If quantities continue to fluctuate downward it could result in additional costs. For example, according to the Air Force, cancellation costs alone could be as much as $201 million—a sum currently unfunded in the multiyear proposal. This financial risk, when compared to

[1] GAO, Tactical Aircraft: DOD Should Present a New F–22A Business Case before Making Further Investments, GAO–06–455R (Washington, DC: June 20, 2006).

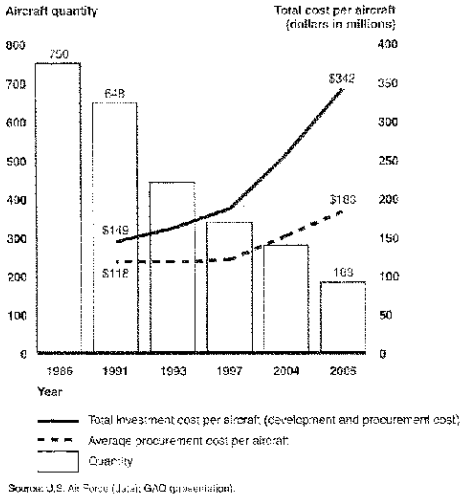
the savings projected from a multiyear contract, raises additional questions about the proposal and limits flexibility for future decisionmaking.

BACKGROUND

The F–22A program is illustrative of a number of systemic problems in DOD's acquisition system. First, the F–22A was approved in an environment with no clear agreement on enterprise-wide priorities and without due consideration of current and likely future threats and resource constraints. Second, the requirements and key program specifications were not fixed when the program began and have changed over its decades-long development. Third, key procurement decisions were made without adequate consideration of technology and other program risks, with costly consequences. Finally, in this program as in many others, DOD has paid out significant incentive and award fees to its contractors despite large cost overruns and schedule delays.

The program has been a case study in cost increases and schedule inefficiency in major weapon system acquisitions. We have issued numerous reports over the years on the problems and issues associated with the F–22A development program. Beginning in 1986 the program was expected to complete development in 9 years for an estimated cost of $12.6 billion. After taking 19 years to complete development in December 2005, development costs were reported at $26.3 billion—109 percent more than expected. The end result of these inefficiencies in the acquisition program has been a loss of buying power as the reduced quantity of aircraft will require a significantly higher unit cost than expected. Figure 1 shows the changes in procurement quantities over time and allocates both development and procurement costs to those changing procurement quantities to show the trend of average total acquisition unit costs and procurement unit costs.

Figure 1: Changes to Quantities and Costs of F-22As as Program Has Evolved



Source: U.S. Air Force (data); GAO (presentation).

While the F–22A program has completed development and testing of its initially planned air-to-air capability, the Air Force now sees a need to develop more robust air-to-ground attack and intelligence-gathering capabilities. Therefore, it has started a multibillion dollar development program for these additional capabilities. These capabilities were not previously considered a primary role for the F–22A as it was intended to be primarily an air-to-air fighter to replace the F–15. From the outset the F–22A was built to counter expected large numbers of new advanced Soviet fighter aircraft but this threat never materialized. The expanded air-to-ground attack capability is intended to allow the F–22A to engage a greater variety of ground targets, such as surface-to-air missile systems, that have posed a significant threat to U.S. aircraft in recent years.

DOD'S LATEST RESTRUCTURING IS MORE EXPENSIVE AND SLOWS F–22A DELIVERIES

Amidst changes to expand F–22A missions and roles, the procurement quantities and acquisition strategy have also been in flux in recent years. In December 2004, the Office of the Secretary of Defense (OSD) reduced planned quantities to a total of 179 F–22A aircraft. At the same time, it decided to terminate the procurement program at the end of 2008 in order to free up about $10 billion for other priorities. Then, the fiscal year 2007 budget extended the procurement program 2 years, to 2010. The department cited the health of the industrial base—the need for maintaining a fifth-generation fighter[2] production line—as its rationale for this added expense and delay. DOD also proposed buying 4 additional aircraft and using a 3-year multiyear contract to procure the remaining 60 F–22As to mitigate some of the costs of extending procurement for at least 2 years.

To identify savings that might reduce the cost impact of the restructured acquisition strategy, the Air Force is proposing a multiyear contract to buy the remaining F–22A aircraft. The Air Force formulated an estimate for three annual contracts to compare to a single multiyear contract to buy 56 aircraft. While this comparison can provide a basis for determining potential savings, the Air Force had not previously planned to buy the remaining aircraft over 3 years. Instead, the fiscal year 2006 President's budget included procurement costs to buy 56 F–22As in two annual lots—29 F–22As in 2007 and 27 F–22As in 2008. Therefore, even utilizing the multiyear contract authority, the restructuring will add $1.7 billion in cost to the procurement program and slow deliveries of the final aircraft when compared to the plan previously provided for in DOD's fiscal year 2006 budget. The final 60 aircraft will each cost 10 percent more on average (unit procurement costs increase from $166 million per aircraft to $183 million per aircraft) under the restructured plan, even taking into account expected savings from the multiyear procurement.

CONCERNS WHETHER DOD SATISFIES ALL MULTIYEAR PROCUREMENT CRITERIA

The Air Force submitted its justification to Congress on May 16, 2006, to buy the remaining 56 to 60 F–22A aircraft over a 3-year period with a multiyear contract. To enter into a multiyear contract for the F–22A, the Air Force must first obtain specific legislative authorization in both the annual DOD appropriations act and in an authorization act. If authorization is obtained from Congress, the Air Force must also meet the statutory criteria listed in 10 U.S.C. § 2306b(a) for entering into a multiyear contract. The justification package the Air Force submitted to Congress in support of its request for authority to enter into a multiyear contract for the F–22A concludes that the statutory criteria for multiyear procurement have been met and that such a multiyear contract would provide substantial cost savings or avoidance over three annual lot buys. In reviewing these criteria and the Air Force's position, we have serious concerns regarding whether all of the criteria have been satisfied (i.e. substantial savings, sufficient funding, and stable quantities). Table 1 lists the six criteria and our observations (we did not assess two of the criteria).

TABLE 1: OBSERVATIONS OF F–22A MULTIYEAR CONTRACT CRITERIA

Multiyear criteria	GAO observations
Contract will result in substantial savings.	Substantial savings are not defined in the statute, but the 2005 F–22A Independent Cost Estimate states that between 1982 and 1989 estimates for multiyear savings for proposed weapon systems averaged 13 percent. The Air Force justification package shows only 2.7 percent cost avoidance ($225 million) for 56 aircraft.
Reasonable expectation agency head will request funding at required level to avoid contract cancellation.	The Air Force has indicated that its multiyear budget is currently underfunded by $674 million and is seeking authorization to use incremental funding rather than fully funding each aircraft lot.

[2] F–22A and F–35 are considered fifth-generation fighter aircraft as compared to the F–15, F16, F/A–18, and F–117. The primary characteristics are Very Low Observable (VLO) stealth and information fusion capabilities that make fifth-generation aircraft more survivable and lethal.

TABLE 1: OBSERVATIONS OF F–22A MULTIYEAR CONTRACT CRITERIA—Continued

Multiyear criteria	GAO observations
Minimum need expected to remain substantially unchanged during contract period in terms of production rates and total quantities.	F–22A quantities have changed in the last 2 fiscal years to accommodate the need to fund other annual priorities. Given the potential for other priorities in the future—military presence overseas, global war on terrorism, and response to natural disasters—there is a risk that F–22A quantities would need to be adjusted again. Quantity reductions could result in cancellation costs of as much as $201 million, an amount that is currently unfunded.
There is stable design, and technical risks are not excessive.	The baseline F–22A aircraft design is stable (the proposed multiyear contract is for the baseline aircraft). While not the subject of the proposed multiyear contract because it is a separate effort, the design for adding new ground attack and ISR capabilities has not been demonstrated through development or operational testing and cannot be considered ''stable'' at this time.
Estimates of contract cost and cost avoidance are realistic.	Not assessed.
Use of the multiyear contract will promote national security of the United States.	Not assessed.

Source: GAO Analysis and 10 U.S.C. 2306b.

Substantial Savings Criterion

To identify potential savings, the Air Force formulated an estimate for three annual contracts to compare to a single multiyear contract with buys of 56 and 60 aircraft. Section 2306b of title 10 of the U.S. Code does not define what constitutes substantial savings, but the 2005 F–22A Independent Cost Estimate[3] indicates that from 1982 to 1989, DOD proposed at least 60 multiyear procurement programs for congressional approval, with estimated savings averaging 13 percent. The Air Force estimates F–22A multiyear procurement savings to be 2.7 percent if 56 aircraft are procured, approximately $225 million. The justification package also shows that an additional $10 million could be saved by buying 60 aircraft as stated in the fiscal year 2007 President's budget, but it would require an additional $674 million not included in the fiscal year 2007 future year defense plan.

Funds Have Not Been Budgeted

The proposed multiyear contract for 60 F–22As submitted with the fiscal year 2007 budget is underfunded by about $674 million—funds the Air Force believes it will need in fiscal years 2008 through 2010 to complete these buys. Additionally, the Air Force has proposed using incremental funding to pay for the multiyear contract. Instead of fully funding the buy for each fiscal year, this proposal plans four funding increments—economic order quantity, advanced buy, subsystem, and final assembly. Incremental funding for multiyear procurement is neither permitted by the annual DOD appropriations act[4] nor the multiyear authorizing statute, which requires that funds only be obligated under a multiyear contract "for procurement of a complete and usable end item."[5] The Air Force is seeking an exception to these requirements in its request to Congress for statutory authorization for the multiyear contract. The congressional defense committees are aware of the concerns with incremental funding, and those committees that have completed a defense bill have provided full funding for the initial year of the proposed multiyear contract. However, the congressional authorization and appropriations processes are ongoing.

Multiyear Contract Quantities Could Be Changed in the Future

OSD has restructured the F–22A acquisition program twice in the last 2 years in order to allocate funds to other priorities. In December 2004, OSD reduced the program from 279 to 179 F–22As to save $10.5 billion. Then in December 2005, OSD changed the F–22A program again, adding $1 billion to extend the production line for 2 years to ensure a fifth-generation fighter aircraft production line would remain in operation in case the JSF experiences delays or problems. So far we have not seen detailed rationale concerning the impact to the health of the industrial base. OSD also added 4 aircraft at this time for a total of 183 F–22As. We have also not

[3] F/A–22 Independent Cost Estimate, Institute for Defense Analyses, August 2005.

[4] Section 8008 of the fiscal years 2005 and 2006 Department of Defense Appropriations Acts (Public Laws 108–287 and 109–148, respectively) require full funding of units to be procured.

[5] 10 U.S.C. § 2306b(i)(4)(A). This restriction was added by section 820 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107–314).

seen the threat based justification for buying these additional aircraft at an estimated cost of $674 million. Given the potential for priorities to change again in the future to fund the military presence in Iraq and Afghanistan, fight terrorism around the globe, fund the response to natural disasters, or for other reasons, there is risk that F–22A quantities under the proposed multiyear contract would need to be adjusted again. According to the Air Force's multiyear proposal, if a reduction in quantity were to happen, it could result in cancellation costs of as much as $201 million in fiscal year 2007, the first year of the multiyear contract. The current Air Force acquisition strategy does not fund these potential cancellation costs. Therefore, the Air Force would have to find funds from other sources to pay these costs in the event quantities are reduced. This is therefore a risk that must be weighed in approving a multiyear contract for the F–22A, particularly at this late stage of its procurement program as it could limit the flexibility of decisionmakers in the future.

OTHER FACTORS INFLUENCE THE PRACTICALITY OF USING MULTIYEAR CONTRACTS AT THIS STAGE IN THE F22A PROGRAM

Other circumstances argue against using a multiyear contract. Multiyear contracts are typically used earlier in an acquisition program when greater efficiencies in buying materials and subsystems can be achieved and thereby provide more substantial savings at both the prime contractor and subcontractor levels. In the case of the F–22A, the multiyear proposal comes at the end of production. At the same time, the F–22A program plans to reduce the annual buying rate, providing less opportunity to incur savings. Previously, the Air Force had planned to purchase 29 and 27 aircraft in fiscal years 2007 and 2008, respectively. The multiyear plan calls for 20 aircraft a year in 2008, 2009, and 2010—7 to 9 aircraft fewer in each of the 2 years under the previous plan. Additionally, it appears the primary purpose for proposing a multiyear contract was to mitigate the additional cost of extending procurement for an additional 2 years; even with the proposed multiyear contract, procurement costs will be $1.7 billion higher than costs proposed under the previous program structure.

The length of the proposed multiyear contract and the lower quantity of aircraft planned for multiyear are concerns identified in the May 2006 Air Force business case analysis for F–22A multiyear procurement. For example, the business case analysis states that the average number of air vehicles procured under a multiyear contract was 308[6]—more than five times the number of aircraft the F–22A program is proposing to buy under its 3-year contract. The analysis also acknowledges that there is limited opportunity to obtain additional savings from the previously planned initiatives to improve the F–22A production efficiency as these savings were obtained earlier in the acquisition cycle.

In conclusion, the Air Force's decision to extend production for 2 years for industrial base purposes has increased the length and cost of the F–22A program. We are not sure what the Air Force's rationale was for extending production and how it specifically relates to maintaining the industrial base so as to warrant an increased cost of at least $1.7 billion. At the same time, our Nation's large and growing long-term fiscal imbalance requires the Federal Government—especially DOD—to begin making hard choices between its many wants and real needs. In this context, we continue to believe that Congress needs to reevaluate a range of existing Federal programs and policies, including the F–22A program, based on credible current and future threats, current and expected future national budget levels and priorities, and the warfighter's many true needs. As it stands, the restructured F–22A program's increased cost to complete the procurement program—$1.7 billion—will eventually serve to reduce the Department's options in fulfilling other important national security priorities. This at a time when the difference between DOD's program wants and its expected resource levels is growing.

Senator MCCAIN. Thank you.

Secretary Finley, welcome.

STATEMENT OF HON. JAMES I. FINLEY, DEPUTY UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND TECHNOLOGY

Mr. FINLEY. Thank you.

[6] The Institute for Defense Analysis analyzed the multiyear procurement programs for the F/18, C–17, C–130J/KC–130, and F–16. Institute for Defense Analysis, F–22A Multiyear Procurement Business Case Analysis (May 2006).

Good morning, Chairman McCain and members of the subcommittee. I am pleased to come before you today to talk about the multiyear procurement of the F–22 Raptor.

Copies of my written testimony have been provided. My opening oral statement will address some of the key points from that testimony.

I am pleased that Congress has raised the focus on acquisition excellence. I am fully committed to acquisition excellence and the restoration of the confidence in our leadership and our acquisition systems. I pledge to work with you and Congress as stewards of our taxpayer dollars to provide our warfighters the capability needed to perform their mission with a decisive advantage.

Multiyear procurement is an acquisition strategy that supports that goal. Multiyear procurement will allow the DOD to be better buyers and save taxpayer's money while providing the tools to protect our national security. Multiyear procurement has saved the taxpayer an estimated $5 billion over the past 7 years. The President's budget provided for this acquisition strategy for the F–22 aircraft.

Title 10 of the United States Code, section 2306(b), subparagraph (A) sets forth six criteria to be satisfied to authorize multiyear procurement. In my judgment, the multiyear procurement acquisition strategy for F–22 and its F–119 engine satisfies those criteria, summarized as follows: substantial savings, stable requirement, stable funding, stable design, realistic cost estimates, and national security.

I based my judgment that these six criteria are satisfied on the business case analysis conducted by IDA, as well as listening and learning about the various perspectives of the F–22 multiyear procurement during numerous meetings, including ones in Congress, OSD, and the Air Force.

The business case analysis by IDA provides for comparison of a multiyear procurement to a single-year procurement strategy of the F–22 for three production lots over a 3-year period. The business case analysis estimated savings of $225 million, approximately $3.7 million per aircraft, based on 60 aircraft. I consider these estimated savings of $225 million and $3.7 million per aircraft substantial. I believe there's opportunity for more savings. I view the estimate from the business case analysis as a starting point to further improve the benefits of the multiyear procurement for the F–22. I have initiated ideas and will press for additional savings in the F–22 multiyear procurement acquisition strategy.

The Secretary of the Air Force, the Honorable Michael Wynne, has made the commitment to request funding for the multiyear procurement at the level required to avoid contract cancellation. I support Secretary Wynne's commitment.

I think we all believe the F–22 is a superior aircraft that is needed for our national security. The F–22 is in full-rate production and is ready for combat. It is the world's only fifth-generation fighter, and provides a unique combination of warfighting capabilities that are critical to the United States.

In summary, multiyear procurement for F–22 is a good acquisition strategy to provide us the opportunity to save $225 million for the taxpayer. We will press for more savings. I believe we should

strive to save every penny possible, and multiyear procurement provides us that acquisition strategy for buying these F–22 aircraft.

I reinforce my pledge to work together with you, Mr. Chairman and Congress, in an open and transparent manner on multiyear procurement, as well as acquisition excellence.

Mr. Chairman, subcommittee members, thank you for the opportunity to come here today. I stand ready to answer your questions. May God continue to bless America.

[The prepared statement of Mr. Finley follows:]

PREPARED STATEMENT BY JAMES I. FINLEY

Chairman McCain, Senator Lieberman, and members of the subcommittee: I am pleased to come before you today to talk about multiyear procurement (MYP) of the F–22 Raptor.

MYP is a valuable acquisition strategy by which the Department of Defense (DOD) can buy weapon systems more efficiently and provide benefits to the taxpayer. MYP also enables broader planning and control for labor and the associated resource needs. MYP has been successfully utilized for a variety of weapon systems.

In my judgment the F–22 and its F119 engine MYP acquisition strategies meet each of the six statutory criteria established by 10 U.S.C. 2306b(a), which are summarized as follows:

Criterion 1: The first criterion is that the 3-year MYP will result in substantial savings when compared to three, single year procurements (SYP).

Response 1: The Institute for Defense Analyses (IDA) conducted a Business Case Analysis (BCA) of an MYP vs. SYP acquisition strategy. The basis for the BCA was the President's fiscal year 2007 budget (PB07). IDA utilized its integrated aircraft cost model that was used for the 2005 F–22 Independent Estimate for the F–22. The model was updated to reflect recent production cost, negotiated Forward Pricing Rate Agreement wage rates and inflation rates that correspond to the Bureau of Labor Statistics. Production rates of 20 aircraft per year were utilized in the model.

The savings of MYP vs. SYP is estimated to be $225 million ($3.7 million per aircraft). This is for both the air vehicle and F–119 engines. This savings is considered substantial in terms of absolute savings and therefore, criterion 1 is considered to be satisfied.

Criterion 2: The second criterion is that the minimum need is expected to remain substantially unchanged in terms of production rate, procurement rate, and total quantities, providing for stability of the requirement.

Response 2: The PB07 MYP provides for a production rate of 20 aircraft per year for 3 years. This reflects a steady production rate that will enable stable procurement planning for a total quantity buy of 60 aircraft. In addition, the MYP supports the Quadrennial Defense Review (QDR) and sets forth a balanced portfolio of tactical aircraft assets as described in the Joint Air Dominance (JAD) Study, performed to support the QDR.

One of the QDR recommendations was to support the tactical aircraft industrial base by stretching out F–22 production until we gain confidence in Joint Strike Fighter (JSF) production, in order to maintain an active production capacity and sustain aircraft vendors and suppliers until we ramp up JSF production. The MYP strategy achieves that recommendation. The JAD Study showed that a balanced force structure mix of fifth-generation fighters, with legacy F/A18–E/Fs, F–15Es, and conventionally armed bombers, best met our requirements. Buying fifth-generation tactical aircraft assets (F–22 and JSF), for both the Air Force and the Navy, optimized capability, affordability, and mitigated risk better than other options. Therefore, criterion 2 is considered to be satisfied.

Criterion 3: The third criterion is that there is a reasonable expectation that, throughout the contemplated contract period, the head of the agency will request funding for the contract at the level required to avoid contract cancellation.

Response 3: The Secretary of the Air Force, the Honorable Michael Wynne, in his May 16, 2006, letter addressed to the chairman of the Senate Armed Services Committee, said that the Air Force intends to fund and procure 60 aircraft to the level to avoid contract cancellation costs. I support Secretary Wynne's commitment. If an MYP of the F–22 is approved by Congress, the Department expects that sufficient funding will be requested to avoid contract cancellation, and therefore criterion 3 is considered to be satisfied.

Criterion 4: The fourth criterion requires a stable design for the F–22 and that the technical risks associated with such property are not excessive.

Response 4: The F–22 has significant production maturity, consisting of two preproduction and six production lots prior to the first MYP. The aircraft design and manufacturing processes have been proven and are considered stable. The F–22 successfully completed initial operational test and evaluation (IOT&E), which was focused on the air superiority mission. The first phase of follow-on operational test and evaluation, which was focused on air-to-ground mission testing using the Joint Direct Attack Munition (JDAM) has also been completed. The Department is working on modernization improvements to the F–22. Examples of modernization changes are software, electronics, processors, and subsystem components to address parts obsolescence. Such changes are not unusual during multiyear procurements. Therefore, criterion 4 is considered satisfied.

Criterion 5: The fifth criterion for MYP require that the estimates of both the cost of the contract and the anticipated cost avoidance through the use of a multiyear contract are realistic.

Response 5: The BCA from IDA provided an independent analysis of the F–22 MYP. The basis of the BCA was derived from an extensive independent estimate of F–22 acquisition costs for Congress in August 2005. Both the BCA and independent estimate are considered realistic, and therefore criterion 5 is considered satisfied.

Criterion 6: The sixth criterion for MYP is that the use of such a contract will promote the national security of the United States.

Response 6: The F–22 is in full rate production, flying today, and is ready for combat. It is the world's first fifth-generation fighter—an aircraft with superior survivability, lethality, and maintainability. It provides a unique combination of warfighting capabilities that are critical to ensure United States air dominance and promote the national security of the United States. Therefore, criterion 6 is considered satisfied.

In closing, Mr. Chairman, thank you for the opportunity to provide my views concerning the F–22 MYP. I am fully committed to working together with you and Congress to address the F–22 MYP and provide responsible stewardship of taxpayer resources. I am ready to answer any questions you and the members of the subcommittee may have.

Senator MCCAIN. Thank you very much, sir.

Secretary Wynne, yesterday you submitted to the SASC a reprogramming request seeking to buy a 23rd F–22 Raptor. Is that correct?

Secretary WYNNE. Yes, we did, Senator.

[The information referred to follows:]

Unclassified **REPROGRAMMING ACTION – PRIOR APPROVAL** Page 1 of 2

Subject: F-22A and NATO AWACS LAIRCM

Appropriation Title: Aircraft Procurement, Air Force, 06/08

DoD Serial Number: FY 06-19-R PA

Includes Transfer? No

Component Serial Number: FY 06-17 PA

(Amounts in Thousands of Dollars)

Line Item	Program Base Reflecting Congressional Action		Program Previously Approved by Sec Def		Reprogramming Action		Revised Program	
	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
a	b	c	d	e	f	g	h	i

This reprogramming action is submitted for prior approval because it exceeds thresholds. This action realigns $120.0 million within the Aircraft Procurement, Air Force, 06/08, appropriation to fund an additional F-22A in the Lot 6 aircraft buy; and realigns an additional $15.0 million within the Aircraft Procurement, Air Force, 06/08, appropriation to fund the Large Aircraft Infrared Countermeasures (LAIRCM) modifications to NATO NE-3A aircraft. **This action replaces reprogramming FY 06-19 PA, dated June 9, 2006.** This action reprograms funding in support of higher priority items, based on unforeseen military requirements, than those for which originally appropriated; and is determined to be necessary in the national interest. It meets all administrative and legal requirements and none of the items have previously been denied by the Congress.

Aircraft Procurement, Air Force, 06/08

Budget Activity 1: Combat Aircraft

F-22A	22	3,649,146	22	3,649,146	+1	**+120,000**	23	3,769,146

Explanation: Due to multiple changes in the F-22 production program after the FY 2006 President's Budget submission to Congress, the Air Force funding could support the procurement of only 22 aircraft. This reprogramming action enables the purchase of the 23rd aircraft in the Lot 6 aircraft buy and related F-22 production costs (i.e., fleet modification program and structural retrofit).

Budget Activity 7: Aircraft Support Equipment and Facilities

Other Production Charges	650,012	650,012	**+15,000**	665,012

Explanation: The funds will enable the NATO E-3A (NE-3A) fleet to install Large Aircraft Infrared Countermeasures (LAIRCM) to meet an Urgent Operational Requirement approved by the NATO Military Committee. This will allow the NE-3A aircraft to participate in the NATO Response Force. The U.S. provides 39.7 percent of the total cost to modernize the aircraft with the remainder of the cost provided by the other 13 participating nations. Follow-on funding is programmed as part of the FY 2007 President's Budget request.

Approved (Signature and Date) (Acting) JUL 24 2006

DD 1415-1 *UNCLASSIFIED*

Unclassified REPROGRAMMING ACTION – PRIOR APPROVAL Page 2 of 2

Subject: F-22A and NATO AWACS LAIRCM

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	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
a	b	c	d	e	f	g	h	i
Budget Activity 1: Combat Aircraft								
F-22A Advance Procurement (CY)		571,128		571,128		**-120,000**		451,128

Explanation: The FY 2007 President's Budget request restructures the remaining production lots to a 3-year multiyear procurement of 60 aircraft. Specifically, it reduces the Lot 7 procurement quantity from 29 to 20 aircraft, as supported in the FY 2006 President's Budget. The reduced Lot 7 quantity results in the Lot 7 Advance Procurement requirement to decrease accordingly.

Budget Activity 6: Aircraft Spares and Repair Parts				
Initial Spares/Repair Parts	203,038	203,038	**-15,000**	188,038

Explanation: Based upon review of FY 2006 initial spares requirements, deliveries for KC-135 stabilizer and brakes spares ($12.0 million) and other smaller spares deliveries across multiple programs ($3.0 million) will not occur until FY 2007. As a result, funds are available to support higher priority items without adverse program impacts.

DD 1415-1 *UNCLASSIFIED*

Senator McCAIN. That brings the total for Lot 6 from 22 to 23 for fiscal year 2006, is that correct?

Secretary WYNNE. That is correct.

Senator McCAIN. Congress originally fully funded 24 in the National Defense Authorization and Appropriations Acts for Fiscal Year 2006. What's wrong with the math there, Secretary Wynne?

Secretary WYNNE. The quantity of aircraft and the funding did not match up to the PBD–753 impact, sir, which reduced dramatically the quantity of units that I was able to buy, and caused all of my suppliers to, in fact, reprice some of their costs. So, we did,

in fact, accurately predict to the Senate and to the House that we thought that the resulting funding would only get 22 aircraft. In fact, we were correct.

The 23rd aircraft, we find, as a result of the next change, which was out of advanced procurement that has now been reduced from 29 airplanes to 20, in fact, left over enough funds that we felt like those funds could better be applied to buying additional aircraft capability for our warfighter.

Senator MCCAIN. Let me get this straight. The defense appropriations and authorization committees plucked a number out of the air and said that this is enough for 24 aircraft, and, indeed, it was only enough for 22. Is that correct?

Secretary WYNNE. Sir, when the program decisions were made, it did not go back and adjust the figures that the President's budget submitted to you. But we did try to advise that this would only buy 22 aircraft instead of the 24 that were stipulated in the budget. That advice was essentially not taken into account.

Senator MCCAIN. The President's budget was 24, Secretary Wynne.

Secretary WYNNE. Yes sir, it was.

Senator MCCAIN. So what happened? The President's budget called for 24. We were operating under the assumption that that would fund 24 aircraft. In fact, we only funded 22.

Secretary WYNNE. What happened was PBD–753 truncated the program, as Mr. Walker said. I think this program has been faced, since its inception, fiscal realities that have stretched it out, that have caused cost increases, dominantly as a result of other priorities coming in and encroaching upon it. It has, in fact, I think, done a superior job of completing the initial operational test and evaluation (IOT&E) and now entering production, and actually proving itself to be worth all of the concerns and the commitments that have been made across the board to get this ready for our warfighters.

Senator MCCAIN. After 19 years, the quantities have gone from 750 to 648 to 442 to 440 to 342 to 341 to 278 to 181 to 183. So you wonder why there's some skepticism at least on the part of some of us on this committee, Mr. Secretary?

Secretary WYNNE. No, sir, I have no doubt that this is a source of skepticism. In fact, as Mr. Walker pointed out, this is not a very good way to enter into an acquisition program from its inception in 1991, to promise, if you will, a little bit more, in fact, a lot more than you ever intend to buy. I do think that there was a substantive look at what capabilities were forecast, and maybe some discounting going on. Now that the warfighter realizes what capabilities this aircraft brings, not only do they want a little bit more, pushing against the secretariat, but I think they may have stabilized the program at a different number.

Senator MCCAIN. Was the request for multiyear procurement of the F–22 in the Future Years Defense Program (FYDP)?

Secretary WYNNE. The request came about in the QDR.

Senator MCCAIN. Yes. My question was, was it in the FYDP?

Secretary WYNNE. I don't believe it was fully accounted for in the out-year program of the FYDP.

Senator MCCAIN. Was it accounted for at all?

Secretary WYNNE. There were, I believe, 20, 20, and 16 that were in the FYDP.

Senator MCCAIN. Was the multiyear procurement in the FYDP?

Secretary WYNNE. It was recommended in the QDR, sir.

Senator MCCAIN. I, again, asked you whether it was in the FYDP. I understand that it was in the QDR.

Secretary WYNNE. Then, sir, you also know that it was not in the FYDP.

Senator MCCAIN. Have you ever heard, in all your involvement, of a request of this nature for a multiyear defense procurement that was not in the FYDP?

Secretary WYNNE. I have not heard of one that wasn't in the President's budget, and this one was in the President's budget. The FYDP——

Senator MCCAIN. Again, I really would like an answer to the question. My question was, have you ever heard of a request for a multiyear procurement that was not in the FYDP? Now, I mean, that's a pretty straightforward question, Mr. Secretary. I don't mean to be combative here, but I think I deserve a straightforward answer.

Secretary WYNNE. Sir, you do. I do not know, in my history, of one that was. This is out-of-cycle, definitely.

Senator MCCAIN. Thank you very much.

Let's talk about this $1.7 billion additional cost here. Mr. Walker, explain that a bit more, would you, please? Because we are touting $225 million savings, and yet there appears to be an addition of $1.7 billion here.

Mr. WALKER. Mr. Chairman, it depends upon what you use as the baseline. You can make numbers do a lot of different things, depending upon what the baseline is. The baseline for the $1.7 billion is, if you look at the 2006 budget with regard to the quantities that the DOD had proposed to buy—namely, 56—and the period of time that they proposed to buy it over, then when you compare that to what they're proposing to buy now, which is 4 more, over 2-plus years additional time, then, when you look at total cost, this is $1.7 billion more than they expected. Of that $1.7 billion, about $0.7 billion is for the four additional aircraft, and about $1 billion is because we're stretching this out. This program, depending upon how you want to calculate it, is anywhere from 2 to 15 years late, and now we're making it later.

Senator MCCAIN. Mr. Secretary, do you want to respond to that?

Secretary WYNNE. Yes, sir, very easily. The first thing you have to decide is whether you want a fifth-generation fighter to span and be available to you and to the President of the United States in case of a contingency. Once you determine that that is, in fact, something that you do want to do, then you have to determine how to best do it. The Department figured the best way to do it was, in fact, not to change the total quantity and cap the program at 183, but to satisfy the Air Force's desire to make sure that the President had available to him a fifth-generation fighter line. They agreed to stretch the program out—20, 20, and 20. I would say to you, sir, that David is right, in the sense that this program has not been treated well, due to Government decisions, and many of the

cost increases that you have talked about were, in fact, due to Government decisions, although the contractor has had a share.

Senator MCCAIN. Mr. Secretary, before you can procure an aircraft under a multiyear contract, you must make various showings under the Federal procurement statutes, and, particularly, you must make six showings under various provisions of the law. Can you state that all of those requirements have been met?

Secretary WYNNE. Sir, the one I lack, really, is the authorization from Congress, because the fact is that all the rest have to be satisfied prior to entry into a multiyear, and we intend to satisfy every one of those statutory restrictions prior to entry into a multiyear.

Senator MCCAIN. Have they been satisfied yet?

Secretary WYNNE. They are underway of being satisfied, but, sir, as you point out, until I essentially submit the President's budget in fiscal year 2008, I don't meet one of them, which is the full funding criterion, but I do intend to meet that prior to entry into the multiyear contract.

Senator MCCAIN. I understand there were six criteria. How many of them have you met, and how many haven't you met?

Secretary WYNNE. From what I can gather, there's a national security requirement. We have met that. There is that you're going to intend to buy the quantity. I have met that. The stability of design, we believe we have come to a configuration that we can contract for. I have met that. The substantial savings rests on the models that IDA has provided, and we believe those savings are, in fact, in the area of other multiyears, so I believe we have met that. So, sir, I believe we have met five out of the six, the sixth being the funding stability—funding, which I intend to meet in the fiscal year 2008 POM.

Senator MCCAIN. Mr. Walker, do you believe that they've met the stable-design requirement?

Mr. WALKER. Just the design requirement? Is that what you're saying, Mr. Chairman?

Senator MCCAIN. The overall standard.

Mr. WALKER. Oh, the overall standard.

Senator MCCAIN. Yes.

Mr. WALKER. The overall standards. We have concerns about three.

Number one, substantial savings. Unfortunately, Mr. Chairman and the other members, that's not clearly defined. What is "substantial"? Obviously $225 million is a lot of money, to us, as individuals. In the scheme of things, it's 2.7 percent of the projected procurement cost involved here, which is much, much less than historically has been the case. Historically, when you do multiyear contracts, it's typically at least 10-percent-plus savings, as compared to single-year contracts.

Number two, when you look at the risk associated with entering into a multiyear contract, that has to be adequately considered, because, as you properly pointed out, this is binding the Government to be able to purchase a larger quantity, and there are termination costs as well as cancellation fees that are associated if we don't go through.

With regard to whether it's adequately funded, that's already been addressed by the Secretary. He intends to request funding, but a request doesn't mean that you'll get the funding.

Number three, the other concern that we have here is, as you properly pointed out, the Air Force is one Service. This is one platform within one Service. The Air Force has challenges with regard to JSF and other platforms. Furthermore, the DOD has huge challenges with regard to FCS and many other platforms; and so, even if the Air Force ends up requesting, it's unclear as to whether or not, in the aggregate, it'll be available.

Then, last, with regard to the need remaining the same and the quantities remaining the same, I mean, the real question is, why do we need four more? What is the comprehensive threat and risk that causes the need for four more? Even if you want to go with a multiyear procurement, that's about $700 million just by itself.

Second, given the budget pressures and the ripple effect, are we certain that we're going to be able to come up with the money to fund all of these? History has not had a very positive track record in that regard.

Senator MCCAIN. Secretary Finley, as a DOD directive said, the acquisition and procurement of DOD weapons and weapons systems should be consistent with all applicable domestic laws, and, further, "an attorney authorized to conduct such legal reviews in the Department shall conduct a legal review of the intended acquisition of weapons and weapons systems." When you signed the July 13 letter, did you follow DOD's own directive?

Mr. FINLEY. Yes, sir.

Senator MCCAIN. You did get legal review?

Mr. FINLEY. I did have legal review of my reply to you, sir, yes.

Senator MCCAIN. From who?

Mr. FINLEY. From Doug Larsen and the legal staff there in Acquisition, Technology, and Logistics (AT&L).

Senator MCCAIN. Mr. Secretary, on the stable funding issue, again, what is your response to Mr. Walker's statement?

Secretary WYNNE. Sir, I have already committed, and intend to follow through on submitting enough money to avoid a cancellation ceiling over the course of this contract. I believe that is the requirement. I will, at the end, prior to the multiyear, offer that as part of the fiscal year 2008 POM.

Senator MCCAIN. We continue to tout the $225 million savings, but isn't it true that cancellation liability for this program is $201 million for the first year?

Secretary WYNNE. Only for the first year, sir. We have already committed to buy, fully, 56. Mr. Walker has brought up the other four, which were necessary to fill out seven squadrons, which gave us the total military utility and the right command structure to really integrate this into the warfight around the world. I think it was a necessary add. I would subscribe that there was a military need for it.

Senator MCCAIN. So, you obtained a waiver that allows you not to fund the cancellation liability.

Secretary WYNNE. We have, in fact, as many programs do, obtained a waiver for that cancellation, which is, if there is not a military need for the weapons system, it would be questionable and

risky, but, since there is, and it's proven, and it's a proven commodity that will add to our system, because it's a bridge over to the JSF and it's clear that we do not want to leave America without a fifth-generation fighter line, I believe, sir, that that risk is minimal.

Senator MCCAIN. What do you do in order to get a waiver? What's the process?

Secretary WYNNE. You request, of the AT&L, and AT&L advises the Office of Management and Budget (OMB). OMB assesses the risk based on the inputs from the military departments, as well as from the AT&L folks, and makes the determination.

Senator MCCAIN. Are you confident there will be no additional cost overruns associated with this system?

Secretary WYNNE. What I am confident of, sir, is that we are entering into a firm fixed-price contract for this multiyear, and, under the terms of a firm fixed-price contract, all cost growth is associated with the contractor. I am very confident, because we've reduced the cost of the F–22 by 35 percent from Lot 1 to Lot 5. We see that we continue to have good progress on the total cost recognized by the contractor and the Government on Lot 6. We believe we have a very firm handle on what savings we can get out of Lots 7, 8, and 9, and the contractor agrees.

Senator MCCAIN. So, you're answer is you are confident there will be no additional cost overruns.

Secretary WYNNE. I am, to date, sir.

Senator MCCAIN. That's not a very comforting answer, to be confident "to date."

Mr. Walker, it's my understanding the Air Force has provided Lockheed Martin with 89.5 percent of the award fee for the F–22 engineering, manufacturing, development phase, or about $838 million. What's your reaction to that, Mr. Walker?

Mr. WALKER. Mr. Chairman, one of the problems that exists with regard to the acquisition system in the DOD is that we are paying billions of dollars in incentive and award fees in circumstances where there are significant cost overruns and significant schedule delays. This is just one example of a systemic problem.

Evidently, we have a difficult time in government defining performance. It means positive outcomes. Effort is important, attitude is important, but outcome is what it's all about.

Senator MCCAIN. Senator Nelson?

Secretary WYNNE. Sir, if I could break in and correct the record, it's the OSD Comptroller that actually approves the—in consultation with OMB and the rest of the secretariat. I apologize for missing that.

Senator MCCAIN. Thank you, Mr. Secretary.

Senator Nelson.

Senator BILL NELSON. Thank you, Mr. Chairman.

Mr. Chairman, I know both of these men personally. They are good men. I've known their families, and they are good families. We have two diametrically opposed positions here that we need to sort out.

Now, it seems to me that the essential question is that if this outside committee came up with the idea that you can save something like $225 million over this multiyear contract, how can they

determine, and how can you, Mr. Secretary, determine that if you don't have a price that you've already determined for the airplane in this 2006 contract for the F–22 procurement?

Secretary WYNNE. The way you do that, Senator, is that you actually construct two budgets, and you almost have two negotiations with the contractor. The contractor does not know which you're going to enter into until the multiyear savings are, in fact, achievable, based on predictions and projections.

You are right about one thing, it is all an estimate. Even the models, as validated by some really smart people, are all estimates. Because the proof of the pudding is in, actually, the settlement of the negotiations. So, the way you do this is you actually construct two proposals and you suggest two outcomes, and you must then compare those two outcomes prior to entry into a multiyear. That's the way you secure yourself, if you will, in some reasonable expectation of achieving your goal.

Senator BILL NELSON. Mr. Walker?

Mr. WALKER. It is based on an estimate. As I said before, the primary support for entering into a multiyear contract, as it relates to substantial savings, was this IDA study and, if the assertions are true in the article this morning, that study cannot be viewed as independent and should not be relied upon.

Candidly, I have tremendous respect for Secretary Wynne, tremendous respect for all my colleagues here on the panel. But there are a couple of very fundamental differences. Number one, I'm independent of the Air Force and the DOD. Number two, I'm looking at a broader perspective of DOD overall and the United States budget overall. Those are two fundamental differences. Reasonable people can, and will, differ.

I think part of the problem here is, there's a difference between what people want and what we need and what we can afford and what we can sustain. As the chairman said before, we only have so much money. The question is, what are we going to spend it on? Is it going to be true needs, or is it going to be wants?

Senator BILL NELSON. Mr. Secretary, we would not have to do as much estimating if we knew about the 2006 aircraft cost. In most programs the contract would have been signed sometime during the middle of the fiscal year, not during the last quarter of the fiscal year. Isn't that the case?

[The information referred to follows:]

Most contracts are awarded during the first and second quarters of a new fiscal year. The fact that Lot 6 is scheduled to award in September 2006, however, is unavoidable. Due to unique circumstances during the previous Lot 5 negotiations, the Air Force awarded the contract several months late, on November 1, 2005. This delayed the start of Lot 6 negotiations. Both the contractor and the Air Force made changes to the process to accelerate Lot 6 negotiations. As such, Lot 6 negotiations are currently on schedule and are expected to conclude by September 30, 2006.

Secretary WYNNE. Sir, I'd like to start this process by defending a really fine American, a former admiral, Dennis Blair.

Senator BILL NELSON. Okay, and let's get to that in a minute.

Secretary WYNNE. I'd like to make sure, sir, that we all know that I googled up, this morning, all of the relevant facts in the article that Mr. Walker is referring to.

Senator BILL NELSON. I didn't ask you that question.

Secretary WYNNE. Sir, I believe that all of it is a part of the public record, with the exception of those that have been talked to by Senator Inhofe, which were, in fact, false. The Air Force did not rely on the IDA report to make a commitment to enter this multiyear. The Air Force does rely on the intelligence of the people within IDA to do it. EDO is a fine supplier to every military service—Air Force, Navy, Marines, and Army—as well as international. They are about $655 million worth of sales.

I would agree with Mr. Walker on one point, and that is that the absence of a conflict-of-interest rule is interesting, and maybe there should be some generic thing. But I would say that to impugn the study and to impugn this great American is wrong. To say that we can't rely on it means that we are fearful of the outcome of the analysis.

Now to your question——

Senator BILL NELSON. No, now let me just stop you. Obviously, you feel very strongly about that. I want to get into that, and I did not stop you, but that wasn't my question. My question had nothing to do with this IDA study. My question is, isn't it normal that you go about, in a contract, in most programs, that would have been signed sometime during the middle of the fiscal year, not until the end of the fiscal year?

Secretary WYNNE. Actually, we're very proud of them. I think they will, in fact, finish by the end of this fiscal year, and there is no rush by a Government agent who thinks that he is not getting the best deal for the Government. We try very hard not to put any pressure on the contract's representative. However, I can tell you, the current status is they are less than 1 percent apart in their offers and counteroffers. They feel like they will drive a settlement within 30 days, and it will, in fact, be closed up before the end of the fiscal year—something that didn't happen, by the way, early on.

I would say that, to your point about: Would you like more facts? Yes, sir, I would like more facts. In fact, I will have those facts available to me when I negotiate finally, the multiyear contract. That's the real nut—having those facts available to you as you enter that negotiation.

Senator BILL NELSON. Mr. Secretary, you're my friend. That's not the question I asked you. I asked you——

Senator MCCAIN. Mr. Secretary, could I caution you that we're having difficulty getting direct answers from you, sir, and the time of all the members is valuable, as is yours. So, I would caution you again to try to give a direct answer to the questions posed by the members. It would be very helpful to us.

Secretary WYNNE. Thank you, sir.

Senator MCCAIN. Thank you.

Senator BILL NELSON. Mr. Secretary, I asked you a very direct, simple question that doesn't have anything to do on your two lengthy previous answers. The question is, in most of the programs, the contract would have been signed sometime during the middle of the fiscal year, not toward the end of the fiscal year, is that correct?

Secretary WYNNE. Sir, I cannot certify to that. I don't know.

Senator BILL NELSON. You see, we are in the situation of trying to judge between two good men with diametrically opposed positions. We are trying to judge on what is the right, accurate figure and how can you determine the cost for a multiyear procurement if you don't know what the cost is in the existing current year? Can you help us?

Secretary WYNNE. The estimates actually—and the schedule adherence that Lockheed Martin has done through Lots 1 through 5, in fact, closing in on Lot 5, gives me pretty good confidence that I could probably predict the cost of Lot 6. So, sir, could your staff, who are analysts, and I think they could, in fact, offer some appreciation for what the costs are going to be.

Of course, the difficulty is really what is the cost of a multiyear, relative to the cost of an annual buy and where do you achieve that? That's where I would say most of the larger cost savings that are attributed to multiyear buys are for 4 or 5 years, and most of the savings are, in fact, achieved in the 4th or 5th year. Having only 3 years to do a multiyear is, in fact, somewhat constraining, because you just can't introduce the manufacturing and get the quantity buy that you could buy otherwise.

So, I agree with your point that it is a very difficult thing working from estimates, but that's, many times, the way it works.

Senator BILL NELSON. I just come to the table asking the common sense country-boy question, how does this outside group estimate savings if we don't know what the price is, because there hasn't been an agreement on price in this particular year?

Let me ask you, Secretary Finley, I understand that the contractor was able to achieve—oh, you've already asked that, Mr. Chairman, about the incentive fee.

Secretary Wynne, during operational testing, the testing community identified a number of deficiencies in operational suitability. I note, in your prepared statement, that the F–22 was able to achieve a departure reliability, during a recent exercise, of 97 percent—in other words, flying 102 of 105 sorties. Is that a good measure of how hard the ground crews had to work to keep the aircraft flying this high-intensity operating period?

Secretary WYNNE. Sir, I have the greatest respect for the Air Force maintainers who are working on this and all of our other fighter aircraft. I would tell you that I asked, in IOT&E, that they treat the maintainers as customers, and that they write up every deficiency as a maintenance corrective action. In fact, I think we have benefited from the maintainers feeling like customers. In fact, even today I read in the Air Force Times some letters from some maintainers who were appreciative of the ease of maintenance on the F–22. I don't think we've achieved what we can achieve on that program yet and I know that we have worked very hard to make sure that the suitability rating that we get is on a constantly improving rate.

Senator BILL NELSON. What effect do you think entering in a multiyear contract for the remaining F–22 aircraft is going to have on your ability to correct these operational suitability deficiencies?

Secretary WYNNE. Many of the changes that we've put in are, in fact, to redo the technical manuals, redo the support equipment, and make sure the diagnostic test equipment is okay. I would say

stabilizing the design, which is one of the requirements of a multiyear, really will assist my maintenance people in coming to closure with what they can do on that airplane.

Senator BILL NELSON. Mr. Secretary, Congress has used incremental funding in certain cases to buy large capital ships. I don't think we've used this approach to buy aircraft. All four of the congressional defense committees have spoken on this matter, and they've rejected this incremental funding, even though, when it went, as I said earlier, before the full Senate, the Senate adopted Senator Chambliss's amendment. Does having full funding for the F–22 in fiscal year 2007 change anything about the way in which you would propose to structure a multiyear contract for the F–22?

Secretary WYNNE. No, sir, it actually would not. The second buy was as if you were doing a piece-part buy. I think it would make it more complex for the contracting officer as time went on, to schedule these two advance procurements that would result from split funding. I would tell you that entering into a multiyear on a preferred basis that has been restored by both the Senate and the House is a much more worthwhile enterprise. The complexity of the contract would be the issue.

Senator MCCAIN. Senator Nelson, thank you.

I note the presence of the distinguished chairman of the full committee. I wonder if he has any comments or questions he would like to make at this time.

Senator WARNER. I intend to join you. First, I commend you, Senator McCain. You have my full support in conducting this hearing. It's an important one—important from a number of standpoints. I've been on this committee 28 years, and I cannot recall when a decision of this import was carefully reviewed by a subcommittee and then endorsed by the full committee, and then to encounter, on the floor consideration of the bill, a reversal as a consequence of an extraordinary lobby campaign, which, frankly, I was just unaware of. That's history.

But we're also faced with an ever-changing world and an ever-changing set of parameters by which each year we try and make determinations in regard to priorities within our budget, and the effect of this measure now, we'd just put a lockdown for a number of years on the Department of the Air Force in a certain category of its spending; thereby, perhaps, precluding some options to solve serious problems in other platforms, such as your tankers, your 130s. I just think it's not going to work in the best interest of the Department.

Further, this committee and this country is solidly behind the JSF and somehow I feel that the impact of this decision could, in some ways, affect that very valuable program.

I suppose the Air Force —as a participant in JSF, still represents its support, but there are certain signs that cause me an uneasiness. We have to go ahead with that program, subject to technical solutions that have to be achieved. We've made a bold decision to keep the two engines, which I think was a correct one. Certainly since the time that two-engine decision was made here in the committee room, certain tests and evaluation of both models have indicated there's considerable uncertainty in those two engines.

I just mention that because this question cannot be looked in isolation from other factors, such as the other programs of the Air Force and its planes, JSF, and other considerations.

So, Mr. Chairman, I hope we gain a perspective from this hearing that we can take to Congress.

Senator MCCAIN. Thank you very much.

Senator Inhofe.

Senator INHOFE. Okay, Mr. Chairman, thank you very much.

Mr. Chairman, on the floor at this moment we have Jerome Holmes, who's the President's nominee for the Tenth Circuit. He was my recommendation to the President, and so I have to get any shot I have done right here. I won't be around for another round of questions. By the way, it's going to be one of the better nominees that we've had a chance to consider.

I think we're veering away from the question—the questions that really need to be answered. There were six criteria, initially. I studied those six criteria, and I commend you, Mr. Walker, it's my understanding that we're down now to the three that would be—and correct me if I'm wrong—substantial savings, stability of funding, and stability of requirement. First of all, on the substantial savings, some time ago, they said, "If you go to multiyear, it should be something in the neighborhood of 10 percent." However, I applaud the witnesses, and also those of us at the table, for not bringing that up now, because that was only 1 year, some 15 years ago. But then the press, and the very irresponsible press, like the Washington Post this morning, I'm sure will bring that up in the future.

So, we have the substantial savings, in terms of definition. What is it, in our minds, that we consider to be substantial? I really believe that there are two of the six criteria that should not be up to either an outside panel or even the Secretaries, because that's what we are elected to do. Those two criteria are national security, which is not on the table now, so we won't talk about that. In my opening statement, I already talked about the pride I had in General Jumper in bringing up the fact that we had this great need in our strike fighting arsenal. The other one is substantial savings, because we're the ones who are answerable to the taxpayers. I've looked at this and I believe that this is something that is substantial, and I feel strongly about it.

But I'd only ask you, Secretary Finley, do you think the estimated IDA cost savings are realistic? Do you think there's ability to save even more than the $225 million? Now, I've heard $225 million, then $230, $250, and up to $325 million. I have a great respect for your background, Secretary Finley, and would like to have your comments as to how optimistic you feel about these savings, and anything upward from this.

Mr. FINLEY. Thank you, Senator Inhofe.

I believe the numbers are achievable. I believe the numbers are estimates. I believe we have a starting point from which to only improve. I've discussed with the Air Force to use the $225 million as a starting point. One, let's be sure we have a $225 million that is achievable, and we'd build from that. As we have discussed here this morning, the $225 million is an estimate. We do not have de-

finitized contracts, so you do not have a basis from which to start. But, as an estimate, I believe the numbers are realistic.

Senator INHOFE. Maybe conservative?

Mr. FINLEY. Conservative, I have read the IDA report. I have found areas in the IDA report where I feel there are opportunities for improvement. I believe the decision to use IDA on this report goes back to the congressional direction to use the Federally Funded Research and Development Center (FFRDC) IDA as the independent cost analyst on the F–22, back in 2005. I believe the use of IDA at this stage was also very instrumental on the basis of their performance in the independent cost estimate on the F–22 back in 2005.

In previous discussions on the Hill in preparing for this hearing, it was requested of me to talk to the Cost Analysis Improvement Group (CAIG) at DOD. I did that. I talked to them directly as to where was the CAIG on this process of doing an independent cost estimate. The answer to that was that typically the CAIG does not do cost reviews beyond milestone C. They are focused and they have their plate full of issues and areas to investigate that are pre-milestone C, if not milestone C.

But they related to me their utmost confidence that IDA was, in fact, the right FFRDC to go use. They had the right people, with the modeling that was used for the previous independent cost estimate. They updated that cost estimate for this particular round in the business case analysis, based on the actuals, based on the inputs from the contractor, to reflect pricing.

Senator INHOFE. Yes, Secretary Finley, and I appreciate that very much. There's one other thing. You've made a statement to get the exact wording in your written statement. Apparently it wasn't there. When you said, "We've saved $5 billion over the last 7 years by using multiyear contracts," is that what you said?

Mr. FINLEY. Yes, sir.

Senator INHOFE. Would you like to elaborate on that at all?

Mr. FINLEY. I think there have been numbers of programs that have used multiyear procurement, going back to the F–16, going back to the F–15. I might be wrong on the F–15. I apologize for that. But I do believe the F–16 had multiyear procurement on it. So, my staff organized for me the number on that and the details on that. I can certainly take the question for the record, and I can get back to you.

[The information referred to follows:]

Over the last 7 years, the Department of Defense has saved approximately $7 billion. The multiyear procurement programs which resulted in $7 billion savings are shown in the table below:

Multiyear Contract Programs

Apache Airframe MYP I & II
Apache Aircraft Block II
Black Hawk/Sea Hawk—Airframe MYP I & II
Javelin
Longbow Hellfire
LW 155 Howitzer
Family of Medium Tactical Vehicles (FMTV)
A1 MYP I& II
M1 Tank MYP I & II
F/A–18E/F Airframe MYP I & II
F/A–18E/F Engine

E–2C Airframe/Engine MYP I & II
DDG–51 MYP I & II
Virginia Class Submarine
Tactical Tomahawk
Common Cockpit
C–17 Airframe MYP I & II
C–17 Engines MYP I & II
C130J/KC130J Airframe

Senator INHOFE. Okay, that's fine. That's fine. I have heard the same thing, and I agree. I just was glad you said that. It was not in your written statement.

Now, in stability of requirement or, more specifically, would you say, does the minimum need for F–22s remain substantially unchanged during the contract period, in terms of production and total qualities? Mr. Walker accurately points out that the number of F–22s has continually decreased since we first planned on procuring 750 in 1986. 1986 happened to be the first year that I was serving over in the House side at that time, and I remember this program first being talked about at that time. Then we had the C–17, we had the B–1, and the B–2. I've never found a program that wasn't decreased. I think you start off with what is almost a wish-list level, and then when you see the complexities, the problems, and the competition for other platforms, it drops down. So, I've seen the same thing that we're looking at today in the F–22 in all the other systems. I think right now, in retrospect, if we look back at the C–17s, one of the higher figures would have served us much better, Mr. Chairman, than the number of C–17s we have today, because we could not have anticipated the needs that we have.

Now, the Air Force still has an official requirement of 381. Both the QDR and the Joint Air-Dominance Study support the absolute minimum need of 183. The independent Whitney, Bradley & Brown study recently performed also substantiates a minimum of 183, and in some scenarios recommends 240.

Secretary Wynne and Secretary Finley, in turn, ask this panel; do you think the proposed F–22 multiyear meets the stability of requirements set forth by title 10 specifically? That's one of the three that's in question.

Secretary WYNNE. Yes, sir, I do. It is absolutely necessary to fill out 7 squadrons, even at the reduced rate of 18 per squadron, which is the minimum we would ever like to see. It does, therefore, afford us, the management team, and the warfighting team access to ranges across America, and will become a deployable force as a result.

I think, as I mentioned in my testimony, we would have loved to consider any additional units, but that appetite was told to be suppressed. We then argued for stretching this program so that we had an active fifth-generation fighter line available to you and to the President in case of uncertain futures, because we wanted to make sure we had a fifth-generation fighter line for when another fifth-generation fighter line came on, I can certify to you, sir, 183 is our absolute minimum.

Senator INHOFE. I see. Secretary Finley, any comments?

Mr. FINLEY. In terms of requirement stability, I've looked at this from the standpoint of—we are under a fixed price, in terms of production. We've had good solid years of production performance on

this aircraft. In fact, they've had a recovery back to the contract schedule here, it's my understanding, in the last several months. There is a modernization element to the program, which I believe it is excellent for any major program like this to have a modernization element to it. My information has indicated that there may be concerns about the next generation of radar that would be integrated into the F–22. I have a fair amount of radar background. Clearly, the engineering integration of these systems, in this complexity, certainly has risk. But the management of that risk—my notes indicate that on the F–15, for example, we've done four advanced radar integrations; on the F–16, we've done five advanced radar integrations; on the F–18, we're doing another new advanced radar integration; and I believe in the case of the F–22, the advanced radar integration will essentially be completed prior to the start of this multiyear procurement.

Senator INHOFE. All right, Secretary Finley, thank you.

The final one is stable funding. The Government Accountability Office (GAO) states that the Air Force is currently underfunding this proposed 20–20–20 multiyear by $674 million. So, I'd ask you, Secretary Wynne, can you explain the shortfall, and anything further that you haven't already said, and whether this still exists under the current Air Force plans? Just to be sure that we're all clear on this point, can you confirm that the Air Force has committed to funding the F–22 multiyear?

Secretary WYNNE. I can start there, sir, and tell you that the Air Force is fully committed to funding the multiyear. I think the point of confusion came about as a result of the out-of-cycle nature of this multiyear authorization request. We have to correct, if you will, the FYDP, as Senator McCain pointed out earlier, and we are committed to do that as we approach a multiyear contract.

Senator INHOFE. All right.

Secretary Finley, I'd ask you, very specifically, is OSD committed to funding this F–22 multiyear at a required level to avoid contract cancellation?

Mr. FINLEY. Yes, sir.

Senator INHOFE. All right.

Finally, the last thing, you made some comments—I was very glad you did, even though you went a little beyond the question that Senator Nelson had asked, Secretary Wynne, but a man's integrity, a man who I've heard nothing but good things about for a number of years, was impugned this morning on the eve of this hearing. I'd ask you, Secretary Finley, do you know Dennis Blair? Secretary Wynne's already made some comments.

Mr. FINLEY. No, sir, I do not know Dennis Blair. I have met him on two courtesy visits, subsequent to my confirmation hearing, in terms of my contacts to meet FFRDC leadership.

Senator INHOFE. All right. Secretary Wynne, is there anything further you want to say about this man that perhaps you didn't have time to say?

Secretary WYNNE. This man was a combatant commander of our Armed Forces. I think he's a man of utmost integrity. I would say that, as Mr. Walker pointed out, I think it should be taken up a little bit that there should be some conflict-of-interest regulations there. I do not think that there was any impact to the study, and

I don't think there was any impact to the analysis, although you, sir, will be able to cover that in the second panel.

Senator INHOFE. Yes, but I'll be dealing with our nomination to the Tenth Circuit during the second panel.

Mr. Walker, do you know this gentleman?

Mr. WALKER. I may have met him. Let me be clear, I did not mention any names for the record, nor would I mention any names for the record. To me, this is not a personal issue. I have no reason to question Admiral Blair's integrity.

My point is very specific. You need to have standards for independence.

Senator INHOFE. Yes, I understand that. You made that clear in your comments.

Mr. WALKER. These don't meet them.

Senator INHOFE. I was referring to what the Washington Post reporter said, not what you said.

Mr. WALKER. Right, thank you, sir.

Senator INHOFE. Thank you, Mr. Chairman.

Senator MCCAIN. Senator Dayton.

Senator DAYTON. Thank you, Mr. Chairman.

Senator MCCAIN. I'd remind my colleagues we have a vote at 11:45 and we have another panel to go. Thank you.

Senator Dayton.

Senator DAYTON. Thank you, Mr. Chairman.

Referring to that article, I've never met Admiral Blair. I've never heard the name until today, so I start with no view, one way or the other. But I will say that I have served in appointed and elected public office for almost 30 years now in various positions. I have my own financial holdings that affect decisions, and I have spent a lot of time on these issues, personally, as State auditor of Minnesota, as one of five members on a State Board of Investment that made decisions of over $30 billion of pension fund investments. So, I've spent a lot of time looking at these questions.

Mr. Blair, himself, quoting the article, said he was heavily involved in the preparation of the report endorsing the multiyear procurement as the chairman of an internal review committee that approved its final form. It says that Admiral Blair holds options to buy tens of thousands of shares of EDO stock, which closed yesterday at $22.63 a share. That means every 10,000 of that stock option is worth almost $230,000. Take that multiple by whatever the number of the tens of thousands of shares.

Secretary Wynne, were you aware of this financial holding of Admiral Blair, prior to reading this story this morning?

Secretary WYNNE. No, sir. I went straight to Google and Googled it up. I found it to be part of the public record. You go to EDO Corporation, and you go to board of directors, you go to the 10-K, it's pretty much all there. It took 5 minutes to find all the facts.

Senator DAYTON. If I spent my life Googling everything that I was not aware of after it came to light, I would never see the light. [Laughter.]

Secretary Finley, were you aware, prior to this morning?

Mr. FINLEY. No, sir.

Senator DAYTON. All right. I find Admiral Blair says he chose not to recuse himself because his link to EDO was not of sufficient

"scale," to require it. IDA has no policy on conflicts of interest by its officers, Blair added. "We evaluate each one as it comes," he explains, saying that he makes any recusal decisions himself.

I will say that my view is that the extent of this financial holding, in its dollar amount, is most certainly what I would say is of a scale that would obligate someone ethically, if not legally, to make that disclosure. Again, I go back, and I realize this is governed by Federal laws and regulations, but in Minnesota, the law is, I think, a good one, both legally and ethically. It's not holding a financial interest that presents a conflict of interest that is against the law; it's not disclosing it. You can't have somebody, in my opinion, who is representing himself or his firm as independent and coming to independent judgments on these issues, who has financial holding of that scale. I mean, it's just fundamentally contradictory and if it doesn't involve the integrity of that individual, it should, because of that individual's concern about both the appearance and the fact of that lack of independence and that conflict of interest, and the failure to affirmatively disclose it to decision-makers.

I guess I just want to be clear, Mr. Walker, that I understand, there is no Federal law or regulation that impinges upon such a requirement.

Mr. WALKER. I'm not aware of any, and I think that there should be some requirement. You should have clear requirements for both individual and institutional independence as it relates to studies that are referred to as independent studies. I think it's not just the issue of the financial interest, it's also the fact that the individual involved—and I don't want to put names on the record—the individual involved was on the board of directors of a subcontractor that could benefit from this. That, by itself, under at least auditing standards—and I know you were the State auditor; I'm the Comptroller General of the United States—is a per se independence violation.

Senator DAYTON. Mr. Walker, you said earlier in your testimony that this whole project and the funding of it is a case study in what's wrong with DOD's acquisition system. I guess I would like to suggest that this failure of having such a requirement of disclosure is integral to the problems in that acquisition process. Would you concur with that or not?

Mr. WALKER. I would recommend that there be some requirement that standards exist either to piggyback on generally accepted governmental auditing standards, the independent requirement there, or another generally accepted set of standards. I think that's necessary. I am sure there have probably been other situations that have occurred and others that could occur in the future if we don't deal with it.

Senator DAYTON. Would it be appropriate for GAO to make such specific recommendations to Congress?

Mr. WALKER. You can consider us as having made a recommendation, and I'll be happy to provide something for the record if you want more specifics.

Senator DAYTON. I would ask if you would submit, please, your views on what should comprise such a disclosure requirement.

Mr. WALKER. I will do so, Senator.

[The information referred to follows:]

This follows up on the discussion during the July 25 hearing on the F–22A multiyear procurement proposal concerning whether Federally Funded Research and Development Centers (FFRDCs) have the requisite standards of independence and proper conflict of interest safeguards when performing their work. Though concerns have been expressed that FFRDCs are not governed by conflict of interest rules, they are in fact governed by some requirements in this area. Specifically, the Federal Acquisition Regulation (FAR) states that an FFRDC "is required to conduct its business in a manner befitting its special relationship with the Government, to operate in the public interest with objectivity and independence, to be free from organizational conflicts of interest, and to have full disclosure of its affairs to the sponsoring agency." (FAR, 48 C.F.R. section 35.017(a)(2).) The Department of Defense (DOD) prohibits funding an FFRDC "if a member of its board of directors or trustees simultaneously serves on the board of directors or trustees of a profit-making company under contract to DOD, unless the FFRDC has a DOD-approved conflict of interest policy for its members." (Defense FAR Supplement, 48 C.F.R. section 235.017(a)(2).) If there is a need for additional guidance regarding the requirement in the FAR and Defense Federal Acquisition Regulations Supplement that FFRDCs operate with objectivity and independence, it might be useful to consider the Generally Accepted Government Auditing Standards applicable to auditors and audit organizations which requires them to "maintain independence so that opinions, conclusions, judgments, and recommendations will be impartial and will be viewed as impartial by knowledgeable third parties. Auditors should avoid situations that could lead reasonable third parties with knowledge of the relevant facts and circumstances to conclude that the auditors are not able to maintain independence and, thus, are not capable of exercising objective and impartial judgment on all issues associated with conducting and reporting on the work." (GAO–03–673G Government Auditing Standards, paragraph 3.04).

Senator DAYTON. With due respect, Secretary Wynne, your comment that the absence of a conflict-of-interest requirement is interesting, I will say my own view is the absence of a conflict-of-interest requirement is appalling. I would urge both of you, in your respective capacities, also to look at what should be a requirement of every contractor and every individual to meet the kind of standard that gives the American taxpayer confidence that these dollars are being spent wisely in the public interest and not for any self-interest.

I have more questions, Mr. Chairman, but I realize that we're short of time. I'll pass until later.

Senator MCCAIN. Secretary Wynne, did you want to say something else?

Secretary WYNNE. I just wanted to say that the Senator is exactly right. I was surprised, myself, because, for all that we have been through, for all that Senator McCain drew out of our entire system, it was surprising to me.

Senator WARNER. I would just simply say as one who's been an observer of these issues and conflicts all the way from my time in the Pentagon to this moment, this is extremely serious. I've had the privilege of knowing Admiral Blair through the years, particularly when he was a senior officer in the Navy. I've met him subsequently. I mean, persons who have had the opportunities that he has been given by our country to rise to four-star rank and have the responsibilities that he did, you just assume that intuitively they have their own set of moral standards. This is extremely disturbing. I really think it taints the validity of the entire report, such that the report no longer can be considered as an argument for the proponents of this multiyear.

Senator MCCAIN. Senator Chambliss.

Senator CHAMBLISS. Thank you, Mr. Chairman.

Secretary Wynne, the statute for a multiyear has six different requirements. In your letter to both the authorizing and the appropriations committees dated May 16, 2006, you outlined the significance of all six, and the justification of all six. Is that correct?

Secretary WYNNE. Yes, sir.

Senator CHAMBLISS. Do you still stand by the contents of that letter and the justification for the multiyear?

Secretary WYNNE. Yes, sir, I do.

Senator CHAMBLISS. There was also a follow-up letter dated—I just noticed it doesn't have a date on it, but it's in response to Senator McCain's letter dated July 7, 2006, so I assume it was within a day or two after that—from Kenneth J. Krieg to Senator McCain, again referencing your letter as the justification for complying with the six steps. Are you familiar with that letter? Would you agree that the contents of that letter are correct?

Secretary WYNNE. I'm less familiar with that letter, but I do agree that the contents of the letter sound correct.

Senator CHAMBLISS. Okay. Following your letter dated May 16, 2006, did Mr. Walker or anybody from GAO ever call you and say, "Hey, Mr. Secretary, I've seen your letter. We have some problems with what you're saying there"? Did anybody from GAO ever talk to you about this?

Secretary WYNNE. No, sir.

Senator CHAMBLISS. Okay.

Mr. Chairman, I'd like to ask unanimous consent to enter those two letters in the record, please.

Senator MCCAIN. Without objection.

[The information referred to follows:]

SECRETARY OF THE AIR FORCE
WASHINGTON

The Honorable Ted Stevens
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate
Washington, DC 20510-6028

16 MAY 2006

Dear Mr. Chairman:

The Fiscal Year 2007 (FY07) President's Budget supported a multiyear contract to purchase up to 60 F-22 aircraft and a companion multiyear contract to procure F119 engines for the Air Force for lots 7, 8, and 9. This proposed multiyear procurement (MYP) covers the purchase of economic order quantity (EOQ) components common to an F-22 build, and transitions to a production contract inclusive of lots 7, 8, and 9. The proposed MYP strategy provides for the acquisition of 20 aircraft per year across the three primary lots with deliveries through 2011. The Office of the Secretary of Defense (OSD) contracted with the Institute for Defense Analyses (IDA) to complete a Business Case Analysis (BCA) for the F-22 MYP. The Air Force agrees with the scope and source of savings identified in the BCA, which forms the foundation of the Air Force MYP justification package. An F-22 MYP results in a cost avoidance of approximately $225M compared to annual contracts for lots 7, 8, and 9. The cost avoidance could be even higher ($235M) according to IDA's unconstrained cost estimate, if Congress chooses to fully fund the program as required to procure 60 aircraft. The intent of this submittal is to deliver the completed F-22 multiyear exhibits and document that the requested MYP meets all criteria required by 10 USC 2306b(a)(1).

While results of the BCA validate the F-22 MYP compliance with Title 10 criteria, the Air Force will program additional funds as needed for FY07-10 in order to support a total procurement of up to 60 aircraft and associated engines. In FY07, we will ask to reprogram money in two areas to address opportunities identified in the BCA. This includes reprogramming $110M from F-22 Aircraft Procurement to Advance Procurement in FY07 in order to provide adequate Lot 8 advance procurement dollars to preserve schedule, and to increase FY07 EOQ funding by $100M.

As additional support for the MYP, the exhibits describe the program's indirect benefit to the defense industrial base—specifically, by allowing prime contractors to enter into longer-term agreements with suppliers. This drives improvements in efficiency, training, and tooling. Since the MYP provides a 3-year level of business stability and at least a partial bridge to F-35 full rate production, the Air Force will engage with both prime contractors to determine how this stability will translate into additional cost savings opportunities (i.e., reduction in annual profit margins and supplier rates, leveraging of prime overhead rates across multiple weapon systems, etc.) in the Oct 06-submitted proposals.

In conclusion, the MYP meets the requirements of Title 10 and provides substantial cost savings/avoidance over annual lot buys. The Air Force will continue to support you and the other congressional committees to ensure the F-22 procurement strategy is properly communicated and justified.

A similar letter has been sent to the Ranking Minority Member of your Subcommittee and to the Ranking Minority Members of the other Congressional Defense Committees.

Sincerely,

Michael W. Wynne
Secretary of the Air Force

Attachment:
AF MYP Justification Package

Exhibit MYP-1, Multiyear Procurement Criteria **Date: May 06**
Program: F-22A Raptor (Air Force)

1. Multiyear Procurement Description:
The Department of Defense (DoD) is proposing a multiyear procurement (MYP) to purchase F-22A aircraft and F119 engines across three primary Lots (i.e, 7/8/9) with deliveries through CY2011. This multiyear justification package is constrained to the Fiscal Year 2007 President's Budget (FY07 PB) funding profile, requiring split funding to purchase fifty-six (56) F-22A aircraft and one-hundred twelve (112) F119 engines in a 20-20-16 aircraft, 40-40-32 engine procurement flow. Based on analysis conducted by the Institute for Defense Analyses (IDA), the Air Force will have to reprogram additional funds to procure the 60 aircraft and 120 engines as requested in the FY07 PB justification package. This disconnect will be addressed prior to the FY08PB submission. This proposed MYP covers the purchase of economic order quantity (EOQ) components common to an F-22A build, and transition to a three-year production contract inclusive of Lots 7/8/9. This MYP justification package contains the business case analysis for the FY07 PB, split funding profile. The Air Force will include both Economic Price Adjustment (EPA) and Variation in Quantity (VIQ) clauses to address uncertainty in outyear rates/factors and impacts to contractor proposal preparation.

Lockheed Martin Aero (LMA) and Pratt-Whitney (PW) are the only known sources for this procurement, and the Air Force will contract with these companies to meet this requirement. The proposed MYP strategy follows two lots of Production Representative Test Vehicles (PRTV), 5 Low Rate Initial Production (LRIP) lots, and 1 Full Rate Production (FRP) lot. To date, the program has delivered approximately 60 aircraft and over 200 engines. The DoD hereby proposes the F-22A program as a 2007-2010 MYP contract as it satisfies all Title 10, USC 2306b criteria as described below.

2. Benefit to the Government:

a. Substantial Savings:
A multiyear procurement over three production lots offsets cost increases resulting from reductions in the previous planned annual production rate. Implementation of the proposed MYP contract will yield significant cost savings/cost avoidance over a series of successive single year procurements (SYP). IDA's independent assessment estimated the cost to purchase 60 F-22A aircraft and associated engines in three lots under a MYP contract, and the cost to purchase 60 F-22A aircraft and associated engines in three annually procured lots. IDA's independent perspective of overall cost avoidance gained through a multiyear strategy included the following scenarios:

1. SYP Lots 7, 8, and 9 (20, 20, 20)—Unconstrained budget
2. MYP Lots 7, 8, and 9 (20, 20, 20)—Unconstrained budget
3. SYP Lots 7, 8, 9 (20, 20, X)—Constrained budget (FY07 PB, split funding)
4. MYP Lots 7, 8, 9 (20, 20, X)—Constrained budget (FY07 PB, split funding)

IDA's results for comparison of Scenarios 1 and 2 conclude that the unconstrained comparison (MYP to discrete lots) will result in a combined air vehicle and engine cost avoidance of approximately $235M. IDA's results for comparison of Scenarios 3 and 4 conclude that the constrained comparison will result in a combined cost avoidance of approximately $225M. Only the FY07 PB constrained assessment will be discussed in this package.

IDA describes the benefit of MYP to the defense industrial base, allowing prime contractors to enter into longer-term agreements with suppliers, with resulting improvements in efficiency, training, and tooling. Follow-on assessments will evaluate savings that could be gained through performance-based supplier contracts, which are not currently reflected in the IDA BCA. These agreements would capture savings across multiple years. The IDA BCA also did not assess the benefits of MYP to costs of spare parts and support equipment. Estimates of these initiatives show that further analysis could potentially yield approximately an additional $100M in savings.

b. Stability of Requirement

The F-22A Raptor requirement has been consistently validated and remains a top Air Force priority. The F-22A Operational Requirements Document (ORD), 304-83-I/II/IIIA, dated 17 February 2004, was approved by the Joint Requirements Oversight Council (JROC) and signed by the Chief of Staff of the Air Force. The Quadrennial Defense Review (QDR) supports restructuring the F-22A program and extending production through CY2011 with a multiyear acquisition contract to ensure the Department does not have a gap in the production of its 5th-generation tactical fighter aircraft.[1] The FY07 PB documents this decision, and requests funding to support the planned fleet size of 183 aircraft. Procuring an aircraft with a stable requirement under a multiyear procurement enables better use of limited taxpayer resources.

c. Stability of Funding

The Air Force has committed to provide a stable funding stream for the F-22A Raptor in the FY07 PB. This commitment was reaffirmed by the DoD in the QDR decision to continue the F-22A program. These documents emphasize the criticality of the F-22A Raptor to overall DoD planning and demonstrate the Department's commitment to fund this weapon system at the proposed multiyear quantities.

d. Stable Configuration

The F-22A's Engineering, Manufacturing and Development (EMD) phase defining the weapon system's capability baseline for production concluded in December 2005. In addition, OSD recognized F-22A production processes were

[1] The Quadrennial Defense Review Report, dated February 6, 2006, stated a decision to "Restructure the F-22A program and extend production through Fiscal Year 2010 with a multiyear acquisition contract, to ensure the Department does not have a gap in 5th generation stealth capabilities."

mature in an April 2005 Full Rate Production (FRP) decision. Five production lots have been awarded, and LMA is currently delivering Lot 4 aircraft. The Air Force anticipates the Lot 7 production baseline will be almost identical to the Lot 6 configuration (all known structural retrofit and Group A incorporation will be complete by Lot 6)—with integration of planned modernization (Spiral 3A) and Diminishing Manufacturing Sources (DMS) upgrades planned for Lots 8 and 9, respectively with no changes to the aircraft's outer moldline. These upgrades will change the F-22A's hardware/software baseline but are not expected to perturb the production line. The F-22A's robust design and stable configuration facilitate integration of planned Modernization and DMS efforts with low technical risk—in large part, due to Spiral 3A and Communications, Navigation and Identification (CNI) 2010's completion of their Critical Design Reviews in December 2006, and July 2007. EOQ purchases will be limited to those components with no planned configuration changes through Lots 7/8/9. MYP has been approved under similar circumstances for candidate programs with anticipated upgrades, including the F/A-18E/F and UH-60 programs. As outlined, the 2005 QDR validated the F-22A's operational utility. This assessment was further supported by the results of AFOTEC's August - October 05 independent assessment of the Raptor's capability. From their preliminary report, the F-22A was determined to be "Mission Capable." Based on this information and other supporting data, the Commander, Air Combat Command, declared F-22A Initial Operational Capability (IOC) on 15 December 05. The F-22A has demonstrated over 14,000 developmental test, training and operational flight hours.

e. Realistic Cost Estimates

The FY2005 Defense Appropriations Conference Report directed that a Federally Funded Research and Development Center (FFRDC) be tasked to conduct an Independent Cost Estimate (ICE) of the F-22A aircraft production program to recalibrate F-22A cost models. The Institute of Defense Analyses (IDA) completed the ICE and provided a better understanding of F-22A procurement costs. As part of the report, IDA concluded the F-22A contractors are "well situated" to meet projected production rates. IDA's results conclude that the unconstrained comparison (MYP to discrete lots) will result in a combined cost avoidance of approximately $235M, and the constrained comparison (reported in this package) will result in a combined cost avoidance of approximately $225M.

Additionally, IDA performed a Business Case Analysis resulting in the following statement: "The estimated cost and the anticipated cost savings/cost avoidance for the F-22A program are realistic. Both the single-year and the multiyear contract estimates for the F-22A program are based on historical cost data for EMD through Lot 4 and are based on proven cost-estimating techniques. The program's cost estimates also have been closely scrutinized by the OSD CAIG, the Air Force Cost Analysis Agency (AFCAA), and, most recently, by IDA in a congressionally mandated Independent Cost Estimate (ICE) conducted during FY2004–2005. Although large differences in cost estimates were evident early in the program, recent estimates of the remaining production have tended to converge."

1. National Security

There is no alternative aircraft in production offering comparable capabilities to the F-22A Raptor. The Raptor is a complex weapon system with over a decade of development, and represents the least cost option to replace legacy fighters dedicated to air-to-air, Suppression of Enemy Air Defenses (SEAD), Destruction of Enemy Air Defenses (DEAD), and Homeland Defense. With its unmatched combination of stealth, integrated avionics and supercruise, the F-22A is the keystone of ACC's Global Strike concept of operations. The Raptor's dominant combat capabilities will provide U.S. forces with overwhelming air superiority in any scenario, and its robust employment capabilities (both air-to-air and air-to-ground) will afford joint combatant commanders with options for asymmetric engagement that do not exist with legacy fighters. In total, continued procurement of the F-22A maintains the USAF's preeminence in tactical and strategic airpower well into this century. MYP will allow the DoD to efficiently and cost effectively deliver required 5th generation fighter capability while providing the industrial base bridge to complementary 5th generation capability in the Joint Strike Fighter.

3. Source of Savings/Cost Avoidance

Savings from the SYP have already been removed from the budget and are therefore considered cost avoidance to having a single-year procurement.

20-20-16 Constrained Budget (FY07PB, split funding)

$ in Millions	Air Vehicle[2]	Engine
Inflation	$ -	$ -
Vendor Procurement	$ 138.7	$ 29.5
Manufacturing	$ -	$ 0.1
Design/Engineering	$ 36.8	$ -
Tool Design	$ -	$ -
Support Equipment	$ -	$ -
Other	$ 19.8	$ -
Total Savings	$ 195.3	$ 29.6

[2] Air Vehicle includes prime contractor support labor, initial spares, and other support items.

4. Advantages of the MYP

The multiyear contract will allow savings primarily through vendor procurement and design/engineering sources. Regarding vendor procurement savings, the multiyear contract will allow the placement of long term supplier arrangements/commitments, reduced administrative burden of placing a series of purchase orders/contracts, and an overall more predictable procurement strategy. The multiyear procurement will allow the placement of Economic Order Quantity (EOQ) procurements with key suppliers, thereby reducing processing costs, minimum order fees, production line set up costs, and pre-production costs. Given the longer procurement horizon associated with a three-year multiyear, there is also an increased possibility of vendor-funded cost reduction initiatives. Regarding design and engineering savings, Class I Engineering Change Proposals (ECPs) are generally excluded in a multiyear scenario. Due to the stable configuration of the multiyear program, design and engineering savings will be realized in areas including configuration management, sustaining engineering, data maintenance, customer coordination, and in engineering and manufacturing product liaison. In addition, the MYP will provide a bridge of critical prime contractor resources in support of the Joint Strike Fighter —potentially reducing the development and outyear production costs for this complementary 5th-generation fighter.

5. Impact on Defense Industrial Base

Multiyear procurement will allow the DoD to efficiently and cost effectively deliver required 5th generation fighter capability (both air vehicle and engine) while providing an industrial base bridge to complementary capability in the JSF. The JSF's reliance on Lockheed Martin's facilities in Palmdale, CA and Fort Worth, TX and many vendors common to the F-22A, raises concerns about sustaining an experienced stealth aircraft industry. For example, BAE, Northrop Grumman, and Lockheed Martin in Palmdale, California, perform work for both the F-22A assembled at Lockheed Martin in Marietta, GA, and the JSF assembled at Lockheed Martin in Fort Worth, TX. AFCAA estimated the value of shared suppliers as a 1 to 3 percent decrease in JSF aircraft flyaway cost. As such, F-22A production termination before JSF production maturity will translate into higher JSF costs. The transition from F-22A to JSF production requires an integrated approach to keep aircraft production open and to control the risk and cost of the JSF program and reduce operational risk to the combatant commanders. It is imperative the United States maintain production of advanced aircraft to meet national defense requirements in an uncertain world.

6. Multiyear Procurement Strategy

FY07PB Constrained Budget (20-20-16 Profile)	Air Vehicle		Engine	
	Annual Contracts	Multiyear Contract	Annual Contracts	Multiyear Contract
Quantity	56	56	112	112
Total Contract Price	$ 7,336.0	$ 7,140.7	$ 1,095.6	$ 1,066.0
Cancellation Ceiling (highest point)				
Funded	n/a	$ –	n/a	$ –
Unfunded (FY07)	n/a	$ 201.2	n/a	$ –
$ Cost Avoidance over Annual	n/a	$ 195.3	n/a	$ 29.6
% Cost Avoidance over Annual	n/a	2.7%	n/a	2.7%

Exhibit MYP-2, Total Program Funding Plan
Program: F-22A Raptor (Air Force)

Date: May 06

Exhibit MYP-2 , Total Program Funding Plan

Date April 2006

Appropriation (Treasury) Code/OC/BA/BSA/Item Control No

P-1 Line Item Nomenclature

Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

F-22 (Raptor)

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Procurement Quantity	-	0	20	20	16						56
Annual Procurement											
Gross Cost		$ 2,049.5	$ 3,209.5	$ 2,906.8	$ 1,722.7						$ 9,888.6
Less Prior Year AP		(566.2)	(277.4)	(366.6)	-						(1,213.2)
Net Procurement (P-1)		1,480.3	2,932.2	2,540.2	1,722.7						8,675.4
Plus Current Year AP	569.2	277.4	366.6	-	-						1,213.2
Weapon Sys	569.2	1,757.7	3,298.8	2,540.2	1,722.7						9,888.6
Multiyear Procurement											
Gross Cost		$ 2,566.9	$ 2,625.0	$ 2,631.5	$ 1,641.3						$ 9,663.7
Less Prior Year AP		(566.2)	(477.4)	(366.6)	-						(1,413.2)
Net Procurement (P-1)		1,996.7	2,147.6	2,464.9	1,641.3						8,250.5
Advance Procurement											-
For 2006	569.2										569.2
For 2007		477.4									477.4
For 2008			366.6								366.6
For 2009				-							-
Total AP	569.2	477.4	366.6	-	-						1,413.2
Weapon Sys	569.2	2,474.1	2,514.2	2,464.9	1,641.3						9,663.7
MYP Savings (TY$M)	$ -	$ (716.4)	$ 784.6	$ 75.3	$ 81.4						$ 224.9
Cancellation Ceiling - Funded											
Cancellation Ceiling - Unfunded		201.2	100.6	50.3	-				MAX =		$ 201.2
Outlays											
Annual (TY$M)	$ 181.1	$ 734.6	$ 1,774.7	$ 2,465.4	$ 2,259.2	$ 1,464.8	$ 602.3	$ 245.2	$ 98.0	$ 43.1	$ 9,888.6
Multiyear (TY$M)	181.1	937.5	1,851.4	2,253.1	2,142.2	1,379.9	584.2	218.8	94.4	41.0	9,663.7
Savings	-	(202.7)	(76.7)	212.4	157.0	84.9	18.1	26.4	3.5	2.0	224.9

Based on FY07 President's Budget.

- To support a procurement flow up 60 aircraft and associated engines, the Air Force projects a need for an additional $674M (assumes split funding) above the FY07 PB in FY08-10
- Requires reapportion of funds from within the F-22A program in two areas:
  - Move $110M from F-22A air vehicle to advance procurement in FY07 in order to provide adequate Lot 6 advanced procurement dollars to preserve schedule
  - Increase FY07 EOQ funding by $100M

P-1 Shopping List – Item No. __

Exhibit MYP-3, Total Contract Funding Plan (Air Vehicle) **Date: May 06**

Program: F-22A Raptor (Air Force)

Exhibit MYP-3, Total Contract Funding Plan

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

Date April 2006
P-1 Line Item Nomenclature
F-22 (Raptor) Air Vehicle

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Procurement Qty	0	0	20	20	16						56
Annual Procurement											
Gross Cost		$1,036.5	$1,006.9	$2,637.6	$2,655.0						
Less Prior Year AP		(565.4)	(274.3)	(362.5)	-						$7,336.0
Net Procurement (P-1)		471.1	732.6	2,275.1	2,655.0						(1,202.2)
Plus Current Year AP	565.4	274.3	362.5	-	-						6,133.8
Contract Price	565.4	745.4	1,095.1	2,275.1	2,655.0						1,202.2
											7,336.0
Multiyear Procurement											
Gross Cost		$1,722.9	$ 262.9	$2,572.8	$2,582.1						
Less Prior Year AP		(565.4)	(444.3)	(362.5)	-						$7,140.7
Net Procurement (P-1)		1,157.5	(181.4)	2,210.3	2,582.1						(1,372.2)
Advance Procurement											5,768.5
For FY2006	565.4										-
For FY2007		444.3									565.4
For FY2008			362.5								444.3
For FY2009				-							362.5
Total	565.4	444.3	362.5	-	-						
Contract Price	565.4	1,601.8	181.1	2,210.3	2,582.1						1,372.2
											7,140.7
Multiyear Savings											
MYP Savings (TY$M)	$ -	$ (856.4)	$ 914.1	$ 64.8	$ 72.9						
MYP Savings (%)		-114.9%	83.5%	2.8%	2.7%						$ 195.3
Cancellation Ceiling - Funded											2.7%
Cancellation Ceiling - Unfunded		$ 201.2	$ 100.8	$ 50.3	$ -						
									MAX =		$ 201.2
Outlays											
Annual (TY$M)	$ 160.0	$ 446.7	$ 726.2	$1,278.9	$1,967.9	$1,638.6	$ 692.9	$ 245.5	$ 110.0	$ 56.4	$7,336.0
Multiyear (TY$M)	160.0	689.1	826.6	1,042.1	1,802.2	1,554.6	677.9	216.6	106.9	54.6	7,140.7
Savings	-	(242.4)	(98.4)	236.8	165.7	85.0	14.9	28.9	3.1	1.8	195.3

– MYP-3 only includes estimated costs for the Air Vehicle MY contract

P-1 Shopping List – Item No. __

Exhibit MYP-4, Present Value Analysis (Air Vehicle) **Date: May 06**
Program: F-22A Raptor (Air Force)

Exhibit MYP-4, Present Value Analysis

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Air Vehicle

	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Annual Proc											
TY$M Outlay	160.008	446.727	728.192	1278.896	1987.894	1839.612	692.862	245.453	109.976	66.374	$ 7,335.994
BY06$M Outlay	160.008	451.311	748.437	1344.056	2106.489	1769.059	748.424	264.854	118.390	72.231	7783.260
PV (BY06$M)	160.008	439.660	710.293	1242.628	1897.245	1552.199	639.726	220.544	96.038	57.081	7015.421
Multiyear Proc											
TY$M Outlay	160.008	689.090	628.835	1042.111	1802.241	1554.621	677.931	216.568	106.898	64.552	$ 7,140.655
BY06$M Outlay	160.008	696.942	643.381	1093.014	1930.895	1678.365	731.585	234.472	115.077	70.248	7556.067
PV (BY06$M)	160.008	680.898	600.398	1010.529	1739.093	1472.623	625.401	195.244	93.351	55.514	6833.060
Difference											
TY$M Outlay	0.000	-242.363	-98.443	236.785	185.654	84.991	14.931	28.885	3.078	1.822	$ 195.339
BY06$M Outlay	0.000	-247.630	-94.944	251.042	175.595	90.693	16.760	30.383	3.313	1.983	227.193
PV (BY06$M)	0.000	-241.238	-90.105	232.097	158.152	79.576	14.325	25.300	2.687	1.567	182.361
MYP Savings (PV$)	0.000	-241.238	-90.105	232.097	158.152	79.576	14.325	25.300	2.687	1.567	$ 180.794
MYP Savings (%)	0.0%	-54.9%	-12.7%	18.7%	8.3%	5.1%	2.2%	11.5%	2.8%	2.7%	2.577%

Remarks
Constant year dollars in FY06 dollars using OSD inflation indices (Air Force Aircraft Procurement-Other, issued 19 Jan 2006).
Present value analysis based on a 2.65% real discount rate per OMB circular A-94 dated January 2006.

- MYP-4 only includes estimated costs for the Air Vehicle MY contract

Exhibit MYP-3, Total Contract Funding Plan (Engine) **Date: May 06**
Program: F-22A Raptor (Air Force)

Exhibit MYP-3, Total Contract Funding Plan

Date April 2006

Appropriation (Treasury) Code/COBA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Engine

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Procurement Qty	0	0	40	40	32						112
Annual Procurement											
Gross Cost	$ -	$ 147.0	$ 242.9	$ 389.4	$ 316.3						$ 1,095.6
Less Prior Year AP		(3.8)	(3.1)	(4.1)	-						(11.0)
Net Procurement (P-1)		143.2	239.8	385.3	316.3						1,084.6
Plus Current Year AP	3.8	3.1	4.1	-	-						11.0
Contract Price	3.8	146.3	243.9	385.3	316.3						1,095.6
Multiyear Procurement											
Gross Cost	$ -	$ 147.0	$ 232.4	$ 378.9	$ 307.7						$ 1,066.0
Less Prior Year AP		(3.8)	(33.1)	(4.1)	-						(41.0)
Net Procurement (P-1)		143.2	199.3	374.8	307.7						1,025.0
Advance Procurement											
For 2006	3.8										-
For 2007		33.1									3.8
For 2008			4.1								33.1
For 2009				-							4.1
Total	3.8	33.1	4.1	-	-						-
Contract Price	3.8	176.3	203.4	374.8	307.7						41.0
											1,066.0
Multiyear Savings											
MYP Savings (TY$M)	$ -	$ (30.0)	$ 40.5	$ 10.5	$ 8.5						$ 29.6
MYP Savings (%)		-20.5%	16.6%	2.7%	2.7%						2.7%
Cancellation Ceiling - Funded											
Cancellation Ceiling - Unfunded		$ -	$ -	$ -	$ -						$ -
Outlays											
Annual (TY$M)	$ 1.1	$ 43.0	$ 130.7	$ 236.8	$ 308.1	$ 224.0	$ 83.7	$ 34.4	$ 16.0	$ 7.9	$ 1,095.6
Multiyear (TY$M)	1.1	51.5	131.8	224.6	293.5	216.4	81.3	32.6	15.5	7.7	1,066.0
Savings	-	(8.5)	(1.0)	14.2	12.6	7.6	2.4	1.8	0.4	0.2	29.6

- MYP-3 only includes estimated costs for the Engine MY contract

P-1 Shopping List – Item No. __

Comptroller General
of the United States

United States Government Accountability Office
Washington, DC 20548

July 6, 2006

The Honorable John Warner
Chairman
The Honorable Carl Levin
Ranking Minority Member
Committee on Armed Services
United States Senate

The Honorable Ted Stevens
Chairman
The Honorable Daniel K. Inouye
Ranking Minority Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Duncan L. Hunter
Chairman
The Honorable Ike Skelton
Ranking Minority Member
Committee on Armed Services
House of Representatives

The Honorable C.W. Bill Young
Chairman
The Honorable John P. Murtha
Ranking Minority Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Press reports and congressional debate on our recent correspondence concerning GAO's work on the F-22A program contain certain misstatements that I believe need to be addressed. Some have asserted that our correspondence relied upon old data and included erroneous information, using as an example our statement that the cost of the F-22A's procured under the proposed multiyear contract will be higher. We

stand behind our report and its findings, and do not believe that the Department of Defense (DOD) has demonstrated that it has met all the requirements for a multiyear procurement.

To set the record straight, our report stated that the fiscal year 2006 President's Budget included procurement costs to buy 56 remaining aircraft in two lots that amounted to an average unit procurement cost for each plane of $166 million. The fiscal year 2007 President's Budget, which extends the program 2 years and proposes multiyear procurement, includes procurement costs to buy 60 remaining aircraft in three lots that amounts to an average unit cost for each plane of $183 million, or about 10 percent more than the previous figure. These figures are fact, not opinion based.

One of the purposes of a multiyear procurement commitment is to reduce costs. There are statutory criteria that must be met before a multiyear contract can be entered into, including a requirement for a finding that the contract will result in substantial savings. As we observed in our correspondence, there are serious questions as to whether this and other multiyear criteria have been satisfied.

With regard to the claim that our correspondence relied on old data in finding continued funding instability on the program, our report clearly points out that the Air Force itself has identified that its plan for the F-22A multiyear procurement is underfunded by $674 million at this time. In addition, some stated that the proposed incremental funding of the multiyear procurement has been abandoned; however, the Department's pending multiyear procurement proposal as submitted to the Congress still includes it.

Our recommendation was not to delay the F-22A program as some have said. We recommended that the Department and the Congress not fund anymore investment in the program until it had an updated business case for further investment. In fact, the new plan that includes multiyear procurement delays the program by two years and procures less aircraft annually than the optimum production rate. Importantly, we were briefed on the Department's Quadrennial Defense Review and found that it differs from the business case we have called for in one critically important respect—the DOD study was not resource constrained. Employing a nonresource-constrained approach is imprudent and unrealistic, especially given the growing gap between the department's procurement wants and its likely future resource levels.

The F-22A program is also emblematic of systemic problems in DOD's acquisition system. First, the F-22A was approved in an environment with no clear agreement on enterprise-wide priorities and without due consideration of current and likely future resource constraints . Second, the requirements and key program specifications were not fixed when the program began and have changed over its decades-long development. Third, key procurement decisions were made without adequate consideration of technology and other program risks with costly consequences. And finally, in this program as in many others, DOD has paid out significant incentive and award fees to its contractors despite large cost overruns and schedule delays.

Our nation's large and growing long term fiscal gap requires that the federal government begin making hard decisions. In this context, we continue to believe that Congress needs to reevaluate a range of existing federal programs and policies, including the F-22A program, based on credible current and future threats, current and expected future national budget levels and priorities, and considering various reasonable and realistic ways to meet the warfighter's true needs. As it stands, the current F-22A program's increased costs will eventually serve to reduce the Department's options in fulfilling other important national security priorities.

If you or any of your staff have any questions concerning this important issue, please do not hesitate to call me, Katherine Schinasi, or Michael Sullivan on (202) 512-4841.

David M. Walker
Comptroller General
of the United States

JUL. 7. 2006 4:36AM NO. 2966 P. 2

JOHN McCAIN
ARIZONA

CHAIRMAN
COMMITTEE ON INDIAN AFFAIRS
COMMITTEE ON ARMED SERVICES
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

United States Senate

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July 7, 2006

The Honorable Kenneth Krieg
Under Secretary of Defense for Acquisition, Technology and Logistics
3010 Defense Pentagon
Washington, DC 20301-3010

VIA FACSIMILIE AND FIRST CLASS MAIL

Re: Air Force F-22 Multiyear Procurement Proposal

Dear Secretary Krieg:

As you likely know, the Air Force has recently briefed congressional defense committees on details of a multiyear procurement strategy to procure three lots of F-22A aircraft, numbered as lots seven through nine, each consisting of 20 aircraft, for a total of 60 aircraft. I am concerned that certain aspects of this strategy may not comply with existing statutory law.

Please certify that the Air Force's strategy satisfies those conditions set forth in subsection (a) of section 2306b of title 10, United States Code, that must be present before the Air Force can enter into a multiyear contract for the procurement of additional F-22 aircraft. Please also set forth the basis for your certification.

Your prompt response is required as I will be holding an AirLand Subcommittee hearing to address this matter, and related issues, in the near future. Given the foregoing, I respectfully request that you provide me your certification, and the reasoning supporting that certification, regarding the Air Force's F-22 multiyear procurement strategy by Wednesday, July 12, 2006.

If you have any questions, please contact my Military Legislative Assistant, Chris Paul at (202) 224-7138.

Sincerely,

John McCain

John McCain
United States Senate

PRINTED ON RECYCLED PAPER

THE UNDER SECRETARY OF DEFENSE

3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION AND TECHNOLOGY

Senator John McCain
United States Senate
Washington, DC 20510-0303

Dear Senator McCain:

Thank you for your July 7, 2006, letter concerning the Air Force F-22 Multiyear Procurement (MYP) acquisition strategy and for raising your concern that certain aspects may not comply with statutory law.

We are aware that Secretary Wynne, in his letter of May 16, 2006, to Senator Warner, provided details on the MYP strategy to procure three lots of F-22 aircraft. The letter states in the first paragraph, last sentence that "the intent of this submittal is to deliver the completed F-22 multiyear exhibits and document that the requested MYP meets all criteria required by 10 USC 2306b(a)(1)." The letter concludes on the top of page 2 "... the MYP meets the requirements of title 10..." The letter, along with the Institute for Defense Analyses (IDA) independent Business Case Analysis (BCA) and additional documentation on the criteria specified in 10 USC 2306b(a), which support Secretary Wynne's determination, are attached.

We concur with Secretary Wynne's determination, the IDA BCA and the additional supporting documentation. This information demonstrates the proposed MYP satisfies the statutory criteria.

As a courtesy, a copy of this letter is being provided to the Chairmen and Ranking Minority Members of the Senate Armed Services Committee and House Armed Services Committee.

Sincerely,

FOR Kenneth J. Krieg

Attachments:
As stated

Senator CHAMBLISS. Mr. Secretary, again, Senator McCain asked you about the FYDP. I believe this multiyear contract was included in the 2007 FYDP, as well as the 2007 POM, is that not correct?

Secretary WYNNE. What I recall, sir, is it was definitely in the 2007 POM. I just don't remember if we adjusted the FYDP.

Senator CHAMBLISS. Okay.

Mr. Walker, you have raised, as one of your questions here today, the fact that the termination costs of the multiyear contract are not budgeted in the current budget, is that correct?

Mr. WALKER. That's correct, as well as that they represent a risk that one has to consider.

Senator CHAMBLISS. What is the purpose of a multiyear contract?

Mr. WALKER. Part of the purpose of a multiyear contract is to save money, as compared to otherwise being able to purchase on annual increments.

Senator CHAMBLISS. Do you expect both parties to live up to that contract when you sign it?

Mr. WALKER. If it's a firm fixed-price contract, absolutely, we do.

Senator CHAMBLISS. That's what this is supposed to be, is that not right?

Mr. WALKER. That's correct, although, as has been noted for the record, it's based upon estimates because negotiations haven't taken place.

Senator CHAMBLISS. Why would you fund the fact that we're going to break this contract in a budget where you are entering into a contract to save money? Why does that make sense, or is that a quirk that the Government has, once again?

Mr. WALKER. Because the history has shown that the Pentagon wants way more than it can afford, and that we have, from time to time, had to change our mind when the budget crunch hits. There are many differences between wants, needs, affordability, and sustainability, not just within the Air Force budget but also within the Pentagon budget.

Senator CHAMBLISS. Have all of those instances that you have referenced been funded in the budget at the time the multiyear was entered into?

Mr. WALKER. Senator, I'd have to check. I can't answer but I will check and provide something for the record.

[The information referred to follows:]

Not all programs with multiyear procurement (MYP) contracts fund termination costs in the budget. Defense Federal Acquisition Regulations Supplement MYP regulations state that if an MYP has estimated cancellation costs of more than $100 million and is not going to fund those costs in the budget, the head of the agency must report to Congress: (1) planned cancellation ceiling amounts; (2) the extent to which these amounts are not funded in the budget; and (3) an assessment of the financial risk associated without funding these costs. Three of the MYP contracts referenced in the Institute for Defense Analysis study included cancellation ceiling clauses and estimated termination costs. At least one of those, the F–18 MYP, fully funded all of its cancellation costs. Historically, we found programs that funded these costs and some that did not. The M1 tank program is an example of a major weapon acquisition which did not fund cancellation costs during MYP. On the other hand, the Blackhawk helicopter and the Maverick missile acquisitions both fully funded the liability.

Senator CHAMBLISS. All right. I'd venture to say none of them have.

Let's look at your letter of June 20, which was about a month after the letter that I asked Secretary Wynne about that went to the authorizing and appropriations committees where he detailed the requirements of the multiyear and the substantiation of those requirements. In fact, you reference that letter in your letter, I believe. Were you familiar with that letter before you sent your letter of June 20, 2006?

Mr. WALKER. Do you mean Secretary Wynne's letter? Is that what you mean, sir?

Senator CHAMBLISS. No, I'm talking about your letter to Bill Young dated June 20. Were you familiar with Secretary Wynne's letter dated May 16?

Mr. WALKER. My staff was. They brought it to my attention.

Senator CHAMBLISS. Why did you not call the Secretary's office and say, "We have some problems with this, and let's discuss this. Give me further substantiation for the issues that we think are still outstanding"?

Mr. WALKER. Several things, Senator. First, we work for Congress, not for the executive branch. Second, if I made a call every time something came out of the Pentagon or anyplace else in Government where we have a disagreement, I'd be on the phone 100 percent of the time.

Senator CHAMBLISS. Yes. Senator McCain and I agree that we have a flawed procurement system, but we also have a flawed internal system. There's no reason for you not being able to do that. If you're going to be responsible to Congress, you should do that.

Mr. WALKER. Senator, with all due respect, there's no question that the Pentagon and the Air Force understands that we've had a longstanding concern with regard to the F–22A. This is not news.

Senator CHAMBLISS. Well, we've never been to this point before, have we? We've never been to the point of a multiyear before.

Mr. WALKER. That's correct, Senator, not to my knowledge.

Senator CHAMBLISS. Now, let's take your letter dated June 20. You cite three issues in that letter. The first issue is savings. In there you say that, instead of saving $225 million, or about 2.7 percent, this contract is actually going to cost the taxpayer money. Now, in the trial of a lawsuit, what we do when we secure an opinion is we have the expert base that opinion on facts in evidence. Now, the facts in evidence here, Mr. Walker, are that originally we were going to buy 27 airplanes in this fiscal year, is that correct? Excuse me, the next fiscal year, the first year of this multiyear.

Mr. WALKER. I believe that's correct, Senator.

Senator CHAMBLISS. All right. Now, sometime back the latter part of last year, before the President's budget was submitted in January—I don't know the exact date, but let's assume it was December 2005—a decision was made by the Air Force and by the President to request a multiyear of 20 airplanes for each of the next 3 years and extend this program out for 3 years. Would you agree with that?

Mr. WALKER. It was part of the budget request, the most recent budget request, I believe, if I'm not mistaken.

Senator CHAMBLISS. The budget request that was submitted to the Hill in January 2006. Isn't that right, Mr. Walker?

Mr. WALKER. I don't know the exact date that it was submitted, but my understanding was it was the 2007 budget request.

Senator CHAMBLISS. Okay. Well, the law says it has to be submitted in January, so we'll take that as one fact. In that budget, there was a requirement that we have 20 airplanes rather than 29 airplanes in the 2007 budget. That fact was again substantiated and approved by both authorizing committees in the House and the Senate and ultimately, at about the time of your letter of June 20,

by the Appropriations Committee on the House side. I don't know the exact date of that appropriation, but certainly before your follow-up letter of July 6, where you again reference the same issue of this multiyear costing the taxpayer money. What you did, Mr. Walker, was, you said that there is a savings issue based upon facts that are not in evidence, because your question regarding savings relates to a prior decision to request 29 airplanes in a fiscal year when everybody in the world had already requested and approved 20 airplanes in that fiscal year, is that not correct?

Mr. WALKER. I don't recall when they approved it. I stand by what I said, Senator. I said that—and the numbers are clear, and they're factbased—the fiscal year 2006 budget versus what's on the table now, which includes multiyear, but not solely multiyear; it also includes adding four aircraft and extending things out at least 2 years. This is $1.7 billion more than last year. Just look at the multiyear; it's an estimated savings of $225 million without considering termination charges, without considering any other risk. I stand by that. That's factbased.

Senator CHAMBLISS. Mr. Walker, you've spent a lot of time here today talking about budget savings and budget crunches and why we can't afford this and why we can't afford that. Did you ever think about the fact that we may not have been able to afford 29 airplanes this year?

Mr. WALKER. We have been saying for years, Senator, that the difference between wants, needs, affordability, and sustainability is great, and it's greater today than it was a year ago.

Senator CHAMBLISS. Mr. Walker, I would just say I'm a little bit embarrassed that, as a representative of the Government, you would come in here and say that there are not savings to the taxpayer in this multiyear contract, there are actually costs to the taxpayer in this contract because we are now buying 20 airplanes, as the President requested, as this committee approved, and as the House Armed Services Committee approved. I mean, that's just based on facts that are not in evidence, and it truly is embarrassing.

Mr. WALKER. Senator, we're saving an estimated $225 million, which I've said for the record, if the estimates are correct, without considering termination charges, without considering the other risk associated with entering into a multiyear. So, if you look at the multiyear, standing alone, I stand by what I said.

Senator CHAMBLISS. Second, let's look at your issue relative to funding. You talk about the fact that this airplane is underfunded by $674 million. There was an issue relative to incremental funding. That was originally proposed. It was rejected. You've already talked about that. Everybody agrees with that. We have incrementally funded ships, but we've never incrementally funded an aircraft. A decision was made by this committee, as well as by the House Armed Services Committee, in the authorizing process, not to have incremental funding. That was approved in advance by both committees, in advance of your letter dated June 20, 2006, and yet you still talked about incremental funding in your letter of June 20, 2006. Why do you do that?

Mr. WALKER. Senator, it was an issue that we had raised before. If it had already been settled, then I wouldn't have included it, had I known that at the time.

Senator, there's a very fluid environment up here, there are many things that happen that are in public view, and there are many things that happen that aren't in public view, and I can't be aware of everything.

Senator CHAMBLISS. Did anybody on your staff check the mark coming out of Senator McCain's committee to see whether or not incremental funding was included for this aircraft?

Mr. WALKER. They may have, Senator, but they didn't bring it my attention, if they did.

Senator CHAMBLISS. Third issue you raise is design stability. We've already had testimony here today—Senator Nelson asked the question to Secretary Wynne—about the most recent exercise that was done, where this plane has a 97-percent rating. Granted, it's had design problems from day one because of the sophistication of the aircraft, but now it's flying at a 97-percent rate. You don't mention any particular design stability issues in here, other than there have been problems in the past, and, therefore, under your rationale here, we would never satisfy design stability. Certainly, 97 percent ought to, but the way I read this, you would never have design stability.

Let me just ask you about stability in other programs, like the F/A–18. Would you not admit that, even though we had a multiyear on that, that there were actual design stability problems with the F/A–18?

Mr. WALKER. There were issues there and, by the way, Senator, I did not mention design stability today. I mean, there's no question that with regard to the base design, we have stability. There's no question. The only issue that you might have, and I didn't raise it today, was, it originally was an F–22, now it's an F–22A, and obviously there are issues with regard to ground attack. But I don't think that's relevant to the multiyear that we're talking about today.

Senator CHAMBLISS. All right, let's talk about significant savings. $225 million is the estimated savings, and that has not been refuted here today. Mr. Finley and Secretary Wynne have told you how they have calculated that. Do you have any problems with how that has been calculated, or is that a fair estimate, in your opinion?

Mr. WALKER. I have concerns about the IDA study, for the reasons that I said before and, to the extent that this is based upon that study, I have concerns.

Here's my concern about substantial savings, Senator. $225 million, in absolute terms, is a lot of money. But I do not believe you should just look at it in absolute terms. I think you also should look at it in relative terms, and I think you also need to look at it with regard to the risk associated with that $225 million. I've already heard that people are now making an argument for a similar action for the V–22, and the basis they're giving for substantial savings is because their estimate is more than the F–22 savings. We need to have some standards, I would respectfully suggest. You need to have some standards in order to be comfortable that you are consistently making that determination, although, as the elect-

ed officials, you're the ones that have the right to make it, no matter what it is.

Senator CHAMBLISS. I'm just looking at a list of previous multiyear contracts, some of which are still in effect, some of which have already been completed, where we've saved $51 million on the F–414 engine. We saved $127 million on the C–17A engine. We saved $92 million on the C–17 engine in another multiyear. We saved $173 million on the KC–130J multiyear for the Marine Corps and $246 million on an F–16 multiyear.

Senator MCCAIN. Senator Chambliss, you're going to have to truncate a little bit here. You've been 15 minutes, so far.

Senator CHAMBLISS. I'm sorry, Mr. Chairman. I promise, I'm close to the end.

What about all those multiyears? Should they not have been entered into?

Mr. WALKER. The question I would ask you, Senator, is, what percentage of the estimated production cost did that represent? I think you'll find out it was a lot higher than this. Believe me I understand this. I used to live in Marietta, so I'm very familiar with the——

Senator CHAMBLISS. Let's talk about that. The F–414 engine was 2.8 percent. The C–17 multiyear fiscal year 1997 to 2003 was 5 percent. There's another one here that is 5.7 percent. I don't know. All I would say is, significant savings of $225 million in south Georgia is a lot of money, and my taxpayers and my constituents appreciate any amount of money we can save, especially when it comes to $225 million.

That's all I have, Mr. Chairman.

Senator MCCAIN. Thank you, Senator Chambliss.

Just very briefly, Secretary Wynne, did you ask IDA to analyze the effects of F–22 procurement on the JSF production line? I don't believe you did. I think that's important.

Secretary WYNNE. I don't think so, Senator.

Senator MCCAIN. I think that's an important factor. Because, as Mr. Walker said, and I said in my opening statement, everyone knows that we are facing a serious, serious crunch on procurement because of the costs of the war, and decreasing defense spending. I notice that the Senate and House Appropriations Committees have cut money from defense appropriations. Whether they should or not, they have. I really believe that we should base this decision in the entire context of our defense procurement practices.

So, I thank the witnesses. I'd be glad to hear your responses, Secretary Wynne, Mr. Walker, or Secretary Finley.

Secretary WYNNE. Senator, I've always appreciated your point of inquiry and, in this case, I think the needs of the airmen to make sure we give them the right weaponry will be best met here by doing this. I can appreciate the concerns.

Senator MCCAIN. But, unfortunately, those choices cannot be made in a vacuum.

Mr. Walker or Secretary Finley, do you have any concluding comments?

Mr. WALKER. I would just say, Senator, that you're correct that the crunch is coming. While obviously we want to look every way that we can to save money—and $225 million is a lot of money, in

my view—at the same point in time, we need flexibility, because we don't know how bad the crunch is going to be and there is a ripple effect with regard to other platforms, both within the Air Force as well as within DOD, and, frankly, outside the DOD.

Senator MCCAIN. Secretary Finley, would you like to make any closing comment?

Mr. FINLEY. I'd like to thank you, Mr. Chairman, for your time and thank the subcommittee for their questions. I do believe the multiyear procurement, based on the information I've seen so far, is the right thing to do for F–22, sir. I completely pledge to work with this committee and with you, Mr. Chairman, on acquisition excellence as we move forward.

Thank you.

Senator MCCAIN. Thank you very much.

We'll ask the second panel, which is David Newman, the principal analyst in defense in the Congressional Budget Office (CBO); J. Richard Nelson, who's a research staff member with the Operational Evaluation Division of IDA; Christopher Bolkcom, who's a specialist in national defense in the Congressional Research Service (CRS); and Danielle Brian, who's the executive director for the Project on Government Oversight (POGO).

Senator CHAMBLISS. Mr. Chairman?

Senator MCCAIN. Yes, sir.

Senator CHAMBLISS. I would ask unanimous consent that Mr. Walker's letters dated June 20, 2006, and July 6, 2006, be entered in the record, along with the table of previous multiyears.

Senator MCCAIN. Without objection.

[The information referred to follows:]

United States Government Accountability Office
Washington, DC 20548

June 20, 2006

The Honorable C.W. Bill Young
Chairman
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Subject: *Tactical Aircraft: DOD Should Present a New F-22A Business Case before Making Further Investments*

Dear Mr. Chairman:

The F-22A is the Air Force's next generation air superiority[1] fighter aircraft. It incorporates a low observable (stealth) and highly maneuverable airframe, advanced integrated avionics, and a new engine capable of sustained supersonic flight without the use of afterburners. It was originally designed to counter threats posed by the Soviet Union and was intended to replace the F-15 fighter in the air-to-air combat role. However, the Air Force now plans to add a more robust ground attack and intelligence-gathering capability not previously envisioned but now considered "necessary" to increase the utility of the aircraft. In December 2005, the Air Force changed designations from the F/A-22 to the F-22A. The aircraft maintained all current capabilities as well as the expanded ground attack capabilities. Officials have initiated a modernization program to develop and integrate these new capabilities.

In March 2005,[2] we reported that despite substantial changes to the F-22A program since it started in 1986, Air Force leaders have not developed a new business case for investing billions more dollars to modernize the aircraft. Over time quantities have been reduced, and in recent years both funding and quantities have been in a state of flux. Given significant changes in quantities and planned capabilities, the large investments still planned, and the potential for further changes, you requested that we review the F-22A program. Specifically, we assessed the need for a new business case[3] before further investments are made in the F-22A program and statutory criteria the Air Force is required to meet to enter a multiyear contract for the remaining aircraft.

To assess the Air Force's business case for further investments in the F-22A program, we reviewed recent Office of the Secretary of Defense Program Budget Decisions (PBDs) and F-22A requirements documents. We also reviewed F-22A planned modernization schedules and documents and interviewed

[1] Air superiority is the degree of air dominance that allows the conduct of operations by land, sea, and air forces without prohibitive interference by the enemy.

[2] GAO, *Tactical Aircraft: Air Force Still Needs Business Case to Support F/A-22 Quantities and Increased Capabilities*, GAO-05-304 (Washington, D.C.: Mar. 15, 2005).

[3] A business case provides demonstrated evidence that (1) the warfighter need exists and that it can best be met with the chosen concept and (2) the concept can be developed and produced within existing resources—technologies, design, funding, and time. Establishing a business case calls for a realistic assessment of risks and costs; doing otherwise undermines the intent of the business case and invites failure.

program officials from the F-22A program office, Air Combat Command, and the Air Force Program Executive Officer for Tactical Air. To assess the Air Force's proposed use of a multiyear contract for the remaining F-22As, we compared program documentation on cost, schedule, and performance with statutory criteria for entering into a multiyear contract. We conducted our review between August 2005 and April 2006 in accordance with generally accepted government auditing standards.

Summary

Based on our review, in our opinion, the DOD has not demonstrated the need or value for making further investments in the F-22A program. The Air Force's current stated "need" is for 381 F-22As to satisfy air-to-air missions and recently added requirements for more robust ground attack and intelligence-gathering capabilities. However, because of past cost overruns and current budget constraints, the Office of the Secretary of Defense (OSD) states that it can now afford only 183 F-22As. This leaves a 198-aircraft gap between the Air Force's stated need and what is currently affordable. The Air Force is planning to invest about $4.4 billion through 2011 to add more robust ground attack and intelligence gathering capabilities for the F-22A. However, because of the large aircraft gap between stated Air Force requirements and current and future budget realities, it may not be prudent to make additional investments for these new missions and capabilities. Furthermore, alternatives such as the Joint Strike Fighter and F-15 might be able to execute ground attack more cost-effectively given the substantially fewer numbers of F-22As that OSD has committed to buy.

In December 2005, OSD restructured the F-22A program by extending production to 2010, adding 4 aircraft for a total planned procurement of 183 F-22As and adding $1 billion to the procurement program. Under the restructured acquisition program, the Air Force is planning to procure a total of 60 F-22As in a multiyear procurement. However, in the Air Force's multiyear procurement justification package sent to Congress on May 16, 2006, it stated that an additional $674 million is needed to fully fund the multiyear program being proposed. Our work led us to make observations on issues that could affect the Air Force's ability to satisfy several of the statutory criteria for entering into a multiyear contract, including the documentation of savings, a stable design, and available funding.

We believe the Congress should consider withholding additional funding for procurement and modernization until the Department completes a comprehensive business case that addresses the concerns we have raised herein. In response to a draft of this report, the Department stated that a recently completed Joint Air Dominance (JAD) study conducted by DOD adequately identified the quantity and mix of tactical aircraft needed and thus already satisfied the intent of our recommendation. We have asked OSD to provide us access to the JAD study, but it has not yet done so. We plan to pursue this matter with the Department. However, because Congressional deliberations on this issue are ongoing, we believe it is important to provide the data and analysis in the report at this time. Given the way this program has unfolded, with frequently changing OSD-approved requirements, repeated cost overruns, and given that DOD did not object to the data and analysis contained in the report, we are not changing our matter for Congressional consideration. If Congress does decide to provide more funding for the F-22A program, that funding should be conditioned on DOD providing the JAD study and subjecting it to independent review to ensure that it provides adequate justification for sound investment of taxpayer resources.

Background

The F-22A began development in 1986 to replace the F-15 air superiority aircraft. The continued need for the F-22A, the quantities required, and modification costs to perform its mission have been the subject of a continuing debate within DOD and the Congress. Supporters cite its advanced features—

stealth, supercruise speed, maneuverability, and integrated avionics—as integral to the Air Force's Global Strike initiative and for maintaining air superiority over potential future adversaries.[4] Critics argue that the Soviet threat the fighter was originally designed to counter no longer exists and that its remaining budget dollars could be better invested in enhancing current air assets and acquiring new and more transformational capabilities that will allow DOD to meet evolving threats. The Air Force has already committed funds to acquire 122 F-22As. To complete the procurement program, it now plans to buy the remaining F-22As using a 3-year multiyear contract that ends procurement in 2010. To begin the multiyear strategy, the Air Force has included $2.0 billion for advance procurement of parts and subassembly activities in its fiscal year 2007 budget request. Additionally, it has included $800 million for continuing development and modifications of existing aircraft.

DOD Has Not Completed a New Business Case to Justify Further Investments in the F-22A Program

The Air Force's business case for the F-22A program is unexecutable as planned because there is a significant mismatch between the Air Force's stated "need" for the F-22A aircraft and the resources OSD is willing to commit. According to Air Force officials, a minimum of 381 F-22A aircraft are needed to satisfy today's national security requirements, yet OSD states it can only afford to buy 183 F-22A aircraft. This results in a 198-aircraft gap in capability. Additionally, the Air Force now states a "need" for greater ground attack and intelligence-gathering capabilities, not included in the existing business case that will require an extensive modernization program. The value of this planned investment in modernization is highly questionable absent a new business case that supports the minimum capability-based need, given credible current and future threats, and that considers various options that are both affordable and sustainable over time.

The Air Force states a need for one squadron of 24 F-22A aircraft for each of the 10 Air Expeditionary Forces, the planned organization of the Air Force aircraft and personnel for operations and deployments. This requirement is established to carry out missions including support in major regional conflicts, home land security, and others. According to the Air Force, this requires a total of 381 F-22As, 240 primary aircraft and 141 aircraft for training, attrition, and to allow for periodic aircraft depot maintenance.

OSD has restructured the F-22A acquisition program twice in the last 2 years (in December 2004 and December 2005) to free up funds for other priorities. These decisions have created a mismatch between the Air Force's stated requirements and what OSD considers an affordable quantity of F-22As. In December 2004, OSD reduced the program to 179 F-22As to save about $10.5 billion. This budget decision also terminated procurement in 2008. Then in December 2005, OSD changed the F-22A program again, adding $1 billion to extend production for 2 years to ensure a 5th generation fighter[5] aircraft production line would remain in operation in case the Joint Strike Fighter experienced delays or problems. OSD also added 4 aircraft for a total planned procurement of 183 F-22As.

The Air Force is currently planning to provide the F-22A with greater ground attack and intelligence-gathering capabilities. It estimates these will cost about $4.4 billion between 2005 and 2011. It is also

[4] Global Strike is one of six complementary concepts of operations laying out the Air Force's ability to rapidly plan and deliver limited-duration and extended attacks against targets.

[5] F-22A and F-35 are considered 5th generation fighter aircraft as compared to the F-15, F-16, F/A-18 and F-117. The primary characteristics are Very Low Observable (VLO) stealth and information fusion capabilities that make 5th generation aircraft more survivable and lethal.

planning additional modernization efforts for more of these capabilities in the future, but the cost, content, and timing has not yet been determined. However, the 198- aircraft gap between the Air Force's stated "requirement" and the planned procurement quantities raises questions on whether the F-22A will be able to carry out its planned missions. The Air Force is buying less than half the required 381 aircraft to fill out its planned organizational structure—necessary to carry out planned air-to-air, ground attack, and intelligence-gathering missions. Other alternatives could be available to carry out the ground attack and intelligence gathering capabilities. For example, DOD is also investing billions of dollars to develop the Joint Strike Fighter aircraft—a 5th generation fighter-intended for ground attack and billions of dollars to develop intelligence, surveillance, and reconnaissance platforms and sensors.

Air Force Is Requesting to Use a Multiyear Contract for the F-22A

The Air Force is proposing to buy the remaining 60 F-22As over a 3 year period with a multiyear contract and submitted its justification to the Congress on May 16, 2006.[6] To enter into a multiyear contract the Air Force must first meet the statutory criteria listed in 10 U.S.C. § 2306b (a). Table 1 shows the six criteria that must be satisfied before entering into a multiyear contract and our observations on issues that could affect the Air Force's ability to satisfy several of the criteria.

[6] The Air Force needs statutory authorization for its proposed multiyear contract under 10 U.S.C. § 2306b and the annual DOD appropriations act.

Table 1: Observations of F-22A Multiyear Contract Criteria as of April 2006

Multiyear criteria	GAO observations
Contract will result in substantial savings	The Air Force has not completed an estimate of savings, but its preliminary indications are a maximum of 5 percent savings. However, when the unit procurement costs for the planned multiyear approach is compared to how the Air Force had previously planned to buy the remaining aircraft, the unit procurement costs increase under multiyear.
Minimum need expected to remain substantially unchanged during contract period in terms of production rates and total quantities	Quantities have continually been in a state of flux in the F-22A program including changes in the last two budget submissions.
Reasonable expectation agency head will request funding at required level to avoid contract cancellation	The Air Force has indicated that its multiyear budget is currently under funded by $674 million. Further, it is proposing to use incremental funding rather than fully funding each aircraft lot.
There is stable design, and technical risks are not excessive	While the design for the baseline F-22A aircraft, designed primarily for an air superiority role, is stable, the design for the ground attack capability to be added has not been demonstrated and thus cannot be considered "stable."
Estimates of contract cost and cost avoidance are realistic	The Air Force has not completed its analysis of contract cost or cost avoidance at this time.
Use of contract will promote national security of the United States	No observation.

Source: GAO Analysis and 10 U.S.C. 2306b.

The Air Force has requested statutory authorization for a multiyear contract for the remaining F-22As as part of the fiscal year 2007 authorization and budget process in order to award the contract in early 2007. As shown in the table above, we believe there are some critical considerations that need to be addressed before the multiyear plan can be justified. These include the following considerations:

Savings—The Air Force stated in its May 16, 2006, multiyear justification package that cost avoidance would approximate $225 million or about 2.7 percent. This is based on comparing three annual contracts to a single multiyear contract to buy 56 aircraft. The document also identifies a need for an additional $674 million to fully fund a 60 aircraft multiyear contract as was proposed in the fiscal year 2007 President's budget. While building an estimate for three separate annual contracts provides a basis to compare to a multiyear approach, it is not how the Air Force had previously planned to buy the aircraft remaining in the F-22A program. The fiscal year 2006 President's Budget included procurement costs to buy the remaining 56 F-22As in two lots—29 F-22As in 2007 and 27 F-22As in 2008. If the unit procurement costs of this previous plan are compared to the planned multiyear procurement unit costs for 60 aircraft as proposed in the fiscal year 2007 President's Budget, the unit costs increase by 10 percent. In other words, the unit procurement costs increase from $166 million per aircraft to $183 million per aircraft for the proposed multiyear contract.

Funding—The Air Force has stated that the proposed multiyear plan for 60 aircraft is under funded by about $674 million. The Air Force believes it will need these funds in fiscal years 2009 and 2010. Additionally, the Air Force has proposed using incremental funding to pay for the multiyear contract. Instead of fully funding the buy for each fiscal year, it plans four funding increments—economic order quantity, advanced buy, subsystem, and final assembly. Incremental funding for multiyear procurement is neither permitted by the annual DOD appropriations act,[7] nor the multiyear authorizing statute which requires that funds only be obligated under a multiyear contract "for procurement of a complete and usable end item."[8] However, the Air Force is seeking an exception to these requirements in its request to Congress for statutory authorization for the multiyear contract. The Air Force's proposed F-22A multiyear strategy includes an increment of funding in each fiscal year to begin manufacturing subsystems, not considered a complete and useable end item. For example, the fiscal year 2007 budget request includes $1.5 billion for subassemblies. It would not be until fiscal year 2008 that the final assembly would be fully funded.

Design Stability—The baseline F-22A aircraft, designed primarily for the air superiority role, has successfully completed development and initial operational testing, and its design is stable for that particular mission. However, the Air Force has stated that to be "effective" in the future a more robust ground attack capability is needed for the F-22A. It plans to spend several billions of additional dollars to add this ground attack capability. A key to the success of this effort is the development and integration of a new radar. The Air Force expects to take delivery of the first aircraft with the new radar in November 2006 but the software needed to provide the robust ground attack capability will not be completed until 2010. According to a representative of the Director, Operational Test and Evaluation (DOT&E), the key to achieving a more robust ground attack capability will center on the integration of this new radar. A December 2005 report issued by the Defense Contract Management Agency stated that problems encountered during the test and integration of the new radar has added risk to the development program. Until software and integration testing in the F-22A have been successfully completed, we consider the design unstable creating the potential for significant cost overruns and schedule delays.

Conclusions

The F-22A development has spanned more than a 19-year period during which time requirements have changed both in terms of the quantity of aircraft needed and the capabilities that would be incorporated. At the same time, new budgetary constraints have grown and other priorities have come to the forefront in DOD, including the need for funding the war on terrorism. While the Air Force's stated need is 381 F-22As, OSD will commit to fund only 183. The Air Force also states the basic capabilities developed for the F-22 are not sufficient to be effective in the current and future national security environment. The conditions facing the F-22A program are significantly different than those addressed by the original business case, yet despite these significant changes the Air Force has not developed a new business case to justify currently planned and proposed additional investments in the F-22A. Given our nation's growing fiscal challenges, the changing security threats, and prevailing best business practices for acquisitions, it is highly questionable whether it is prudent to continue in the current path proposed by

[7] Section 8008 of the fiscal years 2005 and 2006 Department of Defense Appropriations Acts (Public Laws 108-287 and 109-148, respectively) require full funding of units to be procured.

[8] 10 U.S.C. § 2306b (i)(4)(A). This restriction was added by section 820 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314).

the Air Force. DOD must begin to make the difficult choices required to counter current and credible future threats at current and expected future resource levels because it will not have enough money to purchase everything that it wants. Furthermore, going to a multiyear procurement strategy appears to be more costly than previous Air Force plans and would tie up significant amounts of funds at a time when DOD already has more wants than it is likely to be able to afford and sustain over time. The Department needs to reevaluate the value delivered by continuing production of the F-22A past what it has already committed to by examining the likely future threat and risk environment, the funding it can make available relative to other demands, and the alternative ways to achieve air-to-air and air-to-ground military superiority.

Matters for Congressional Consideration

Because of the large disparity between what the Air Force wants for the F-22A program and what OSD has committed to fund, there is a significant break in the business case to justify buying more F-22As. For this reason, Congress may want to consider withholding additional funding for procurement and modernization until the Department completes a comprehensive business case that addresses the concerns we have raised herein. The additional issues surrounding this matter and our reporting are discussed in the Agency Comment section of this report.

Recommendation

Because of the significant and continuing changes in the F-22A program that have created an environment of investment uncertainty as well as the significant mismatch between stated Air Force needs and wants and future resource levels, we recommend that Secretary of Defense delay further investments in F-22A procurement and modernization until it completes a comprehensive business case analysis that adequately considers alternatives, justifies the need for further investments, and reconciles the numbers of F-22As that are needed (i.e. based on credible current and future threats and considering other alternative approaches) as well as affordable and sustainable (i.e., based on current and expected DOD resource levels).

Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD stated that it did not concur with our recommendation that the Secretary of Defense delay further investments in F-22A procurement and modernization until it completes a new business case analysis that adequately considers alternatives, justifies the need for further investments, and reconciles the numbers of F-22As that are needed. They stated a Joint Air Dominance (JAD) study conducted by DOD adequately identified the quantity and mix of tactical aircraft needed. DOD stated that delaying investments in the F-22A would disrupt production and create program instability. DOD also stated that keeping the F-22A production line active, preserves the Department's options and sustains the industrial base for efficient transition to Joint Strike Fighter production.

Preserving options and the industrial bases will be costly. The 2007 future year's defense plan added $1.05 billion for a 60 aircraft multiyear procurement contract and subsequently the Air Force identified an additional $674 million needed to fully fund this plan. Therefore, the total additional multiyear procurement cost is $1.724 billion. Furthermore, it will add two years to the F-22A procurement program. This represents significant opportunity cost. That is, the funding used here will not be available to support other DOD priorities. If preserving options and the industrial base are primary reasons for these added costs and the extension of the procurement program, DOD should make them more transparent to the Congress as it seeks authorizations and appropriations to execute this plan.

As to the Department's position that they have already conducted the business case called for in our recommendation, we asked OSD to provide us access to the JAD study, but they have not yet done so. Because Congressional deliberations are ongoing, we believe it is important to provide the data and analysis in the report at this time. Given the way this program has unfolded, with frequently changing OSD-approved requirements, repeated cost overruns, and delays in fielding capability to the warfighter, and given that DOD did not object to the data and analysis contained in the report, we are not changing our matter for Congressional consideration. If Congress does decide to provide more funding for the F-22A program, that funding should be conditioned on DOD providing the JAD study and subjecting it to independent review to ensure that it provides adequate justification for sound investment of taxpayer resources.

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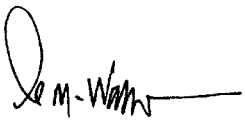
We are sending copies of this report to the Secretary of Defense; the Director, Office of Management and Budget; and interested congressional committees. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

Should you or your staff have any questions on matters discussed in this report, please contact Michael Sullivan on (202) 512-4163 or Michael Hazard on 937-258-7917. Principal contributors to this report were Marvin Bonner and Daniel Chen.

Sincerely



David M. Walker
Comptroller General
Of the United States

Enclosure

Enclosure

Comments from the Department of Defense

DEPUTY UNDER SECRETARY OF DEFENSE
3015 DEFENSE PENTAGON
WASHINGTON, DC 20301-3015

ACQUISITION AND TECHNOLOGY

JUN - 8 2006

Mr. David M. Walker
Comptroller General of the United States
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dave,

~~Dear Mr. Walker:~~

This is the Department of Defense (DoD) response to the GAO draft report, 'Tactical Aircraft: DOD Should Present a New F-22 Business Case Before Making Further Investments,' dated May 8, 2006 (GAO Code 120474/GAO-06-455R).

The Department does not agree with draft GAO report's recommendation to delay further investment in the F-22. While the Department agrees with the GAO's emphasis on the importance of supporting our procurement decisions with appropriate "Business Case" analysis, we have performed such analysis to support F-22 and tactical aircraft force structure decisions, and will continue to do so. Additional information and rationale for the Department's position is summarized below.

Implementing the GAO's recommendation to delay investment in the F-22 would disrupt production and create program instability. This instability would be detrimental to our nation's defense capabilities and our tactical aircraft industrial base. Over the past several procurement lots, the Air Force has been very successfully working with the prime contractor to drive down costs. Unit flyaway costs have come down 35% between Lot 1 and Lot 5. If stopped, production re-start would be very costly and difficult to resume, breaking this positive trend. Likewise, there is considerable modernization work ongoing. To stop this work would result in large termination costs and would be very costly to resume. Multiple GAO reports have noted the negative impact that program instability has on program cost, schedule, and performance.

The assumptions on which the GAO's recommendations are based were not understood. The quantity and mix of tactical aircraft to be procured by the Department has been and remains an area of significant "Business Case" analysis. As the geopolitical and fiscal environment changes, we continually reassess national security requirements and adjust our force structure as needed. Keeping the F-22 production line active,

preserves the Department's options and sustains the industrial base for efficient transition to Joint Strike fighter production.

To support the Quadrennial Defense Review and preparation of the President's Fiscal Year 2007 Budget (PB07), the Department performed a Joint Air Dominance (JAD) Study. The JAD Study examined options for varying levels within the strike fighter mix. The Department looked at the war scenarios and cost implications of buying fewer variants of Joint Strike Fighters, increasing and decreasing the number of F-22s, and buying more legacy aircraft at the expense of fewer fifth generation platforms. The results of these analyses are reflected in PB07, which sets forth a balanced portfolio of tactical aircraft assets, including Joint Strike Fighter, F-22 and F/A-18E/F. The draft GAO report makes note of, "the large disparity between what the Air Force wants for the F-22A program and what OSD has committed to fund, there is a significant break in the business case to justify buying more F-22As." The 381 aircraft the Air Force analysis indicates are required is a fiscally unconstrained projection of Service needs. The QDR analysis reflects fiscal realities and the need to address competing defense priorities. The JAD analysis showed that a balanced force structure mix of fifth generation fighters, with legacy F/A-18E/Fs, F-15Es and conventionally armed bombers, best met our requirements. Buying fifth generation tactical aircraft assets (F-22 and JSF), for both the Air Force and the Department of the Navy, optimized capability, affordability, and mitigated risk better than other options.

A detailed response is attached.

Thank you for the opportunity to respond to this draft report.

Sincerely,

James I. Finley

Attachments:
As stated

GAO DRAFT REPORT - DATED MAY 8, 2006
GAO CODE 120474/GAO-06-455R

"TACTICAL AIRCRAFT: DOD SHOULD PRESENT A NEW F-22 BUSINESS CASE BEFORE MAKING FURTHER INVESTMENTS"

DEPARTMENT OF DEFENSE COMMENTS TO THE RECOMMENDATION

RECOMMENDATION: The GAO recommended that the Secretary of Defense delay further investments in F-22A procurement and modernization until it completes a comprehensive business case analysis that adequately considers alternatives, justifies the need for further investments, and reconciles the numbers of F-22As that are needed (i.e., based on credible current and future threats and considering other alternative approaches) as well as affordable and sustainable (i.e. based on current and expected DoD resource levels) (p. 7 GAO Draft Report).

DOD RESPONSE: Nonconcur with the GAO recommendation.

- The F-22 is currently in full rate production. A delay in F-22 procurement would result in production shut down and impact the entire F-22 supplier base consisting of thousands of companies. Once interrupted, it would be very costly, and time consuming to resurrect. The F-22 industrial base involves many of the same companies that will manufacture components for the Joint Strike Fighter when it enters production. Disruption of F-22 production could cause many of those suppliers to move to other business activities, seriously weakening the nation's tactical aircraft industrial base.
- The assumption on which this recommendation was made is not accurate. The quantity and mix of tactical aircraft to be procured by the department has been and remains the subject of continuous analysis. Most recently, in support of the Quadrennial Defense Review, the Department examined a number of options for varying levels within the strike fighter mix. The results of this Joint Air Dominance (JAD) study are reflected in the President's Fiscal Year 2007 Budget which sets forth a balanced portfolio of tactical aircraft assets, including Joint Strike Fighter, F-22 and F/A-18E/F Super Hornet aircraft that have already proven their worth in the Global War On Terrorism. We looked at the war fight and cost implications of buying fewer variants of Joint Strike Fighters, increasing and decreasing the number of F-22s, and buying more legacy aircraft at the expense of fewer fifth generation platforms. Our analysis showed that buying fifth generation tactical aircraft (F-22 and JSF), for both the Air Force and the Department of the Navy, optimized capabilities and mitigated risk better than other options.

- In the JAD studies supporting the Quadrennial Defense Review, the F-22 clearly demonstrated its superiority as an air dominance fighter with the JSF also showing strong capabilities. These fifth generation fighters are needed in the early days of a conflict to gain air dominance by neutralizing advanced air and surface threats, and thereby "opening the door" for follow-on joint forces, including non-stealthy legacy tactical aviation and long-range strike aircraft. The quantity of 183 F-22s, reflected in the PB07, incorporates the ability to reposition some of the F-22 aircraft to other theaters, or to the homeland, after suppression of the major threats to air dominance in the early days of a conflict. Changing the mix of F-22 and JSF aircraft only marginally increased effectiveness. When fielded, the tri-service Joint Strike Fighters, with their superior strike capability, will complement F-22 capabilities and can remain in theater with legacy aircraft to conduct strike missions and suppress any remaining air dominance threats. The logistics plans used in the analysis reflected the Combatant Commander's war plans.
- The analysis used the projected enemy's order of battle provided by the Central Intelligence Agency/Defense Intelligence Agency-approved Joint Capability Force Assessment for the 2024 timeframe. The selected scenario for the modeling was the most challenging to air dominance in terms of enemy capability and quantity, and it was in accordance with the Joint Staff Multi-Service Force Deployment. The results showed that a balanced force structure mix of fifth generation fighters with legacy F/A-18E/Fs, F-15Es, and conventionally armed bombers met our requirements and balanced cost and risk.
- Modernization and continuous improvement are characteristics of many defense programs and are essential to maintaining the military advantage of our forces in an environment of rapid proliferation of advanced technologies. The Department's decision to hold F-22 procurement at 183 aircraft, increases the importance of the modernization program. With fewer aircraft than originally envisioned, the F-22 must bring a high level of capability with continuous improvement, to maintain the U.S. advantage in air dominance.

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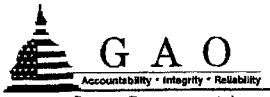

Comptroller General
of the United States

United States Government Accountability Office
Washington, DC 20548

July 6, 2006

The Honorable John Warner
Chairman
The Honorable Carl Levin
Ranking Minority Member
Committee on Armed Services
United States Senate

The Honorable Ted Stevens
Chairman
The Honorable Daniel K. Inouye
Ranking Minority Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Duncan L. Hunter
Chairman
The Honorable Ike Skelton
Ranking Minority Member
Committee on Armed Services
House of Representatives

The Honorable C.W. Bill Young
Chairman
The Honorable John P. Murtha
Ranking Minority Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Press reports and congressional debate on our recent correspondence concerning GAO's work on the F-22A program contain certain misstatements that I believe need to be addressed. Some have asserted that our correspondence relied upon old data and included erroneous information, using as an example our statement that the cost of the F-22A's procured under the proposed multiyear contract will be higher. We

stand behind our report and its findings, and do not believe that the Department of Defense (DOD) has demonstrated that it has met all the requirements for a multiyear procurement.

To set the record straight, our report stated that the fiscal year 2006 President's Budget included procurement costs to buy 56 remaining aircraft in two lots that amounted to an average unit procurement cost for each plane of $166 million. The fiscal year 2007 President's Budget, which extends the program 2 years and proposes multiyear procurement, includes procurement costs to buy 60 remaining aircraft in three lots that amounts to an average unit cost for each plane of $183 million, or about 10 percent more than the previous figure. These figures are fact, not opinion based.

One of the purposes of a multiyear procurement commitment is to reduce costs. There are statutory criteria that must be met before a multiyear contract can be entered into, including a requirement for a finding that the contract will result in substantial savings. As we observed in our correspondence, there are serious questions as to whether this and other multiyear criteria have been satisfied.

With regard to the claim that our correspondence relied on old data in finding continued funding instability on the program, our report clearly points out that the Air Force itself has identified that its plan for the F-22A multiyear procurement is underfunded by $674 million at this time. In addition, some stated that the proposed incremental funding of the multiyear procurement has been abandoned; however, the Department's pending multiyear procurement proposal as submitted to the Congress still includes it.

Our recommendation was not to delay the F-22A program as some have said. We recommended that the Department and the Congress not fund anymore investment in the program until it had an updated business case for further investment. In fact, the new plan that includes multiyear procurement delays the program by two years and procures less aircraft annually than the optimum production rate. Importantly, we were briefed on the Department's Quadrennial Defense Review and found that it differs from the business case we have called for in one critically important respect—the DOD study was <u>not</u> resource constrained. Employing a nonresource-constrained approach is imprudent and unrealistic, especially given the growing gap between the department's procurement wants and its likely future resource levels.

The F-22A program is also emblematic of systemic problems in DOD's acquisition system. First, the F-22A was approved in an environment with no clear agreement on enterprise-wide priorities and without due consideration of current and likely future resource constraints . Second, the requirements and key program specifications were not fixed when the program began and have changed over its decades-long development. Third, key procurement decisions were made without adequate consideration of technology and other program risks with costly consequences. And finally, in this program as in many others, DOD has paid out significant incentive and award fees to its contractors despite large cost overruns and schedule delays.

Our nation's large and growing long term fiscal gap requires that the federal government begin making hard decisions. In this context, we continue to believe that Congress needs to reevaluate a range of existing federal programs and policies, including the F-22A program, based on credible current and future threats, current and expected future national budget levels and priorities, and considering various reasonable and realistic ways to meet the warfighter's true needs. As it stands, the current F-22A program's increased costs will eventually serve to reduce the Department's options in fulfilling other important national security priorities.

If you or any of your staff have any questions concerning this important issue, please do not hesitate to call me, Katherine Schinasi, or Michael Sullivan on (202) 512-4841.

David M. Walker
Comptroller General
of the United States

Page 3

Senator McCain. Welcome, to the witnesses.

Mr. Newman, we'll begin with you, sir.

I apologize for keeping you waiting. It's obviously been a spirited discussion.

STATEMENT OF DAVID B. NEWMAN, PRINCIPAL ANALYST IN DEFENSE, CONGRESSIONAL BUDGET OFFICE

Mr. NEWMAN. Mr. Chairman and members of the subcommittee, I'm pleased to appear before you today to discuss the multiyear procurement proposal for the F–22 program.

The additional material provided by the Air Force in May leads me to the following three observations. First, the estimated savings from that contract are smaller, in percentage terms, than from other multiyear procurement programs. Second, in dollars, the savings are about the same as the unfunded cancellation liability the Air Force would incur when it signs the F–22 contract. Third, Congress should consider those factors and the uncertainty of the estimated savings when determining whether to grant multiyear procurement authority.

The estimated savings of just over 2 percent are smaller than savings estimated for other multiyear procurement contracts, which have ranged from 5 percent to 11 percent. Because the F–22 is more expensive than other fighters, the Air Force has already taken advantage of most potential cost-reduction initiatives. There just aren't that many opportunities left for additional cost reductions at this point and because the Air Force will also buy fewer planes than were procured in other multiyear contracts, the opportunities for additional savings from this contract are limited.

While it no longer includes incremental funding, the Air Force's budget strategy for the contract is still a cause for concern. That strategy currently includes an unfunded cancellation ceiling estimated at $200 million in the first year of the contract. Although that liability has been described as a contingent liability, it is not. In fact, it is part of the Air Force's minimum liability under the contract.

The Government may cancel the multiyear contract at the end of any fiscal year if funds aren't available to proceed in the next year. But, because some nonrecurring costs may be spread over items that have yet to be produced, the Government could owe the contractor more than had been appropriated up to the point where the contract was canceled.

The Air Force would obligate the Government for the full cost of all 60 planes—that's over $10 billion—when it signs the contract. However, because it can cancel the contract at the end of the first year or the second year, the Government's minimum liability will be the sum of the production costs for the items already ordered and the cancellation cost for the end of that year. An appropriation that covered only the cost for each annual production lot as it was manufactured would be insufficient to finance that minimum obligation.

CBO concludes that an unfunded cancellation ceiling is not good budget practice. It distorts the resource allocation process by understating the costs and decisions made for the budget year, and may require future Congresses to find the resources to pay for decisions made today.

Ultimately, Congress must weigh the potential for savings against the risk, that additional funds that have to be provided if the contract is canceled. It must also consider that by authorizing DOD to make an upfront commitment to purchase additional air-

craft in subsequent years, it will reduce budget flexibility in those years as today's commitments consume resources and make them unavailable for tomorrow's requirements.

When considering whether to grant multiyear procurement authority, it is important to note that estimates from such contracts are inherently uncertain. The savings are based on the estimates of the cost of a multiyear procurement contract, versus annual contracts. Because DOD pursues only one or the other, but not both, there are no actual data for a comparison of cost to determine if savings are, in fact, realized. Also, some parts of the cost models that are used in estimates are inexact, so savings could be significantly different from estimates.

Congress will have to judge whether the estimated savings for the F–22 program, accounting for the inherent uncertainty, are enough to compensate for the risk that additional appropriations will be necessary if the contract is canceled, and for the loss of budget flexibility that Congress will face.

That concludes my remarks, gentlemen. I look forward to your questions.

[The prepared statement of Mr. Newman follows:]

PREPARED STATEMENT BY DAVID B. NEWMAN

Mr. Chairman, Senator Lieberman, and members of the subcommittee, I am pleased to appear before you today to discuss the Air Force's acquisition strategy for the F–22 fighter program. At your request, the Congressional Budget Office (CBO) has examined the proposal for a multiyear procurement contract for 60 aircraft, focusing specifically on the additional material that the Air Force submitted to Congress after the Airland Subcommittee's hearing on this matter on March 28, 2006.

When the Air Force proposed a multiyear procurement contract for 60 F–22As in February as part of the President's budget request for fiscal year 2007, it had not completed the analysis required by the statute that authorizes multiyear procurement (10 U.S.C. 2306b) to determine whether such a contract would result in "substantial savings" compared with the cost of procuring the aircraft through a series of annual contracts. At the request of the Department of Defense (DOD), the Institute for Defense Analyses (IDA) completed that analysis in May, in which it determined that procuring those aircraft through a multiyear contract could save $235 million, or about 2.2 percent, of the estimated $10.8 billion cost of procuring those aircraft through three annual contracts.[1,2]

After reviewing the material provided by the Air Force, I offer the following observations:

- The estimated savings from procuring the 60 F–22As through a multiyear contract are smaller in percentage terms than the savings estimated for other aircraft procurement programs.
- The Air Force does not intend to set aside funds to cover potential cancellation costs for the multiyear contract. It also has not requested funding to cover the full cost of the 60 aircraft that it will commit to buy when it signs the contract. Thus, if the requested funding is provided, the funds available to the Air Force for the F–22A procurement contract will be less than the government's minimum liability.
- The savings from procuring F–22As through a multiyear contract could differ from the amounts estimated because of the uncertainty inherent in such estimates.

[1] The cost of procuring the aircraft includes the costs of separate contracts for the air vehicles and the engines, as well as support expenses and other costs.

[2] In the budget justification documents submitted in May, the Air Force indicated that the amount of funding it intended to request for the F–22A program in the Future Years Defense Program for the 2007–2011 period would be sufficient to purchase only 56 aircraft and that an additional $674 million would be required to purchase all 60 planes envisioned in its multiyear procurement proposal. If that additional funding was not available, IDA estimated that the Air Force could save $225 million by procuring 56 aircraft through a multiyear procurement contract.

COMPARISON WITH OTHER MULTIYEAR PROCUREMENT PROGRAMS

The estimated savings from a multiyear procurement contract for F–22As are relatively small—as a percentage of contract costs—compared with the savings estimated for other multiyear procurement contracts for aircraft programs. For example, the Navy estimated that the multiyear contract to procure 210 F/A–18 E/F/G fighter/attack aircraft over the 2005–2009 period would save 11 percent compared with a series of annual contracts for those aircraft. In pursuing a multiyear contract to procure 80 C–17A intertheater transport aircraft over the 1997–2003 period, the Air Force anticipated savings of 5 percent in comparison with the cost of a series of annual contracts. Estimates of savings from multiyear contracts for other aircraft procurement programs, such as those for the C–130 cargo aircraft, the F–16 fighter, and the UH–60 helicopter, were between 5 percent and 11 percent.

The savings that could accrue from a multiyear procurement for the F–22A are lower than estimates for other programs for two reasons. First, the Air Force has already undertaken many cost-reduction initiatives prior to proposing the multiyear contract for the F–22A. A substantial portion of the savings that the military Services expect to realize from multiyear procurement contracts is derived from investments in equipment, facilities, materials, and techniques that improve the efficiency and reduce the cost of production processes. However, because the F–22A has turned out to be much more expensive than other fighter aircraft—procuring 182 aircraft will cost an average of $185 million per plane—the Air Force has already funded many cost-reduction initiatives during the development and initial production phases in an effort to hold down total costs.[3] As a result, few such initiatives remain to be funded as part of the proposed multiyear contract, reducing the savings available from that acquisition strategy.

A second explanation for the lower estimated savings is that the Air Force would buy fewer planes under the proposed multiyear contract for the F–22A than were procured under other aircraft programs. The Navy plans to purchase a total of 432 F/A–18 E/F/G aircraft by the time it completes a second multiyear procurement contract for those aircraft in 2009. The Air Force purchased 1,830 F–16 fighters under three sequential multiyear contracts over the 1982–1993 period. It also will acquire a total of 140 C–17 aircraft by the time it completes the second multiyear contract for that program next year. Because relatively few F–22A fighters remain to be procured under current plans—the Air Force has already ordered 122 of the 182 aircraft it intends to buy—the opportunity for savings is limited.

BUDGETING FOR MULTIYEAR PROCUREMENT

CBO's testimony before this subcommittee in March focused on two issues regarding the Air Force's acquisition strategy for the F–22A—incremental funding and unfunded cancellation liability. The Air Force had requested the authority to budget and pay for each annual production lot incrementally over a 2-year period rather than obtaining appropriations for the full cost of those aircraft in the year production was to begin. That plan would have reduced the amount of budget authority needed in the first year, although it would have increased the amount needed in subsequent years. Incremental funding might constrain the funding available for other programs in future years as programs that were partially funded in previous years continue to require the appropriation of budgetary resources. Because it does not display the full cost of decisions at the time they are made, incremental funding might also limit transparency and accountability and tilt the playing field in favor of expensive programs that benefit from such a funding arrangement. Because the Committees on Armed Services and Appropriations in both Houses disapprove of using incremental funding for the F–22A, the Air Force has indicated that it will submit a proposal to fully fund each annual lot of aircraft before that lot enters production.[4]

Under a multiyear contract, the Government may, at the end of each fiscal year, cancel its order for all remaining years of the contract if it notifies the contractor that funds are not available to proceed for the next fiscal year. Thus, cancellation

[3] The average procurement cost for each annual production lot has declined over time as the production process becomes more efficient. The Air Force will pay an average of $157 million per plane for the 24 aircraft it ordered this fiscal year. However, the average procurement cost of aircraft ordered in the next three production lots is expected to increase to about $175 million because the Air Force will procure those planes at a slower, less cost-effective rate of 20 aircraft each year.

[4] The committee reports accompanying the defense authorization and appropriation bills for 2007 indicate that funding will be provided for the full cost of the aircraft before they are ordered.

of a multiyear contract occurs between fiscal years if Congress does not provide the additional appropriations needed to continue. In such a contract, some nonrecurring costs may be allocated to items expected to be produced in future years. Therefore, if the contract is canceled, the Government may owe the contractor more than the amount appropriated for items produced in the years before the cancellation. The maximum liability for cancellation at the end of any given year is usually negotiated upfront and included in the terms of the contract.[5]

In the budget justification material that the Air Force submitted in May, it estimated that the multiyear contract for the F–22A could include a cancellation ceiling of approximately $200 million in the first year of the contract—approximately the same as the estimated savings from using such a contract. The Air Force does not intend to dedicate budget authority for that liability at the time it is incurred.

DOD does not request budget authority specifically for cancellation liability because it considers cancellation a contingent liability with only a remote probability of happening.[6] Although the amount of the Government's actual liability depends on how the program proceeds, its minimum liability is the sum of the production costs for the items ordered in the first year and the cancellation costs at the end of that year. Regardless of whether the multiyear procurement contract proceeds for the full term or is canceled early, the Government's initial obligation to the contractor will exceed the amount required to pay for the items ordered in the first year. For example, after the first year of the 3-year contract proposed for the F–22A, the Air Force could either cancel the remaining 2 years of production and pay the costs for cancellation, or it could continue production for the second year and pay for the cost of those aircraft. Under the multiyear contract, the Air Force would not have the option of forgoing future production lots without paying the cancellation charge. Thus, in no case would the government pay only the cost of the aircraft produced in the first year. An appropriation that covered only the cost for each annual production lot as it was manufactured would therefore be insufficient to finance the Government's minimum obligation under the multiyear contract.

The Air Force indicates that it may be able to pay contract cancellation costs with funds appropriated for procuring the F–22A, which suggests that there would be sufficient funds to pay both the cost of canceling future production lots and the cost of procuring the aircraft that had been ordered up to that point. However, if that were the case, the Air Force would be committing the same appropriations for both purposes simultaneously. But with no funds set aside specifically for cancellation costs, the Air Force would have to terminate orders for some of the aircraft that had already entered production if a decision was made to cancel subsequent orders. Thus, if it canceled the remaining years of the multiyear contract at the end of the first year, the Government not only would forego the aircraft to be produced in later years but also would not receive some of the planes it had ordered in the first year—and the taxpayers' investment in those aircraft would be lost. In particular, if the Government decided to cancel the contract at the end of the first year but had not set aside funds specifically for cancellation costs, it would not only forego the 40 aircraft that had not entered production, but, to free up funds for cancellation costs, also have to stop work on some of the 20 aircraft that had already been ordered. Alternatively, the Air Force could divert funds appropriated to procure a different aircraft to pay the cost of canceling the contract for the F–22A. However, to make such funds available to pay cancellation costs, the Air Force would have to buy fewer of that other aircraft.

DOD's failure to request funding for cancellation liability may distort the resource allocation process by understating the cost of decisions made for the budget year and may require future Congresses to find the resources to pay for decisions made today.

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[5] The maximum cancellation liability is known as the cancellation ceiling. Contract cancellation differs from contract termination. The Government has the right to end any contract early, when doing so is in the Government's interest, but must pay the contractor for any authorized work performed before it was notified to cease work. Contract termination is the act of rescinding orders for items for which funds have already been appropriated and on which work has already begun. The cost of terminating an annual procurement contract early should not exceed the available appropriations because an agency should have sufficient appropriations to cover all recurring and nonrecurring costs before it initiates an annual procurement contract.

[6] DOD is authorized by 10 U.S.C. 2306b to pay cancellation costs from funds originally available for the performance of the contract, appropriations currently available to procure the type of property at issue (in this case, other aircraft) and not otherwise obligated, or funds appropriated for cancellation payments.

ISSUES FOR CONGRESS

Neither the estimated savings nor the cancellation liability is large relative to the cost of the Air Force's proposed multiyear contract to procure the remaining F–22A aircraft. Congress must weigh the potential for savings against the risk that additional funds will have to be provided if the contract is canceled. It must also consider that, by authorizing DOD to commit to additional purchases in subsequent years, it will reduce budgetary flexibility in those years, as past commitments make resources unavailable for other requirements.

When considering those risks and benefits, it is important to note that estimates of savings from such contracts are inherently uncertain. The savings that might be realized from a multiyear procurement strategy are based on estimates of the costs of the two alternate approaches—multiyear procurement and annual contracts—made at the time the multiyear contract is proposed. Because DOD pursues only one of those approaches, there are no actual data for a comparison of the costs to determine if savings are realized. In this particular case, some of the cost-estimating relationships that IDA used to calculate the savings associated with several aircraft components are not strong. The savings could be significantly different from what has been estimated.

The statute authorizing multiyear procurement contracts requires that such contracts result in "substantial savings" but does not quantify in either dollars or percentage terms a threshold for meeting that requirement. Therefore, Congress will have to judge whether the estimated savings for the F–22A program are sufficient to compensate for the risk that additional appropriations will be necessary if the contract is canceled and for the loss of budgetary flexibility that it will face.

Senator MCCAIN. Thank you very much.

Dr. Nelson, welcome.

STATEMENT OF J. RICHARD NELSON, RESEARCH STAFF MEMBER, OPERATIONAL EVALUATION DIVISION, INSTITUTE FOR DEFENSE ANALYSES

Dr. NELSON. Thank you, Mr. Chairman and members of the subcommittee. I'm happy to be here to testify on this issue.

I need to begin by setting the record straight, because I was there. There is considerable confusion because of this morning's newspaper article about two studies at IDA. We were sponsored to do an independent cost estimate for the F/A–22 in September 2004, completed that study in August 2005, and delivered it to Congress. It was a congressionally-mandated study. Our sponsor was the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), who directed the task. I directed the work. It seemed logical to our sponsor that we continue with an examination of the F–22 multiyear business case analysis. Again, USD(AT&L) was the sponsor and directed the task and, again, I, at IDA, directed the work.

Admiral Blair attended reviews of the F–22 independent cost estimate, which we completed in August 2005. He was not chairman of the review. General Larry Welch chaired a high-level review panel, and our sponsor, AT&L, chaired a working-group level that included members of organizations in OSD, the Air Force, the contractors, and Defense Contract Audit Agency (DCAA) and Defense Contract Management Agency (DCMA).

Senator MCCAIN. So, let me get this straight. You were tasked to do an independent analysis, and it was staffed by Air Force personnel and Pentagon personnel. Thank you.

Dr. NELSON. For the independent cost estimate, we were tasked by USD(AT&L).

Senator MCCAIN. Fine. So, you included in the studies the Air Force personnel and Pentagon personnel.

Dr. NELSON. Yes, as reviewers.

Senator MCCAIN. Thank you. Then I hope you——

Dr. NELSON.—at the working level——

Senator MCCAIN.—don't call it independent. It's fine with me, but just don't call it independent.

Dr. NELSON. We did the work. We did the data collection.

Senator MCCAIN. I'm sure you did.

Dr. NELSON. We did the information collection. We did the analysis. We did the documentation. We did the report. It was an independent and objective piece of work. Admiral Blair did not attend the final reviews for this work. No officer of IDA attended the reviews of the F–22 multiyear procurement (MYP) business case analysis (BCA). So, Admiral——

Senator MCCAIN. Dr. Nelson, I asked you to come here to testify on the issue of the F–22 multiyear procurement proposal, and I would like to have that testimony, if we could have that, Doctor. I have not raised the issue of Admiral Blair, and I don't intend to. But I do intend to have your testimony on this issue, or you can be excused. Now, which do you prefer?

Dr. NELSON. Yes, sir. I will now do that.

I will now proceed with my testimony.

Senator MCCAIN. Thank you very much, Doctor.

Dr. NELSON. IDA's work was based on paper P–4116, copies of which have been provided extensively to the committee.

In January 2006, IDA was asked by the USD(AT&L) to conduct a BCA for a possible F–22A MYP. IDA's task was to estimate the cost savings to the Government of pursuing a multiyear procurement contract for the three final planned lots of the F–22A program, and a multiyear procurement contract was to be compared to three single-year procurement contracts. The study team collected existing F–22 data. We updated the work from the independent cost estimate. We added considerable data on the basis of further deliveries of aircraft from Marietta and further component deliveries by the contractors and subcontractors to Marietta.

That model then was used, in terms of looking at a constrained and unconstrained budget for four scenarios, as outlined in Table 1 of this testimony. So, we looked at a scenario comparison of single-year versus multiyear for an unconstrained, and single-year versus multiyear for a constrained budget. This was for, in the unconstrained scenario, the 20/20/20 Air Force program; and, in the constrained scenario, 20 in Lot 7, 20 in Lot 8, and X in Lot 9, depending upon how much of the constrained budget was available for the purchase of aircraft in Lot 9.

The results are shown in Table 2, in which we provide the budgets, the savings, and the average unit flyaway and average unit procurement costs for those airplanes.

The balance of my testimony is further description of the analytical approach and the detailed results of our work—again, documented in P–4116.

Our bottom line for what we were asked to do: the unconstrained savings—$235 million, and the constrained savings—$225 million. If you prefer to buy additional airplanes with the savings, you can buy 2 more airplanes, so that the unconstrained budget gets you 60, the constrained budget gets you 58.

That is my testimony.

[The prepared statement of Dr. Nelson follows:]

PREPARED STATEMENT BY DR. J. RICHARD NELSON

Mr. Chairman and members of the subcommittee, I am pleased to come before you today to discuss IDA's work regarding the recently completed F–22A Multiyear Procurement (MYP) Business Case Analysis (BCA).[1]

My testimony today will be based on IDA Paper P–4116, copies of which have been provided previously.

TASK OBJECTIVE AND APPROACH

In January 2006, the Institute for Defense Analyses (IDA) was asked by the Office of the Under Secretary of Defense Acquisition Technology and Logistics to conduct a Business Case Analysis for a possible F–22A Multiyear Procurement. IDA's task was to estimate the cost savings to the Government of pursuing an MYP contract for the three final planned lots of the F–22A program. An MYP contract was compared to three Single-Year Procurement (SYP) contracts.

The study team first updated IDA's existing F–22 cost model. This model, which IDA developed for its 2005 Independent Cost Estimate (ICE) for the F/A–22,[2] was updated to reflect recent production experience and other new information. We then used the updated cost model to analyze the procurement strategies under constrained and unconstrained budgets under four scenarios, as outlined in Table 1. All scenarios involved the purchase of aircraft in the last three lots of production, Lots 7, 8, and 9.

TABLE 1. SCENARIOS ADDRESSED IN STUDY

Scenario	SYP/MYP	Lot Number (Number of Units)	Budget Constrained?
1	SYP	7 (20), 8 (20), 9 (20)	No
2	MYP	7 (20), 8 (20), 9 (20)	No
3	SYP	7 (20), 8 (20), 9 (16)	Yes
4a	MYP	7 (20), 8 (20), 9 (16)	Yes
4b	MYP	7 (20), 8 (20), 9 (18)	Yes

For Scenarios 1 and 2, the unconstrained cases, IDA estimated the costs of building 60 aircraft over the three lots regardless of whether the Defense Department's current budgetary limits on the F–22A program would permit the Air Force to do so. Comparing these two scenarios is the best way to examine the impact of MYP on the purchase of 60 aircraft. For Scenarios 3 and 4, the constrained cases, IDA estimated the costs of the three-lot buy under budgetary limits established in the President's budget for fiscal year 2007 (PB07). For Scenario 4b, IDA applied the MYP savings in 4a towards procuring additional aircraft in Lot 9. Scenarios 3, 4a, and 4b assume funding flows are adequate to support the lot sequence 20, 20, and x—where x is the incremental number of units in Lot 9 afforded under the cumulative PB07 budget authority. Note that the constraint we imposed is the total funding in PB07 for Lots 7, 8, and 9, and not its year-to-year funding levels. In Scenarios 3, 4a, and 4b the year-to-year funding levels would have to be shifted (within the PB07 total) to fully fund the SYP and the MYP.

IDA used data provided by F–22A contractors and Government offices to estimate MYP savings. These data included information from previous F–22 MYP studies and recent MYP experience with other aircraft programs. In analyzing these data we took into account differences between the currently proposed F–22A MYP and MYP programs in the historical database. For example, our estimate recognizes that the F–22 MYP would include fewer lots and aircraft units than previous fighter aircraft MYPs. IDA also had in-depth discussions with suppliers who were expected to be a source of savings under the MYP strategy. From these data and analyses, IDA developed percentage reductions in the cost elements in the model that would benefit from cost savings in an MYP. The sum of these reductions constitute our estimate of the savings provided by the MYP. The cost estimating approach we used

[1] IDA Paper P–4116, "F–22A Multiyear Procurement Business Case Analysis," For Official Use Only, May 2006.

[2] IDA Paper P–4029, "F/A–22 Independent Cost Estimate," For Official Use Only, August 2005.

was otherwise identical to that used for IDA's F/A–22 ICE, copies of which were provided to Congress in August 2005.

SUMMARY OF RESULTS

IDA estimated the savings with MYP to be 2.2 percent of procurement costs. We estimated the savings for the air vehicle contract (Lockheed Martin Aeronautics and Boeing) to be 2.6 percent for both the constrained and unconstrained cases. Savings for the engine contract (Pratt & Whitney) were estimated to be 2.7 percent, also for both cases. The percentage savings on total procurement are lower than on contract costs because substantial portions of the procurement budget would not be part of the multiyear contracts.

Table 2 summarizes the BCA results. In the unconstrained total budget cases, Scenarios 1 and 2, MYP results in the maximum savings since the maximum number of aircraft are procured. The $235 million in savings represent 2.2 percent of procurement cost for Lots 7–9. Constraining the buy to the total budget of record reduces the number of aircraft by 4 to 56 in the SYP Scenario 3. At 56 units (three lots of 20, 20, and 16 aircraft), the MYP strategy reduces the cost by the same 2.2 percent, but for a lower total savings of $225 million. If the $225 million in savings were applied instead towards additional aircraft, the Air Force would be able to buy 2 more units for a total of 58.

The addition of two aircraft using $225 million in MYP savings may seem optimistic. Note, however, that IDA's cost modeling approach takes into account fixed as well as variable costs, so the $225 million has to cover only the variable portion of aircraft costs. The fixed portion must be paid regardless of lot quantity.

TABLE 2. MYP BCA RESULTS SUMMARY

[Then-year in millions of dollars]

	Scenario 1–2	Scenario 3–4a	Scenario 3–4b
SYP Budget (Scenarios 1 and 3)	$10,863	$10,438	$10,438
MYP Budget (Scenarios 2, 4a, and 4b)	10,628	10,213	10,423
MYP under/(over) SYP	235	225	15
Savings Percentage of Procurement	2.2	2.2	N/A
Constrained to Budget	No	Yes	Yes
AUFC of Lots 7–9 Aircraft (SYP/MYP)	$158/$154	$162/$158	$162/$156
AUPC of Lots 7–9 Aircraft (SYP/MYP)	$181/$177	$186/$182	$186/$180
Aircraft in Lots 7–9 (SYP/MYP)	60/60	56/56	56/58
Total Quantity, including Production, Production Representative Test Vehicles, and Replacement Test Aircraft	182	178	180

That completes my description of IDA's work on the F–22A MYP BCA. We provided this information to our sponsor to inform the Defense Department's decision process. We were not asked for, nor did we provide, a recommendation on the decision itself. Our role was to estimate the cost savings with MYP.

Mr. Chairman and members of the subcommittee, thank you for your attention. I am available for comments and questions.

Senator MCCAIN. Thank you very much, Dr. Nelson.

Mr. Bolkcom, welcome.

STATEMENT OF CHRISTOPHER BOLKCOM, SPECIALIST IN NATIONAL DEFENSE, CONGRESSIONAL RESEARCH SERVICE

Mr. BOLKCOM. Thank you, sir.

Chairman McCain, Senator Nelson, and distinguished members, thanks for inviting me to speak with you today about the F–22. As requested, I'll focus today on the criteria for multiyear procurement and the business case for such a strategy.

When it grants multiyear authority, Congress allows DOD to commit the Federal Government to spend funds that have not yet

been appropriated. In return, DOD agrees to meet certain multiyear criteria to ensure that the benefits of multiyear authority outweigh the risks.

The proposed F–22 multiyear raises four potential oversight issues for Congress.

First, the estimated F–22 multiyear savings appear to be low compared to other multiyears. IDA finds that the potential F–22 multiyear savings of $225 million is about half the amount saved in other multiyears that they studied. When this savings is expressed as a percentage, the F–22 multiyear savings of 2.2 percent is about a quarter of the 8 percent saved in the other multiyears. Various GAO, CBO, and RAND studies corroborate these comparisons.

Second, it is not certain that the savings estimate is realistic. The margin of error in multiyear savings estimates is considerable. It's well documented that many multiyears never demonstrate the savings promised prior to contract award. In this case, the different estimates by the Air Force, OSD, and IDA on the cost of the F–22 program may make savings projections more difficult. Although IDA's expertise in cost estimating is widely recognized, its analysis may, for example, overstate avionics multiyear savings.

Third, Air Force leaders promise stable funding and stable requirements over the proposed contracts. Recent fluctuations in F–22 funding requests, however, show that the Air Force can't always budget as it likes. Also, the request to incrementally fund F–22 procurements suggests that the Air Force doesn't have sufficient funds to implement its modernization plans by conventional means. Several factors could make future funding less stable. One such factor is the decreased use of emergency supplemental funding for Iraq and Afghanistan, which could force difficult and unforeseen choices in the Air Force modernization plans.

Fourth, many indicators suggest that the F–22 design is stable. Testing is complete, 74 aircraft have been delivered, and the aircraft has been declared operational. Existing technical problems may or may not reflect on design stability, but they could add to unforeseen costs. GAO and IDA agree that the F–22's modernization program carries technical risks that could lead to program cost growth.

Air Force leaders tout the IDA study as a business case that supports F–22 multiyear. However, CRS couldn't find any endorsement in the study. IDA was not tasked to study the multiyear criteria for funding stability, requirements stability, or design stability that would be required to make a judgment on the pros and cons of the multiyear. Also, IDA was not asked to address congressional concerns about extending the F–22 production line or the potential impact on the JSF. IDA was asked only to estimate the multiyear cost savings, and it did not judge whether these potential savings are substantial.

IDA was not asked to study the complete range of F–22 procurement alternatives. In every scenario studied, IDA assumed a 3-year procurement. A 2-year contract for 30 aircraft per year, as one example, might save up to $1.8 billion, but IDA was not asked to study this alternative.

Mr. Chairman, I'll conclude by observing that the law requires that to qualify for multiyear, the F–22 must be procured at the minimum economic rate. Conflicting information has been provided on whether building 20 aircraft per year satisfies this requirement. If it is found that producing 20 aircraft per year is below the minimum economic rate, the F–22's procurement plan would violate statutory requirements, and IDA's cost estimates would not be applicable.

Mr. Chairman, this concludes my remarks. I appreciate the opportunity to appear before you.

[The prepared statement of Mr. Bolkcom follows:]

PREPARED STATEMENT BY CHRISTOPHER BOLKCOM

Mr. Chairman and distinguished members of the subcommittee, thank you for inviting me to speak with you today about the proposed multiyear procurement (MYP) of the F–22A. As you requested, my testimony will address whether the F–22A meets the MYP criteria in 10 U.S.C. § 2306b, and the F–22 business case analysis, which the Air Force argues supports a 3-year, 60-aircraft MYP.

At the outset, it is important to note that the F–22 MYP proposal was presented to Congress this year as part of a larger package of proposed changes to the F–22 program. Other proposed changes include adding four additional aircraft to the planned total purchase, adding a production lot to the procurement plan, and slowing production to an annual rate of 20 aircraft per year over a longer schedule. Although Air Force arguments in favor of the proposed F–22 MYP sometimes implicitly assume that these other proposed changes will be implemented, the approval of these proposed changes is not yet certain, as Congress has not yet completed action on the fiscal year 2007 budget.

10 U.S.C. § 2306B MYP CRITERIA

10 U.S.C. § 2306b contains a number of provisions governing MYP contract authority. Perhaps the most relevant for today's hearing is 2306b subparagraph (i)(B) Defense Acquisitions Specifically Authorized by Law, which states that "the proposed multiyear contract provides for production at not less than minimum economic rates given existing tooling and facilities." The Air Force proposes a 3-year F–22 MYP of 20 aircraft per year. The prime contractor has provided conflicting information on whether this rate of production satisfies subparagraph (i)(B).

On July 19, 2006, Lockheed Martin reported that the F–22's minimum economic rate of production is 24 aircraft per year, which means that the MYP of 20 aircraft per year would apparently not comply with the statutory requirement.[1] Upon further review, however, Lockheed Martin representatives changed their position, and reported on July 20, 2006 that the F–22's minimum economic rate of production is "18–20" aircraft per year.[2] It may be interesting to note that congressional staff met with DOD officials on July 19, 2006 and expressed concern that the proposed F–22 MYP might not meet the minimum economic rate of production requirement.

10 U.S.C. § 2306b also contains six criteria for granting multiyear procurement authority for a major weapon systems. These subparagraphs pertain to:

- (a)(1) substantial savings
- (a)(2) stable requirement
- (a)(3) stable funding
- (a)(4) stable design
- (a)(5) realistic contract cost and cost savings estimates
- (a)(6) promoting national security.

These general criteria are designed to help Congress evaluate the risks involved in allowing DOD to commit the Federal Government to spend funds that have not yet been appropriated. In the past, Congress has on occasion approved MYP, only to find that programs did not always exhibit the stability, nor deliver the savings, which were promised.

For example, RAND noted that despite award of MYP authority, the B–1B program experienced "technical and performance difficulties that have added to the cost of the program." Compared to KC–10 and F–16 MYPs, "the B–1B program showed

[1] E-mail communication between Lockheed Martin Co. and CRS July 19, 2006.
[2] E-mail communication between Lockheed Martin Co. and CRS July 20, 2006.

greater signs of instability at the time of its MYP than did the other two procurements . . . assessments at the time, however, did not flag these uncertainties."[3] The C–130J is a more recent example of an MYP that experienced, for example, requirements instability, funding instability, controversy over the contract type, and specific contract clauses such as cancellation liability.

Substantial Savings

MYP savings are typically estimated by comparing the cost to procure the same number of weapons systems under a series of single year procurement (SYP) contracts to the cost of an MYP contract over the same time period. When compared to past statutory requirements (10 percent savings), or to recent experience, some may not consider the projected F–22 MYP savings of 2.2 percent over three SYP contracts to be "substantial" as required under 10 U.S.C. § 2306b.[4]

In its F–22 MYP Business Case Analysis (BCA), the Institute for Defense Analyses (IDA) compared the proposed F–22 MYP to 13 other MYP contracts. IDA found that the projected F–22 MYP savings compared unfavorably to these other case studies. The F–22's projected MYP savings of 2.2 percent is approximately one quarter the average estimated savings (8.0 percent) of these other MYP contracts.

Expanding the survey beyond IDA's data set reveals additional MYP contracts in which savings were estimated to be significantly greater than 2.2 percent. These additional MYP contracts are shown in the table below.

ESTIMATED MYP SAVINGS OF HISTORICAL PROGRAMS

Program	Estimated Savings (percent)
Javelin Anti Tank Guided Weapon	14.3
Medium Tactical Vehicle Replacement	7.4
CH–60 Helicopter	5.5
DDG–51	9
GPS Satellite	13
DSP I Satellite	5.7
DMSP Satellite	19.2
DSCS II Satellite	18
Titan IV Expendable Launch Vehicle	15.1
DSP II Satellite	27.8
DMSP Satellite	18.1

Sources: An Overview of Acquisition Reform Cost Savings Estimates. RAND. 2001. Table 6.1, p. 111. Analysis of Air Force Aircraft Multiyear Procurements with Implications for the B–2. RAND. 1991. p. 10.

Similarly, a Congressional Budget Office (CBO) working paper estimates DOD saved an average of 11.7 percent in current dollars through MYP production contracts from 1982–1987.[5]

Responding to figures such as these, Air Force leaders have stated that the percentage savings is only one factor to consider when granting MYP authority. The absolute figure of dollars saved is also important, they argue. In terms of absolute savings, the IDA study found that the F–22's projected MYP savings of $225 million is roughly half the average $470 million in savings of the 13 MYP contracts it studied.

It can also be noted that IDA's savings calculation takes as its starting point an F–22 production profile that incorporates the Air Force's proposals for adding four aircraft to the planned total purchase and for slowing the annual production rate to 20 aircraft per year over a longer schedule. Taking these two changes as a given in the MYP cost-savings calculation does not take account for the $1.8 billion in additional procurement funding requirements associated with implementing these two changes. It therefore appears that the cost savings of the F–22 MYP are almost certainly smaller than the $1.8 billion in additional funding associated with adding four aircraft and slowing the annual production rate. Conversely, the $1.8 billion in additional funding needed to implement these two changes may be more reason to seek offsetting savings through an MYP. It is possible, however, that greater sav-

[3] Analysis of Air Force Aircraft Multiyear Procurements with Implications for the B–2. (R–3990–DR&E) RAND. 1991.

[4] Some, but not all of these observations were shared with the Subcommittee at the March 28, 2006, hearing on Air Force and Navy tactical aviation programs in review of the National Defense Authorization Request for Fiscal Year 2007 and the Future Years Defense Program.

[5] "Alternative Strategies for Increasing Multiyear Procurement." Staff Working Paper. Congressional Budget Office. July 1986. Table 3, p. 17.

ings could be achieved in the F–22 program without implementing an MYP by simply keeping production at 30 aircraft per year for 2 years.

Realistic Cost Avoidance Estimates

Another potential issue is whether the IDA study's estimate of MYP cost avoidance (regardless of the study's apparent analytical rigor) meets 10 U.S.C. § 2306b's requirement for realist cost avoidance estimates. In assessing whether IDA's cost-savings estimate is realistic, one point to consider is that there is disagreement among IDA, the Air Force, and the Office of the Secretary of Defense (OSD) regarding the overall cost of the F–22 program. Skeptics could ask whether, in a situation where disagreement exists about the overall cost of program, it is possible to realistically estimate savings that might result from changing the program in some way.

Another factor in assessing whether IDA's estimated savings are realistic, is the track record of previous MYPs. Some MYP contracts do not appear to have achieved the cost savings that were "realistically" forecast prior to the granting of MYP authority. IDA's own report, for example, notes that

> Studies analyzing the actual execution of MYPs have shown mixed results. For example, a previous IDA study could not find any evidence of cost savings for the first F–16 MYP, despite the 7.7 percent savings shown in the pre-MYP estimates reported here. A similar result was found for the Army's H–60 helicopter program.

The Government Accountability Office (GAO) analysis corroborates IDA's findings, and casts doubt on the accuracy of before-the-fact MYP cost estimates. In an assessment of the fiscal year 1984 DOD budget request, for example, GAO found that the funds requested for four MYP programs initiated in fiscal year 1982 and fiscal year 1983 exceeded the negotiated or proposed contract amounts by $197 million.[6] RAND notes that "circumstances can easily create a bias in estimates of cost reduction that favor MYP contracting."[7] The IDA study recognizes this potential bias and contains a similar caveat.

Stable Funding

Funding stability is another criterion in 10 U.S.C. § 2306b for multiyear procurement. If a weapon system candidate for MYP has a history of unstable funding, it may suggest "an unstable requirement, a relatively low funding priority, or wavering support, thus rendering the system inappropriate for multiyear contracting."[8]

A review of recent F–22 funding profiles, as depicted in the table and chart below, raises questions as to whether the Raptor's funding has been stable enough to warrant an MYP commitment. The three lines in the chart represent the Air Force's annual budget requests and Future Years Defense Plan (FYDP) funding projections for the F–22 in fiscal year 2005 (President's budget, or PB05) fiscal year 2006 (PB06), and fiscal year 2007 (PB07).

[In millions of dollars]

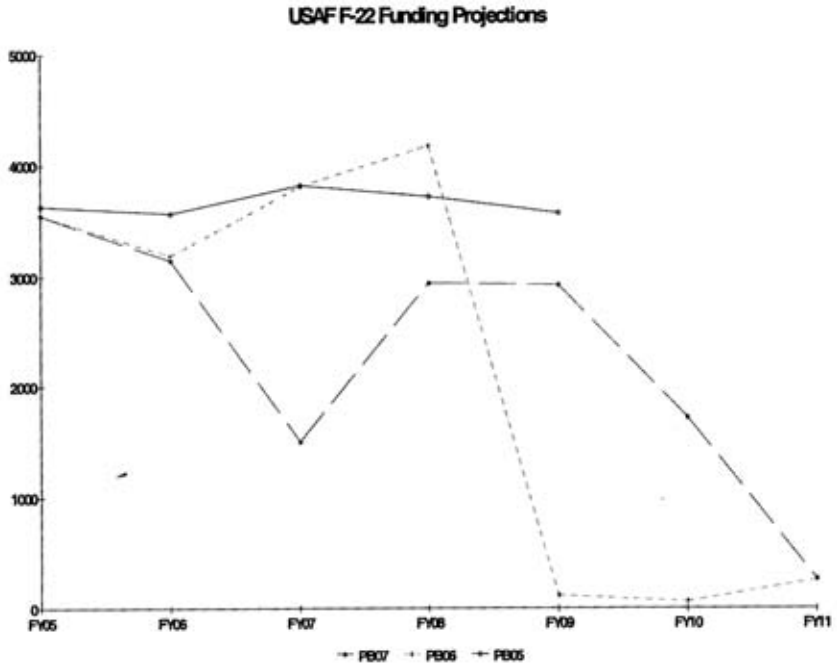
PB	Fiscal Year							Total
	2005	2006	2007	2008	2009	2010	2011	
07	3,552	3,144	1,503	2,934	2,919	1,724	261	28,493
06	3,548	3,186	3,811	4,175	113	56	257	27,601
05	3,633	3,571	3,817	3,716	3,569	5,601 to complete		36,343

Source: Department of the Air Force. Exhibit P–40, Budget Item Justification, Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft. Various years.

[6] Analysis of Fiscal Year 1984 Budget Requests for Approved Multiyear Procurements. (GAO/NSIAD–83–57). General Accounting Office. September 30, 1983.

[7] RAND. (R–3990–DR&E) opcit. p. vi

[8] F–22 Multiyear Procurement Business Case Analysis (BCA). Institute for Defense Analyses. May 2006. p.10.



A budget that does not contain sufficient funds to pay for planned expenditures, or protect against unplanned contingencies, can raise questions concerning future funding stability. The Air Force's request to incrementally fund F–22 procurement over the proposed MYP may be viewed as an indication that procurement funds are limited. The Air Force has no precedent of incrementally funding aircraft procurement. Incremental funding is viewed by Congress as unorthodox and an exception to the full funding rule. Why, it might be asked, would the Air Force request incremental funding of F–22 procurement if it believed it had sufficient budget authority to fully fund F–22 procurement? Also, GAO reports the current Air Force request underfunds the F–22 program through the FYDP by $647 million.[9] CBO similarly expresses concern that the Air Force "is not requesting appropriations sufficient to cover the potential cancellation liability. Under the proposal for multiyear procurement, the Air Force would have to seek additional appropriations in the future even if a decision was made to cancel the contract."[10]

The Air Force and other F–22 supporters argue that the Raptor has been for many years the Service's top acquisition priority, and that the Service is fully committed to funding the program. Few observers if any appear to doubt the Air Force's commitment to the F–22 program. The Air Force, however, does not have complete control over its budget. The actions of other Government actors, especially in what may be a budgetary environment of increased turbulence, may create risks for a plan to commit now to procuring certain numbers of F–22s in future years.

Weapon procurement for all of DOD is expected to cost approximately $1.4 trillion between 2006 and 2009, with more than half of these expenditures yet to be made.[11] In addition, it is possible that in the near future the preponderance of funding for conflicts in Afghanistan and Iraq will need to be requested through the annual budget, rather than emergency supplementals. Such a change could lead to dynamics in the budget process that are difficult to predict.

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[9] "Tactical Aircraft: DOD Should Present a New F–22A Business Case before Making Further Investments." (GAO–06–455R). Government Accountability Office. June 20, 2006

[10] Statement of Donald Marron, Acting Director Statement before the Senate Armed Services, Airland Subcommittee. March 28, 2006.

[11] Leslie Wayne. "Pentagon Struggles with Cost Overruns and Delays." New York Times. July 11, 2006.

STABLE REQUIREMENT

The number of F–22s to be purchased has fluctuated considerably over time. Originally conceived of as a 750-aircraft program, DOD's first selected acquisition report that included the F–22 (December 31, 1991), reported a 648-aircraft procurement plan. Over time, the number of F–22s that could be purchased under budget limits was reduced to 442, 440, 342, 341, 278, 279, 181, and 185 (including aircraft built with research, development, test, and evaluation (RDT&E) funds). The Air Force called its attempts to purchase as many F–22s as possible under budget limits a "buy-to-budget" plan. Some criticized this approach as being inconsistent with DOD's more traditional requirements-driven weapon system acquisition strategy.

Since 2002, Air Force leaders have consistently stated that they require 381 F–22s. Further, Air Force officials point out that this requirement has been validated by DOD.

The Air Force's stated rationale for the 381 figure has not been consistent. At times Air Force officials have argued that this figure is required to field one 24-aircraft F–22 squadron in each of the Service's 10 aerospace expeditionary forces (AEFs). Other times, the Air Force has argued that 381 was the minimum number required to address emerging "near-peer" competitors. At still other times, Air Force leaders argued for the F–22, based on their perception of the Raptor's potential contribution to the "global war on terrorism." Specific F–22 missions Air Force leaders described include conducting cruise missile defense over the United States, and flying close air support (CAS) missions for small, dispersed U.S. ground forces fighting terrorists or insurgents.

It is also important to note that although DOD may support the 381-aircraft goal for the F–22 in theory, DOD has cut the F–22 program by $10.5 billion. This reduction has made the 381 requirement difficult to achieve.

Stable Design

Another MYP criterion in 10 U.S.C. § 2306b is for the program to have demonstrated a stable design. F–22 supporters argue that flight testing is complete, the aircraft is operational, and 75 Raptors have been delivered to the Air Force. These factors, they argue, demonstrate that the F–22 design is stable. Critics argue that technical issues have emerged since late 2005 that create the possibility of additional changes to the F–22 design or production process. The cited technical challenges include the following:

(1) Structures Retrofit Program (SRP). As service life deficiencies were identified during engineering, manufacturing, and development (EMD), corrections were incorporated into the production line. The SRP will retrofit those aircraft delivered prior to the incorporation of all corrective actions into the F–22 production process. Work will begin as early as January 2007 and is scheduled to conclude in 2010.

(2) Forward Boom Heat-Treat Issue. In December 2005, the Air Force was notified that some titanium forward boom frames were not properly heat-treated. This improper heat treatment creates the potential for anomalous material properties (e.g. extensive cracking) in 91 aircraft. The Air Force asserts that this is not a safety of flight issue. The contractor responsible reportedly has stated that "the root cause has yet to be determined."[12]

(3) Canopy Actuator. On April 10, 2006, an F–22 pilot was trapped by a canopy that would not open. A fleet-wide inspection identified 42 potentially faulty actuators. A 30-day repetitive mechanical inspection has been implemented to ensure proper operation of the actuators. The Air Force plans to replace all potentially faulty actuators by February 2007.

(4) Air Recharge System. The Air Recharge System (ARS) experienced three problems: leakage, auto-ignition failures, and a rupture during flight. The ARS replenishes the Stored Energy System after engine start. Air Force officials say that fixes to these problems have been initiated.

(5) Nose Landing Gear. On May 11, 2006, an F–22 experienced an uncommanded nose landing gear retraction and the nose of the aircraft fell to the ground, landing on the main weapons bay doors. A similar incident occurred on March 18, 2003. The technical solution preventing uncommanded nose gear retractions has been incorporated into the production process and is being fielded throughout the fleet. The findings of a safety investigation board are pending.

GAO and others have expressed concern that the Air Force's plan to integrate a new, multi-mode, air-to-ground-capable Agile, Electronically Steered Array (AESA)

[12] Laura Colarusso. "Contractors Blamed for F–22A Faults." Defense News. June 26, 2006.

radar into the F–22 could present unforeseen and significant technical challenges. Although GAO agrees with the Air Force that the design for the baseline F–22A aircraft, designed primarily for an air superiority role, is stable. GAO states that "the ground attack capability to be added has not been demonstrated and thus cannot be considered 'stable.'"[13]

In its August 2005 independent cost estimate (ICE), IDA appeared to concur with the GAO position:

> We think there is little threat to design stability from problems that might be found in the last states of the EMD program. However, the extensive modernization program now in its initial states could affect the future production air vehicle configuration such that favorable downward cost trends evident in current data are disturbed.[14]

The Air Force does not share GAO's and IDA's concern. It asserts that modernizing the F–22 radar is no more challenging than, for example, retrofitting existing F/A–18/E/F Super Hornets with new AESA radars.

IDA F–22 MYP BUSINESS CASE ANALYSIS

As requested, CRS studied the IDA "F–22 Business Case Analysis" to critically assess its task objectives, approach, and results.

Study Approach

The IDA study appears at first inspection to be a logically designed and thorough estimate of potential cost avoidance from MYP contracting. Observations can be made, however, about some of the study assumptions or methodologies that could bring into question the accuracy of the savings estimate. For example, IDA estimated that for the avionics subcontractor to achieve a 5-percent cost savings, the MYP contract would have to be in place by August 2, 2006. If the contract is delayed past that point, IDA estimated that the savings would fall to 4 percent. Due to the uncertainty of this event, IDA split the difference, and counted 4.5 percent savings in its estimate.

The Air Force reports that the MYP contract award is currently scheduled for May 2007, and sees "no possible means to accelerate MYP contract award to August 2006."[15] Even if this contract award could be accelerated, fiscal year 2007 advance procurement funding cannot be obligated prior to the signature of the fiscal year 2007 appropriations and authorization acts. A Congressional Research Service (CRS) review of defense authorization and appropriations bills from 1970 to the present indicates that authorizations have been signed into law by August 1 only three times. No appropriations bills during this time period were signed into law by August 1. Based on this historical experience, the chance of completing the fiscal year 2007 defense authorization and appropriations process by August 2, 2006 appears to be remote. Thus, MYP avionics savings are expected to be 4 percent (at best) per IDA's calculation, not 4.5 percent.

Other witnesses may find additional assumptions or methodologies in the IDA study that they believe weaken or strengthen the estimate of 2.2 percent MYP cost avoidance. Scrutinizing and critiquing IDA's cost estimate of F–22 MYP cost avoidance, however, may have only marginal value in assessing the pros and cons of granting the Air Force MYP authority to purchase 60 aircraft over 3 years.

Task Objectives

It may be that the IDA study's task objectives limit the value of its findings for assessing the pros and cons of F–22 MYP. The fiscal year 2006 Defense Appropriations conference report directed DOD to perform a comprehensive assessment of alternatives for the continued acquisition of the F–22. Specifically:

> The report should consider, but not be limited to, the following: analyses of the advantages of a multiyear procurement program, of extending the F/A–22 procurement profile, and of the effects of F/A–22 procurement on the Joint Strike Fighter production line.[16]

The IDA study notes that its task was to "estimate the cost savings to the Government of pursuing an MYP contract for the three planned lots of the F–22A. (Emphasis added)." Thus, IDA did not analyze the advantages of extending the F–22 pro-

[13] GAO–06–455R op cit.
[14] F/A–22 Independent Cost Estimate. Institute for Defense Analyses. August 2005. p. 15.
[15] Fact Sheet. July 11, 2006. Provided to CRS by SAF/LLW.
[16] H.R. 2863 (H. Rept. 109–359), p. 314.

curement profile. Instead, it considered extending the procurement profile as a given.[17]

Air Force representatives report that slowing down F–22 production to 20 aircraft per year will "create upward cost pressure" that would be mitigated, in part, by the savings realized with multiyear procurement.[18] The increased costs associated with producing 60 F–22s over 3 years is at least $1.8 billion.[19] A robust BCA, and one that would completely fulfill the congressional tasking might have, for example, compared the pros and cons of a 60-aircraft, 3-year MYP to a 60-aircraft, 2-year MYP. All things being equal, a 2-year MYP would be expected to save less money than a 3-year MYP. However, by procuring aircraft over 2 years at the more economic rate of 30 per year, the Air Force may avoid much of $1.8 billion in cost growth, which would be much greater than the $225 million projected to be saved through MYP.

The Air Force did not task IDA to analyze the effects of F–22 procurement on the Joint Strike Fighter (JSF) production line. The two programs are closely associated, and greater clarity of how changes to one program may affect the other would appear to be valuable. Air Force and DOD leaders assert that extending the F–22 production line is a prudent hedge against any potential delay in the JSF program. Since these aircraft compete for limited budget authority, however, extending the F–22 production line arguably could contribute to delay in the JSF program. If extending the F–22 line did push some JSF production further into the future, the added costs of this delay would offset the perceived advantages of extending the F–22 production line. Such an analysis would be useful in informing congressional decisions about whether to extend the F–22 production line and how to fund it.

Results

Although Air Force leaders tout the IDA study as a business case for their plan to procure 60 F–22s over 3 years via an MYP contract, the IDA study does not validate or endorse the MYP strategy. IDA was not asked to examine the MYP criteria pertaining to funding stability, requirements stability, or design stability. Nor was IDA asked to address congressional concerns about extending the F–22 procurement profile, or the potential impact on JSF. IDA provides an MYP cost saving estimate, but does not judge whether these potential savings are substantial and whether they satisfy statutory requirements.

Many observations in the IDA study do not appear to be particularly favorable to the Air Force's argument for MYP. For example, IDA estimates MYP cost avoidance at approximately half of what the Air Force testified the MYP cost savings would be.[20] As mentioned earlier in this testimony, IDA found that the estimated F–22 MYP savings, both as a percentage of SYP and in absolute terms, compared unfavorably to 13 other MYP contracts.

The IDA study makes observations about the F–22 MYP that appear to be at odds with Air Force statements, or could be perceived as detrimental to Air Force arguments that the F–22 meets 10 U.S.C. § 2306b MYP criteria. For example, F–22 supporters describe the F–22 MYP proposal as an orthodox funding strategy.[21] However, IDA notes that elements of this proposal are unorthodox. The F–22 MYP's "shorter contractual period of performance . . . translates into a more abbreviated investment horizon than is typical in a multiyear procurement."[22] Further, the IDA study notes:

> Given a 3-year period of performance, the amount of time available to recoup investments in longer-term projects is limited. In fact, during our review, some suppliers indicated that components with long lead times in excess of 12 months essentially decrease the 3-year investment horizon down

[17] It may be important to note that IDA began the BCA in January 2006. This date is before the official submission of the fiscal year 2007 DOD budget request that proposed modifications to the F–22 production and funding profile. The Air Force tasked IDA to conduct this BCA prior to the congressional defense committee hearings on this request, and thus with no knowledge of what action the committees might take.

[18] CRS meeting with SAF/AQPS and F–22 Program Office. March 8, 2006.

[19] The Air Force's fiscal year 2007 plan to procure 60 aircraft over 3 years of production is $1.134 billion more than the fiscal year 2006 plan to fully fund 56 aircraft over two additional years of production. $674 million more is required to fully fund the plan, bringing the cost increase to $1.8 billion.

[20] On March 28, 2006, LtGen Donald Hoffman testified to the Senate Armed Services Committee Airland Subcommittee that he believed the IDA study would show an MYP would save "about 5 percent—plus or minus 1 percent" over SYP.

[21] On March 28, 2006, Lt. Gen. Donald Hoffman testified to the Senate Armed Services Committee Airland Subcommittee that "we don't view multiyear as unorthodox at all. That's standard practice for any long-term production run."

[22] IDA BCA. op cit. p.15

to just 2 years in certain cases. In summary, each of these considerations reduces the potential of multiyear savings for the F–22A program over conventional multiyear scenarios.[23]

The criteria in 10 U.S.C. § 2306b are intended to ensure that a program is stable before entering into an extended contractual commitment. Air Force leaders disagree with critics' arguments that the F–22 program does not meet this stability requirement. The IDA study recognizes, however, that "The F–22A program has undergone significant change since IDA completed its F/A–22 ICE in August 2005."[24] Some may interpret the "significant change" that IDA observes to be an antonym for the stability that 10 U.S.C. § 2306b requires.

IDA makes observations on F–22 production that may not "make the case" for MYP. These observations could be interpreted as supporting the Air Force position that production is stable, or as supporting the GAO position that "The F–22 entered production without ensuring production processes were in control."[25] For example, IDA notes that "Whereas deliveries were 6 to 9 months late, they are now on the order of 1 to 2 months late."[26] The Air Force may wish to use this observation to highlight the improvement in delivery schedule. Others could note, however, that F–22 deliveries are still late, suggesting ongoing problems in the production process.

Another issue concerns weight growth which, all else held equal, is generally detrimental to aircraft performance. IDA notes that "airframe weight has increased over 500 lbs. between aircraft numbers 4028 (Lot 2) and 4041 (Lot 3), while the weight has increased by less than 150 lbs. between 4041 (Lot 3) and 4108 (Lot 6)."[27] One could infer from this finding that improvements are being made to the production process. On the other hand, although weight growth may have slowed, it still continues, and the weight growth is cumulative. The 150 lbs. that production added to the airframe during Lot 3 production, for example, is on top of the 500 lbs. that were added to the airframe earlier. Later aircraft are 650 lbs. heavier than earlier-built aircraft.

Mr. Chairman, this concludes my remarks. I appreciate the opportunity to appear before you, and look forward to any questions you or the other subcommittee members may have. Thank you.

Senator MCCAIN. Thank you very much.

Ms. Brian, welcome.

STATEMENT OF DANIELLE BRIAN, EXECUTIVE DIRECTOR, PROJECT ON GOVERNMENT OVERSIGHT

Ms. BRIAN. Thank you, Chairman McCain and distinguished members of the committee. Thank you for inviting me today.

In addition to testifying on behalf of POGO, I'm also testifying on behalf of Taxpayers for Common Sense. I have the pleasure of serving on their board of directors.

If you will bear with me for a moment, I would like to draw on some recent history. I sat before your committee, nearly a decade ago, during the defense industry's mergermania, testifying against the then-proposed plan for the Government to reimburse defense contractors for reorganization costs incurred during the merger. Industry representatives on one panel promised future savings on weapons systems that would be produced by the newly streamlined defense industry. I, along with the GAO, warned the committee that talk is cheap. It's easy to promise future savings, but much harder to deliver. The committee concluded, at that time, that it'll keep a close watch and make sure those promised savings for the taxpayer would be realized. If you haven't noticed, our weapons systems prices have not been going down during that time.

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[23] Ibid. p. 16.

[24] Ibid. p. 4.

[25] Defense Acquisitions: Assessments of Selected Major Weapon Programs. (GAO–05–301) Government Accountability Office. March 31, 2005. p. 63.

[26] IDA BCA. op cit. p. 4.

[27] Ibid. p. 7.

Today, we are again hearing of promised future savings. This time, fortunately, you're presented with a more easily quantifiable assessment as to whether those promised savings might ever become reality. It makes good sense before Congress commits to buying a major weapons system over many years, giving up annual consideration and oversight of the program in the process, that Congress makes sure the program is stable and mature. Section 2306(b) of title 10 for multiyear procurement is a sensible law, and Congress should adhere to its requirements.

In a report that POGO is releasing today, which I ask to be included in the record and is now available on our Web site.

Senator MCCAIN. Without objection, it will be inserted after your written statement.

Ms. BRIAN. Thank you. We detailed the six legal requirements, and, one by one, demonstrate how each of the independent congressional analysts and other independent analysts tasked with evaluating the F–22A for multiyear procurement status concluded, to varying degrees, that not all the requirements have been met. Interestingly, according to an internal briefing that we have obtained, even the Air Force questioned whether it could get away with claiming the program had met two of the requirements, noting they would still require waivers for the unfunded termination costs and lack of full funding, and that they were waiting for the IDA analysis on cost savings. That is also an attachment in our report. I'd just like to point out that this seems to counter Secretary Wynne's statement that the Air Force did not rely on the IDA analysis to conclude there were cost savings, because they have it as a yellow, pending the IDA analysis.

For substantial savings, the Air Force and IDA claim there will be a 2.5-percent savings throughout the multiyear procurement, which, by the way, does not impress me as substantial. But the reality is that even after taking into account the four additional aircraft purchased through this plan, we will still be spending $1 billion more because of the inefficiencies created by stretching out production over 3 years. According to the GAO, unit costs will also increase by $17 million per plane. None of this sounds like savings at all, let alone substantial savings.

Stable requirements. Over the years, the number of requested F–22 aircraft has plummeted from 750 in 1986 to the most recent plan of only 183, clearly demonstrating the lack of stability and production rate requirements, in large part because the cost per aircraft has tripled.

Stable funding. The current FYDP does not fully fund the F–22. In fact, the program is being underfunded by $674 million, according to the Air Force.

Design stability. In addition to the new untested modernization plan, there are ongoing technical problems with the existing systems. The Pentagon recently completed a follow-on independent test and evaluation on the existing systems, and it is also an attachment in our report, from this internal Air Force memo. They actually found 75 unresolved deficiencies through this follow-on independent test and evaluation system—evaluation, which just finished this last December.

So, new problems that have cropped up include faulty cockpit actuators, which trapped a pilot in the jet just this April. The pilot had to be rescued from the cockpit with chainsaws. Then there's the uncommanded nose landing gear retractions, which recently caused an aircraft to fall on its main weapons bay doors, literally falling on its face, and concerns about the heat treatment of the booms, which may cause structural cracking and has been reported by Defense News as costing perhaps as much as $1 billion to fix. These and other problems point to a system that is not yet mature and is in need of continuous congressional oversight. A multiyear procurement plan will only tie Congress's hands, and not allow for adequate oversight.

Realistic cost estimates. The Air Force has a history of not providing accurate cost estimates, and there's little reason to believe that it will be any more accurate for this round of procurement. Five years ago, the House Government Reform Subcommittee on National Security was frustrated in getting accurate F–22 program cost estimates from the Air Force. The subcommittee asked the GAO to look at those estimates. What the GAO found was a $7 billion variance between the Air Force's cost estimates and those made by OSD's CAIG, the organization that was discussed in the first panel that evidently is no longer doing analysis of these cost estimates.

At the time, Chairman Chris Shays wrote to House Armed Services Chairman Hunter, "As you proceed with your deliberations on the pace and scope of the F–22A program, please be advised we can have little confidence in the accuracy of production cost estimates, and less confidence in the legitimacy of projected production cost estimates, based on those estimates."

In November 2005, the DCAA actually did their own analysis internally, and found that there is moderate to high risk in the cost estimate development for the F–22, finding about $141 million in unsupported, inaccurate, or defective data in Air Force cost estimates. This DCAA analysis is also attached to our report.

Given all the evidence that the F–22A program is not ripe for multiyear procurement, why did the Senate vote in favor of it? In a brazen example of the military industrial complex at work, Lockheed Martin e-mailed the Chambliss amendment proposing F–22 multiyear procurement status to an undisclosed list of Senate offices before the amendment had even been introduced by the Senator. Attached to that e-mail was an analysis selectively touting the findings of IDA, claiming "IDA found the F–22A meets all title 10 entrance criteria for a multiyear contract."

That claim in the Lockheed e-mail appears to be based on a misreading of the IDA report. IDA limited its analysis to only one requirement, that there be cost savings; however, IDA attached to their report two unattributed documents at the end of their report which assert the F–22 meets all six requirements. Because the author of these documents is not clearly identified, the wrong impression appears to have been reached that these were IDA's conclusions. In fact, however, these were Pentagon exhibits for the fiscal year 2007 President's budget, and not independent analysis by IDA.

Senator Chambliss, you don't have to investigate the committee staff to find out who was working with the Washington Post. POGO was the source of that information, and you will find, in POGO's report, extensive documentation that proves the conflict of interest of IDA's president.

I would submit that the appearance of conflict of interest is not just the substantial personal financial interest, but also his fiduciary responsibility to the organization where he sits on the board, EDO, in the continued funding of the F–22A. This raises reasonable questions about the independence of IDA's analysis. I'm glad to hear that both Chairman Warner and Comptroller General Walker agree.

It is important to understand that I am in no way suggesting that Admiral Blair has violated any laws or any regulations. What we discovered is that while FFRDCs such as IDA have enjoyed the credibility of being regarded as an arm of the Government, the laws treat them purely as contractors. As a result, conflict-of-interest laws that apply to Government employees do not apply to the employees of these FFRDCs. There is a disconnect between the perception that FFRDCs have to comply with conflict-of-interest laws and the reality. I agree that this problem is worth Congress's further attention.

In conclusion, it is clear that independent congressional analysts have significant concerns with accepting the F–22 program as a candidate for multiyear procurement. Based on POGO's research, we do not believe the F–22 meets the requirements, and recommend that Congress remove the language authorizing the multiyear procurement until such time that the program meets those requirements. We also recommend that Congress establish a definition of "substantial savings" of being at least 10 percent.

Furthermore, POGO recommends that Congress consider applying conflict-of-interest rules to FFRDCs.

Thank you, again, for inviting me to testify today.

[The prepared statement of Ms. Brian follows:]

PREPARED STATEMENT BY DANIELLE BRIAN

Senators McCain and Lieberman, thank you for inviting me today. I am the Executive Director of the Project On Government Oversight (POGO), an independent nonprofit organization that investigates corruption and other misconduct in order to achieve a more accountable Federal Government. Since our founding 25 years ago, we have been working to prevent wasteful defense spending, which often comes from buying weapons that don't work or that we don't need. I am also testifying on behalf of Taxpayers for Common Sense, a national non-partisan budget watchdog. I have the pleasure of serving on their board of directors.

If you will bear with me for a moment, I would like to draw on some recent history. I sat before your committee in April 1997, during the defense industry's merger-mania, testifying against the then-proposed plan for the Government to reimburse defense contractors for reorganization costs incurred during a merger. Industry representatives on one panel promised future savings on weapons systems that would be produced by the newly-streamlined defense industry. I, along with the Government Accountability Office (GAO) analyst David Cooper, warned the Senate Armed Services Committee that talk is cheap—it is easy to promise future savings, but much harder to deliver. The committee concluded that it would keep a close watch and make sure that those promised savings for the taxpayer would be realized. If you haven't noticed, our weapons systems prices have not been going down. We've gone from having 400 of our frontline fighter, the F–15, to only a possible 183 of the F–22A at more than 10 times the cost of the F–15. This phenomenon has been described by one aircraft designer as unilateral disarmament.

Today we are again hearing of promised future savings. This time, fortunately, you are presented with a more easily-quantifiable assessment as to whether those promised savings might ever become reality. Section 2306b of title 10 of the U.S. Code requires that six basic legal conditions be met before entering into a multiyear procurement contract. These legal conditions are: (1) the contract will result in substantial savings, (2) the requirements will remain stable, (3) there is stable funding, (4) there is a stable design and technical risks are low, (5) there are realistic cost estimates, and (6) the use of this contract will promote national security.

It makes good sense, before Congress commits to buying a major weapons system over many years—giving up annual consideration and oversight of the program in the process—that Congress makes sure the program is stable and mature. Section 2306b of title 10 is a sensible law and Congress should adhere to its requirements.

In a report POGO is releasing today—which I ask to be included in the record—we detail the six legal requirements and, one by one, demonstrate how each of the independent congressional analysts tasked with evaluating the F–22A for multiyear procurement (MYP) status concluded to varying degrees that not all of the requirements have been met. The Congressional Research Service (CRS) Institute for Defense Analyses (IDA), GAO, Congressional Budget Office (CBO), and Defense Contract Audit Agency all provide evidence that the F–22A program is not yet ripe for this type of financing scheme. Interestingly, according to an internal briefing we have obtained, even the Air Force questioned whether it could get away with claiming the program had met two of the requirements, noting they would still require waivers for the unfunded termination costs and the lack of full funding, and they were waiting for the IDA analysis on cost savings.

I would like to discuss how the F–22A program does not meet the six legal requirements for multiyear procurement as set out by title 10.

Substantial Savings

The Air Force claims there will be a 2.5-percent savings through the multiyear procurement, which by the way, does not impress me as substantial. But, the reality is that even after taking into account the four additional aircraft purchased through this plan, we will be spending $1 billion more because of the inefficiencies created by stretching out production over 3 years. According to the GAO, unit costs will also increase by $17 million per plane. None of this sounds like savings at all, let alone substantial savings.

Stable Requirements

Over the years, the number of requested F–22 aircraft has plummeted from 750 in 1986 to the most recent plan of only 183—clearly demonstrating the lack of stability in production rate requirements—in large part because the cost per aircraft has tripled.

Stable Funding

The current Future Years Defense Plan (FYDP) does not fully fund the F–22A. In fact, the program is being underfunded by $674 million, according to the Air Force.

Design Stability

Attached to my testimony is the Air Force plan to fund its modernization of the F–22A through 2010. The plan primarily addresses the new radar system, which is not even scheduled to be received by the Air Force until November of this year, and the software is not scheduled to be completed until 2010. This radar system is considered integral to the F–22A's ground-attack and intelligence gathering capabilities. According to the GAO, the Air Force "is planning additional modernization efforts for more of these capabilities in the future, but the cost, content, and timing have not yet been determined." Remember, these systems still have not been tested.

In addition to the new, untested systems there are ongoing technical problems with the existing systems. The Pentagon recently completed a follow-on independent test and evaluation on the existing systems, and found 75 unresolved deficiencies. New problems that have cropped up include faulty cockpit actuators—which trapped a pilot in the jet just this April—the pilot had to be rescued from his cockpit with chainsaws. Then there is the uncommanded nose landing gear retractions, which recently caused an aircraft to fall on its main weapons bay doors—literally falling on its face; and concerns about the heat treatment of the booms, which may cause structural cracking, and has been reported by Defense News as costing nearly $1 billion to fix. These and other problems all point to a system that is not mature and is in need of rigorous congressional oversight. A multiyear procurement plan would only tie Congress' hands and not allow for such oversight.

Realistic Cost Estimates

The Air Force has a history of not providing accurate cost estimates, and there is little reason to believe that it will be any more accurate for this round of procurement. For instance, 5 years ago, the House Government Reform Subcommittee on National Security was frustrated in getting accurate F–22A program cost estimates from the Air Force. The subcommittee had tasked the GAO with reviewing the F–22A program's cost reduction plans. What the GAO found was a $7 billion variance between the Air Force's cost estimates and those made by the Office of the Secretary of Defense's Cost Analysis Improvement Group. On August 20, 2001, Subcommittee Chairman Chris Shays wrote to House Armed Services Committee Chairman Duncan Hunter that, ". . . as you proceed with your deliberations on the pace and scope of the F–22A program, please be advised we can have little confidence in the accuracy of production cost estimates and less confidence in the legitimacy of projected production cost savings based on those estimates." (I ask that this letter be included in the record.)

In November 2005, the Defense Contract Audit Agency stated that there is "moderate to high risk . . . [in] cost estimate development" for the F–22A program, as they found $141 million in unsupported, inaccurate, or defective data in Air Force cost estimates.

Another more recent incident fuels POGO's doubts about the accuracy of the F–22A cost estimates. You may recall the debate in the Senate last spring over whether or not to support Secretary Rumsfeld's decision to cancel the C130J cargo plane. Although the contract clearly stated that cancellation costs would be $383 million, some of the very same people handling this F–22A procurement plan circulated to the Senate wildly-inflated and unsupported claims that the C–130J's cancellation costs would be nearly $1.8 billion. Based on that information, the Senate decided to go ahead and continue the contract. Last month, the Department of Defense (DOD) Inspector General concluded that those claims were false and based on potentially faulty data—and caused a $1.5 billion exaggeration. To my knowledge, no one has been held accountable for misleading Congress, but there are probably many people who know they successfully pulled the wool over the Senate's eyes. POGO's concern is that some of the folks handling the F–22A procurement are not above wild exaggerations to ensure that their program is approved.

National Security Interests

At the end of the day, perhaps the most important question remains—why are we continuing to fund a Cold War-era weapon that was designed to counter the next-generation Soviet fighters that were never constructed? In fact, the GAO stated in its June 2006 letter to House Appropriations Subcommittee on Defense Chairman C.W. Bill Young that, "Based on our review, in our opinion, the DOD has not demonstrated the need or value for making further investments in the F–22A program." While the final requirement of the law—that it promotes the national security of the United States—is a matter of judgment and is not quantifiable, the ballooning costs of this aircraft render it impossible to meet the Air Force's own stated requirements for 381 F–22As "in order to meet the needs of the warfighter." If it is too expensive to buy enough planes to meet our national security needs, this certainly challenges the assumption that the final requirement has been met.

Given all of the evidence that the F–22A program is not ripe for multiyear procurement, why did the Senate vote in favor of it? In a brazen example of the Military-Industrial Complex at work, Lockheed Martin e-mailed the Chambliss amendment proposing F–22A multiyear procurement status to an undisclosed list of Senate offices before the amendment had even been introduced by the Senator. Attached to that e-mail was an analysis selectively touting the findings of IDA, claiming "IDA found the F–22A meets all title 10 entrance criteria for a multiyear contract." That claim in the Lockheed e-mail appears to be based on a misreading of the IDA report. IDA limited its analysis to only one requirement—that there be cost savings. However, IDA attached two unattributed documents at the end of its report which assert the F–22A meets all six requirements. Because the author of these documents is not clearly identified, the wrong impression appears to have been reached that they were IDA's conclusions. In fact, however, these are Pentagon exhibits for the fiscal year 2007 President's budget and not independent analyses by IDA.

POGO's investigators began exploring how IDA could have found evidence to support a multiyear procurement, even though they acknowledged "this form of contracting bears significant risks." What we found shocked us, as well as former high-level employees of IDA. The current President of IDA, Admiral Dennis C. Blair, also sits on the board of an F–22A subcontractor named EDO Corporation, as well as another defense contractor. He and his family own 1,787 shares of stock and 30,000 stock options in EDO, according to documents EDO submitted to the Securities and

Exchange Commission. These shares and stock options are currently worth well over half a million dollars, should he choose to exercise those options. EDO has received contracts for almost $90 million from Lockheed Martin for supplying the advanced medium-range, air-to-air missile vertical ejection launcher for the F–22A.

While Admiral Blair was not an author of the IDA report, we understand that because of IDA standard operating procedures, he likely would have reviewed this report before it was made available to the Government. We do not know if Admiral Blair recused himself, or in any way affected the outcome of the IDA report. I would submit, however, that there is an appearance of a conflict-of-interest—given his substantial personal financial interest and his fiduciary responsibility to EDO—in the continued funding of the F–22A. This raises reasonable questions about the independence of IDA's analysis.

It is important that you understand I am in no way suggesting that Admiral Blair has violated any laws or regulations. What we have discovered though, is that while federally-funded research and development centers (FFRDCs) such as IDA have enjoyed the credibility of being regarded as an arm of the Government, the laws treat them purely as contractors. As a result, conflict-of-interest laws that apply to Government employees do not apply to the employees of FFRDCs. There is a disconnect between the perception that FFRDCs have to comply with conflict-of-interest laws and the reality. This problem is worth Congress' further attention.

When initially asked to testify today, I was also asked to address the proposal to purchase the F–22A's F119 engines through multiyear procurement. In short, why should Congress commit to buying a part of the aircraft for several years, when the commitment to buying the entire aircraft is uncertain? The jury is still out on future buys of the F–22A, and there is the risk that the engines will just stack up in a warehouse with nowhere to go.

In conclusion, it is clear that independent congressional analysts have significant concerns with accepting the F–22A program as a candidate for multiyear procurement. Based on its own research, POGO does not believe the F–22A program meets multiyear procurement requirements, and recommends that Congress remove the language authorizing the multiyear procurement until such time that the program meets those requirements.

Furthermore, POGO recommends that Congress consider applying conflict-of-interest rules to FFRDCs.

Thank you again for inviting me to testify today.

[The report referred to follows:]

Project On Government Oversight

Preying on the Taxpayer: The F-22A Raptor

July 25, 2006

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TABLE OF CONTENTS

INTRODUCTION 1

THE TROUBLED F-22A 2

THE MISLEADING LOCKHEED EMAIL 3

MULTIYEAR PROCUREMENT REQUIREMENTS 3

EVIDENCE THAT THE F-22A PROGRAM IS NOT RIPE FOR MYP STATUS 4

A FINANCIAL CONFLICT OF INTEREST? 12

CANCELLATION COSTS – HOW TO BUY A LEMON 14

CONCLUSION 16

RECOMMENDATIONS 16

INTRODUCTION

In June 2006, the Senate passed an amendment to the National Defense Authorization Act for Fiscal Year 2007 which authorized the government to purchase 20 F-22A[1] Raptor fighter jets each year for 2008, 2009, and 2010 using a multiyear procurement (MYP) strategy.

Lockheed Martin (Lockheed), the lead contractor on the F-22A program, lobbied aggressively to secure the MYP deal. If Lockheed is able to secure MYP status, it would essentially lock the government into buying 60 more of the troubled F-22A's and minimize the possibility that the program could suffer further funding cuts. An MYP would also result in the American taxpayers paying Lockheed $1 billion more than they would under the normal annual procurement process. (Appendix A)

In the lead up to the Senate vote and related budget debates in the House, the Congressional Research Service (CRS), Government Accountability Office (GAO), Congressional Budget Office (CBO), and Institute for Defense Analyses (IDA) were tasked with evaluating whether or not the F-22A program met the six legal requirements for an MYP strategy. In order for MYP status to be granted, a program must meet all six requirements. The CRS, GAO, and CBO all provide evidence that the F-22A program is not yet ripe for this type of financing scheme and that putting the F-22A into an MYP at this stage would be premature. Documents obtained by the Project On Government Oversight (POGO) show that even the Air Force raised significant questions as late as February 2006 about whether the F-22A would meet all the MYP requirements. (Appendix B, pages 17-18)

Only one opinion, that of IDA, differed from the rest. IDA concluded that the government would save about 2.5% – totaling around $225 million to $235 million – by using the strategy. (Appendix C) In the hours leading up to the debate on the Pentagon budget bill, Lockheed's lobbyists and its Congressional supporters promoted the surprising finding of IDA, a federally funded non-profit institute that conducts research for the federal government. Lockheed sent an email to Senate offices claiming the IDA had found that the F-22A would meet all the requirements for an MYP. (Appendix D) This claim appears to be based on a misreading of the IDA report.

What was not known at the time of the MYP vote was that IDA President Admiral Dennis C. Blair, USN (Ret.), is on the Board of Directors and a significant financial beneficiary of an F-22A subcontractor. As of July 5, 2006, Blair owned 1,787 shares of stock and 30,000 stock options in EDO Corporation, which manufactures essential suspension and release equipment for the F-22A. As a result, Blair himself stood to financially profit from a favorable MYP decision for the F-22A. (Appendix E)

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[1] The Air Force changed the designation of the F/A-22 to F-22A in 2005.

THE TROUBLED F-22A

In recent years, POGO has questioned the ability of Lockheed Martin to meet its goals for the troubled F-22 fighter jet program. Since its conception in 1986, the Air Force's F-22A Raptor fighter jet has been the focus of continued debate. The aircraft was originally intended to replace the aging F-15 fighter and create superiority in air-to-air combat operations. The F-22A, originally called the Advance Tactical Fighter (ATF), was designed to combat air threats posed by the Soviet Union. As the program took shape, the Kremlin fell and the air superiority threat from the Soviet Union vanished. With a diminishing air-to-air combat mission, the Air Force has assigned the F-22A new roles of air-to-ground combat and intelligence gathering. As a result, the aircraft continues to undergo modernization, and will for several more years.

But even if the F-22A were already adequately designed for today's missions, the program has faced multiple set-backs, and continues to do so. Problems range from technical flaws (despite 20 years of research and development) to a cost that is higher per aircraft than any other in history, totaling over $65.4 billion dollars to date.[2] The Air Force's original intent had been to acquire 750 aircraft for their inventory. Today, that number is 183.[3] This drop in numbers is due primarily to the technical difficulties and repeated cost overruns in the program. The cost of the aircraft has tripled while, in response, the number of aircraft requested has decreased.

In addition to an exorbitant cost-per-aircraft, the Pentagon recently completed a Follow-on Independent Test and Evaluation (FOT&E) on the F-22A's existing systems that found 75 unresolved deficiencies. (Appendix B) New problems that have cropped up include faulty cockpit actuators – which trapped a pilot in the jet, and he had to be rescued from his cockpit with chainsaws; uncommanded nose landing gear retractions, which recently caused an aircraft to fall on its main weapons bay doors – literally falling on its face; and concerns about the heat treatment of the booms, which may cause structural cracking. These problems have been reported to Congress by CRS, GAO, and even the Air Force. Problems have also been identified by the Pentagon's Director of Operational Test and Evaluation (DOT&E).

According to CRS, the F-22A has historically experienced problems with the Avionics, Airframe, Engine, Cockpit Canopy, and Maintenance and Support Requirements. These problems do not incorporate the cost of Class A mishaps to the aircraft. (A Class A mishap is one that results in over $1 million dollars in damage.) The F-22A has had three Class A mishaps over the past two years. (Appendix G)

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[2] "F-22A Raptor," Congressional Research Service, RL31673, Page 4, May 24, 2006, http://www.fas.org/sgp/crs/weapons/RL31673.pdf (Downloaded July 24, 2006); "Defense Acquisitions: Actions Needed to Get Better Results on Weapons Systems Investment," GAO Written Testimony before House Armed Services Committee, GAO-06-585T, April 5, 2006, http://www.gao.gov/new.items/d06585t.pdf (Downloaded July 24, 2006).

[3] "F-22A Raptor."

THE MISLEADING LOCKHEED EMAIL

With this troubled history as a backdrop, on June 15, 2006, Lockheed Martin Vice President of Legislative Affairs Jack Overstreet sent an email to senior Senate staff members titled "Chambliss F-22 Multiyear Amendment." (Appendix D) In a shockingly transparent sign of how the nation's military industrial complex functions, the email contained a copy of Senator Saxby Chambliss' (R-GA) amendment, even though Senator Chambliss had not yet introduced it. The email requested, "PLEASE VOTE 'YES' ON THE PROPOSED CHAMBLISS AMENDMENT ON F-22 MULTIYEAR PROCUREMENT."

The email further states that IDA found that the F-22A meets all six of the entrance criteria for MYP. The email contained multiple attachments, including the text of the amendment in normal legislative format, talking points, and fast fact sheets to which Senators could refer. The email, of course, did not include the evidence from CRS, GAO, CBO, DCAA, or even the Air Force, challenging the program's compliance with the legal requirements for MYP status.

Lockheed's claim in its email that IDA concluded the F-22A meets all MYP requirements appears to have been based on a misinterpretation of the IDA report. IDA limited its analysis to only one requirement – that there be cost savings. However, IDA attached two unattributed documents at the end of its report that assert the F-22A meets all six requirements. Because the author of these documents is not clearly identified, the wrong impression appears to have been reached that they are IDA conclusions. In fact, however, these are Pentagon exhibits for the FY2007 President's Budget and not independent analyses by IDA.

Shortly after Lockheed's email was sent, Senator Chambliss introduced the amendment to the National Defense Authorization Act for Fiscal Year 2007 to grant the F-22A multiyear procurement status. (Appendix F) Based on the timing of the email and its content, it appears that Lockheed Martin was involved in the process and likely drafted the amendment themselves.

The amendment states that the F-22A program is in accordance with Section 2306(b) of Title 10 of the United States Code (USC), which sets forth the six legal requirements that must be met to qualify for MYP status.

MULTIYEAR PROCUREMENT REQUIREMENTS

A multiyear procurement is, according to the Defense Acquisition University, a "method of competitively purchasing up to 5 years' requirements in one contract, which is funded annually as appropriations permit."[4]

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[4] "Glossary of Defense Acquisition Acronyms & Terms," Defense Acquisition University, 12th Edition, July 2005, http://www.dau.mil/pubs/glossary/12th_Glossary_2005.pdf (Downloaded July 24, 2006).

But there are significant risks to using an MYP for procurement:

> A multiyear contract in comparison to a series of successive annual contracts offers cost savings and a stable procurement rate. However, this form of contracting also bears significant risks. MYP reduces congressional budgetary flexibility, both for the instant program and across other programs within the defense portfolio. Though multiyear programs are funded on an annual basis, they tend to require greater budgetary authority in the earlier years of the procurement. The Government also bears the risk of program cancellation, which can be quite high in the earlier years of the program. In certain cases, the requirement for design stability can also be a barrier to technology insertion. (Appendix C, page 9)

To mitigate these risks, the government established Title 10 U.S.C. §2306 (b),[5] which sets forth six legal criteria that must be met for MYP status to be granted. The criteria are:

> (1) That the use of such a contract will result in substantial savings of the total anticipated costs of carrying out the program through annual contracts.
> (2) That the minimum need for the property to be purchased is expected to remain substantially unchanged during the contemplated contract period in terms of production rate, procurement rate, and total quantities.
> (3) That there is a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation.
> (4) That there is a stable design for the property to be acquired and that the technical risks associated with such property are not excessive.
> (5) That the estimates of both the cost of the contract and the anticipated cost avoidance through the use of a multiyear contract are realistic.
> (6) In the case of a purchase by the Department of Defense, that the use of such a contract will promote the national security of the United States.

EVIDENCE THAT THE F-22A PROGRAM IS NOT RIPE FOR MYP STATUS

With the exception of IDA, the analysts tasked with evaluating the F-22A program for MYP status found, to varying degrees, that the program does not meet all of the requirements for MYP. This includes the Air Force itself.

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[5] 10 U.S.C. § 2306 (b), http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=browse_usc&docid=Cite:+10USC2306(b) (Downloaded July 24, 2006).

Requirement 1: That the use of such a contract will result in substantial savings of the total anticipated costs of carrying out the program through annual contracts.

GAO –

"We do not believe this condition has been met. The Air Force has not yet completed an estimate of multiyear procurement savings but has stated that it expects a maximum savings under its "best case" scenario of about 5 to 6 percent. It is expected to provide a final estimate to the Congress in May 2006. According to the CBO, substantial savings was defined in the past as at least 10 percent; however, the current law does not define substantial. **We would point out, however, that the unit cost to procure remaining F-22As has increased 8 percent when comparing the fiscal year 2007 budget (using multiyear procurement) to the fiscal year 2006 budget (without multiyear procurement).** The unit procurement costs to complete the F-22A program in fiscal year 2006 was $166 million per aircraft for 56 aircraft. The unit procurement cost to complete the program in fiscal year 2007 using multiyear procurement increased to $179 million for 60 aircraft. The multiyear plan proposes buying 20 aircraft each in fiscal years 2008 through 2010 whereas the fiscal year 2006 budget terminated procurement in 2008. **The inefficiencies connected with extending the program by 2 years will add over $1 billion to the budget."** [Emphasis added] (Appendix A)

CRS –

"There may be reasons for some to question the feasibility of achieving IDA's estimated $225 million MYP savings. For example,

- There has been consistent and noteworthy disagreement between the Air Force and the Office of the Secretary of Defense (OSD) on F-22 cost estimating. Congress requested an independent cost estimate, which DoD hired IDA to execute.
- IDA's estimate of F-22 costs is different from OSD's and the Air Force's estimates.
- In the December 31, 2004, Selected Acquisition Report (SAR) DoD reported that a two-year MYP (for production lots seven and eight) the Air Force anticipated pursuing would have saved $458.9 million over annual procurement. This level of estimated savings for a two-year MYP is approximately twice the figure IDA estimates the Air Force may save through a three-year MYP. Such disparity in estimates may suggest to some observers poor assumptions, tools, or methodologies for MYP cost savings estimates.
- The basis of some Air Force cost estimates is unclear. For example, the Air Force plans to acquire two additional F-22 aircraft with the anticipated $225 million in MYP savings. According to DoD's latest estimate, the F-22's Average Procurement Unit Cost is $185.4 million in FY2005 dollars. By this figure, two F-22's would cost $370.8 million.

GAO has consistently argued that the F-22 program should have conducted more thorough testing before entering production. For example, the GAO has argued that "The F-22 entered production without ensuring production processes were in control." If true, this less-than-mature production process could be responsible for the F-22's current technical problems, which add to program cost, and may reduce projected MYP savings." (Appendix G)

CBO –

"Deferring recognition of the full cost of the assets being purchased would understate the nature of the government's obligations, potentially distorting budgetary choices by making the program appear less expensive than it is, and would constrain budgetary flexibility in subsequent years." [6]

IDA –

"For the MYP BCA [Business Case Analysis] IDA *estimated* the savings to be 2.2 percent of procurement costs. We present MYP savings in the context of total procurement cost." [Emphasis in original] (Appendix C)

Requirement 2: That the minimum need for the property to be purchased is expected to remain substantially unchanged during the contemplated contract period in terms of production rate, procurement rate, and total quantities.

GAO –

"We do not believe this condition has been met. The planned quantities of F-22As have changed substantially over time starting with a requirement for 750 at program start to the current planned quantity of 183. The Air Force still includes the F-22A as one of its highest priority systems and continues to state a need for 381 aircraft, leaving a gap of 198 aircraft. **However, in the last two years the quantities have changed twice.** In December 2004, OSD determined that procurement of F-22As had to be terminated in fiscal year 2008 in order to save $10.5 billion. OSD stated this was all the F-22s that could be afforded. Then in December 2005, OSD changed the quantities again increasing them to 183 aircraft, adding over $1 billion to the F-22A budget. This tension between OSD and the Air Force will apparently continue into future budgets and quantities and could change again given the potential for further demands on limited government resources through the 2010 timeframe (War on Terror, future natural disasters, aging population, and many others). This disconnect between quantities needed and quantities that can be afforded is a major contributor to the broken F-22A business case and we believe it needs to be resolved before additional funds are authorized for procurement or

[6] Statement of Donald B. Marron, "The Air Force's Proposal for Procuring F-22 Fighters," Congressional Budget Office, March 28 2006, http://www.cbo.gov/ftpdocs/71xx/doc7104/03-28-F-22.pdf (Downloaded July 24, 2006).

modernization. Until the disconnect between needs and affordability can be solved and quantities are firmly established, it is difficult to determine what role the F-22A should have. Other alternatives (JUCAS, F-15s, JSFs) might provide sufficient ground attack capabilities and could result in further reductions in F-22A if its primary role is air superiority." [Emphasis added] (Appendix A)

CRS –

"... the F-22A program has experienced noteworthy turbulence between the FY05 and FY07 budget requests. Total program budget, annual budget requests, total inventory, annual procurement rate, and program duration have all changed. ... Considering the changes to the F-22A program that have occurred, and changes which are being proposed, some may question the Air Force's ability to comply with some provisions of 10 USC 2306(b)(a), including provision (2) ... ." (Appendix G)

Requirement 3: That there is a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation.

GAO –

"We do not believe this condition has been met." The GAO further stated, "The Air Force has indicated that its multiyear budget is currently under funded by $674 million." [Emphasis added] (Appendix A)

CRS-

"Considering the changes to the F-22A program that have occurred, and changes which are being proposed, **some may question the Air Force's ability to comply with some provisions of 10 USC 2306(b)(a), including provision (2) ... and (3).**" [Emphasis added] (Appendix G)

CBO –

"... the funding provided each year would not be sufficient to complete the aircraft ordered that year, and the Air Force would have to seek additional appropriations in the future to obtain functional aircraft. ... The Air Force would commit to the purchase of 20 aircraft per year for three years, with the right to cancel the remainder of the order at the end of each year. **But it is not requesting appropriations sufficient to cover the potential cancellation liability. Under that proposal for multiyear procurement, the Air Force would have to seek additional appropriations in the future even if a decision was made to cancel the contract.**"[7] [Emphasis added]

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[7] Ibid.

Air Force –

POGO recently acquired a February 2006 Air Force presentation showing unresolved issues concerning the stability of funding for the F-22A program, the third requirement for MYP status. The Air Force rated the program's ability to meet the "Stable Funding" requirement "Yellow" as it will need to acquire waivers from the Office of the Secretary of Defense (OSD) because the MYP does not include full funding as required or funding for contract cancellation. (Appendix B)

Requirement 4: That there is a stable design for the property to be acquired and that the technical risks associated with such property are not excessive.

GAO –

> "While the design for the baseline F-22A aircraft, designed primarily for an air superiority role, is stable, the design for the ground attack capability to be added has not been demonstrated and thus cannot be considered 'stable.'" (Appendix A)

CRS –

CRS has highlighted many problems over the years with the F-22A. Most recently, it has discussed difficulties with the Structures Retrofit Program (SRP), forward boom heat treatment, the canopy actuator, Air Recharge System (ARS), and the nose landing gear. These issues remain unsolved. The CRS stated that the Air Force has reported five technical problems currently being experienced in the F-22A program:

> "**Structures Retrofit Program.** SRP is a planned improvement effort required to manage weapon system service life and ensure the aircraft meets the design service life of 8,000 flight hours. As service life deficiencies were identified during Engineering, Manufacturing and Development (EMD) structural testing, (mid fuselage, engine bay, aft boom, forward boom, wing leading edge) corrections were incorporated into the production line. The SRP retrofits those aircraft delivered prior to the incorporation of all corrective actions into the production process (aircraft 4010-4083). Work will begin as early as January 2007 and is scheduled to conclude in 2010.
>
> **Forward Boom Heat Treat Issue.** In December 2005, the Air Force was notified that some titanium forward boom frames were not properly heat-treated. This improper heat treatment created the potential for forward boom frames with anomalous material properties (e.g. extensive cracking) in aircraft 4017-4107. Immediate studies indicated this is not a safety of flight issue, but the cost of inspections and steps potentially required to address this anomaly are currently unknown.
>
> **Canopy Actuator.** On 10 Apr 06, an F-22A ground-aborted because the canopy would not open. This problem was caused by screws backing out of the internal locking mechanism in the canopy actuator. An inspection for potentially faulty actuators identified 42 potentially faulty actuators (35 installed on F-22As and 7 spares). A 30-day repetitive mechanical inspection has been implemented to ensure proper operation of the

actuators and potentially faulty actuators will be replaced through retrofit expected to be complete by February 2007.

Air Recharge System. The Air Recharge System (ARS) experienced three problems: leakage, auto-ignition failures, and an ARS rupture during flight. The ARS replenishes the Stored Energy System after engine start. Fixes to these problems have been initiated.

Nose Landing Gear. On 11 May 06, an F-22A (aircraft 4020) experienced an uncommanded nose landing gear retraction and the nose of the aircraft fell to the ground, landing on the main weapons bay doors. A similar incident occurred on 18 Mar 2003 to aircraft 4008. The technical solution preventing uncommanded nose gear retractions has been incorporated into the production process and is being fielded throughout the fleet. The findings of Safety Investigation Board are pending.

In addition to those problems reported, at least one production issue may also warrant concern. The F-22 aircraft exiting the Lockheed Martin final assembly plant have experienced an increase in gross takeoff weight of 800 lbs from the beginning of production to the present. Increased weight reduces aircraft performance.

It may be useful to note that the technical problems identified above are those that are currently known, and reported. As mentioned in testimony before the Senate Armed Services Committee on March 28 2006, the titanium problem that the Air Force discovered in December 2005 was not reported to Congress until March 2006. Based on this experience, it may be that additional technical problems exist in the F-22A program of which Congress has not yet been informed. Further, the Government Accountability Office (GAO) and others have expressed concern that the Air Force's plan to integrate a new, multi-mode, air-to-ground capable AESA (Agile, Electronically Steered Array) radar into the F-22 could present unforeseen and significant technical challenges. The Air Force does not share the GAO's concern, and argues that modernizing the F-22 radar is no more challenging than, for example, retrofitting existing F/A-18/E/F Super Hornets with new AESA radars.

Technical problems experienced historically

According to the GAO, increased labor rates coupled with technical problems associated with avionics, airframe, and engines have caused 70% of the F-22 cost growth.

Avionics: overcoming avionics software instability was a key challenge that led to an extension of the EMD phase (engineering, manufacturing and development).

Airframe: Lockheed Martin experienced a number of technical challenges with the F-22 airframe, including buffeting of the vertical tail fin, a separation of materials in horizontal tail fin, and "bumps on external shape due to repackaging internal systems."

Engine: F119 engine fuel consumption has been unsatisfactory, and problems were experienced with the engine's core combustor, which did not demonstrate desired temperature levels. Another disappointment was manufacturing problems with fuel-air heat exchangers which reduced effectiveness.

Cockpit Canopy: The F-22 has experienced on-going challenges with the cockpit canopy, including cracking and reliability.

Maintenance and Support Requirements: The F-22 does not meet the Air Force Airlift Key Performance Parameter (KPP) of 8 C-141 equivalents to move a F-22 squadron. 8.8 C-141 equivalents are required. Further, mean time between maintenance is 3 to 5 times the Air Force requirement of ~2 flight hours between maintenance.

Although it is difficult to draw a direct correlation between technical problems and aircraft accidents (also known as mishaps), the F-22 mishap rate may be noteworthy, and may reflect on the technical challenges experienced. The F-22 program experienced three Class A mishaps (>$1 million in damage) in 14 months." (Appendix G)

Air Force –

The Air Force presentation provides evidence that the modernization of systems essential to the new mission of the F-22A has yet to be completed. The main concern is a new radar system, which is considered by the Air Force to be integral to the F-22A's ground-attack and intelligence gathering capabilities.[8] The radar system is not even scheduled to be received by the Air Force until November 2006, and the software is not scheduled to be completed until 2010. The nature of this funding establishes the case that the F-22A is still receiving, and will continue to receive, essential upgrades that are still being developed and have yet to be tested. This ultimately affects the F-22A's ability to prove that the program complies with the "Stable Design" requirement. (Appendix B)

Requirement 5: That the estimates of both the cost of the contract and the anticipated cost avoidance through the use of a multiyear contract are realistic.

GAO –

"**We believe this is questionable** at this time and will require the Air Force to submit a detailed and independent estimate of the cost and will require some evidence that the contractor is willing to sign up to this cost." [Emphasis added] (Appendix A)

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[8] POGO realizes that the F-22A modernization plan is considered a separate program from the MYP. However, the radar system is integral to the capacity of the aircraft to meet its mission, and therefore is relevant to the stability of design for the aircraft.

CRS –

"The DoD has reported 10 cost over-runs in the F-22 program. (DoD is required to report cost overruns in the SAR when the cost estimate is 15% higher than past SAR.) ... Adjusting for inflation, the program unit acquisition cost (PUAC) estimate in 1991 was $114 million per aircraft ($05) and in 2006 the estimate was $354 million per aircraft ($05). In real terms, this represents a per-aircraft increase of over 200%."(Appendix G)

DCAA –

A November 9, 2005, Defense Contract Audit Agency (DCAA) presentation[9] concluded there is "Moderate to high risk ... [in] Cost Estimate Development" after discovering $141 million in unsupported, inaccurate, and defective data in Air Force F-22A cost estimates. (Appendix H)

House Government Reform Subcommittee on National Security Chairman Christopher Shays –

The Air Force has a history of not providing accurate cost estimates, and there is little reason to believe that it will be any more accurate for this round of procurement. For instance, five years ago, the House Government Reform Subcommittee on National Security was frustrated in getting accurate F-22A program cost estimates from the Air Force. The Subcommittee had tasked the GAO with reviewing the F-22A program's cost reduction plans. What the GAO found was a $7 billion variance between the Air Force's cost estimates and those made by the Office of the Secretary of Defense's Cost Analysis Improvement Group. On August 20, 2001, Subcommittee Chairman Chris Shays wrote to House Armed Services Chairman Duncan Hunter that, ". . . as you proceed with your deliberations on the pace and scope of the F-22A program, please be advised we can have little confidence in the accuracy of production cost estimates and less confidence in the legitimacy of projected production cost savings based on those estimates." (Appendix I)

Requirement 6: In the case of a purchase by the Department of Defense, that the use of such a contract will promote the national security of the United States.

At the end of the day, perhaps the most important question remains – why are we continuing to fund a Cold War-era weapon that was designed to counter the next-generation Soviet fighters that were never constructed? In fact, the GAO stated, "Based on our review, in our opinion, the DOD has not demonstrated the need or value for making further investments in the F-22A program." (Appendix A) While the final requirement of the law – that it promotes the national security of the United States – is a matter of judgment and is not quantifiable, the ballooning costs of this aircraft render it impossible to meet the Air Force's own stated requirements for 381 F-22A's "in order to meet the needs of the warfighter." If it is too expensive to buy enough aircraft to meet our national security needs, this certainly challenges the assumption that the final requirement has been met.

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[9] The Defense Contract Audit Agency is the Pentagon's audit agency.

A FINANCIAL CONFLICT OF INTEREST?

In early 2006, the Pentagon's Office of the Under Secretary of Defense, Acquisition, Technology and Logistics requested that a report be prepared by IDA. IDA is a federally funded research and development center (FFRDC) which has assisted the DOD since it was established in 1947 by Secretary of Defense James Forrestal.[10] IDA states that it does not work for the private industry and that it takes "...great pride in the high caliber and timelessness of its analyses, which are produced in an atmosphere that encourages independent thinking and objective results."[11] The report, "F-22 Multiyear Procurement Business Case Analysis," found that the F-22A program met all the criteria needed for the program to be purchased under a lucrative multiyear procurement (MYP) strategy.

Admiral Dennis C. Blair, USN (Ret.), joined IDA in October 2002 and was promoted to President just one year later. Also in October 2002, Admiral Blair joined, and still sits on, the Board of Directors for defense contractor EDO Corporation, a subcontractor on the F-22A.[12] According to EDO's website, EDO manufactures essential suspension and release equipment for the F-22A. The LAU-14/2 AMRAAM Vertical Eject Launcher is the component of the F-22A that carries and ejects the AIM-120C missiles.[13] He currently controls 1,787 shares of stock and 30,000 stock options in EDO, worth well over half a million dollars if he chose to exercise those options. (Appendix E)

As a subcontractor on the F-22A, EDO has a significant financial stake in a multiyear procurement for the F-22A program. According to an analysis by POGO, Lockheed Martin has awarded EDO with approximately $90 million in contracts for components for the F-22A, $68.4 million of which have been awarded since Admiral Blair joined EDO.

An MYP can significantly impact the value of the company's stock over time as investors perceive that such a contract will provide stability of revenues. According to one report: "multi-year contracts substantially increase stock valuations due to investor perception of

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[10] "About IDA," Institute for Defense Analyses, 2005, http://www.ida.org/IDAnew/Welcome/history.html (Downloaded July 24, 2006).

[11] Ibid.

[12] "Admiral Dennis C. Blair and James Roth Join Board of Directors of EDO Corporation," EDO Corporation Press Release, October 1, 2002, http://www.edocorp.com/pr2002/02r1001_2.htm (Downloaded July 24, 2006).

[13] "Corporate Overview," EDO Corporation, http://www.edocorp.com/CorporateOverview.htm (Downloaded July 24, 2006).

controlled risk."[14] A National Defense University study on the Aircraft industry noted: "If the F-22 proceeds with production as expected, a multi-year contract would provide a needed financial boost to Lockheed-Martin."[15]

Admiral Blair became director of EDO the same month that he began working at IDA. He serves as Chairman of the Compensation Committee and is a member of the pension investment committee. As a member of the Board of Directors he is an essential figure in the structuring, direction, and overall success of EDO.

IDA is a registered FFRDC and is considered a contractor of the Federal government. As a contractor, IDA does not fall under the same conflict of interest rules as federal employees. POGO contacted IDA to determine their conflict of interest policies, and received an email stating, "Due to the nature of our work at the Institute for Defense Analyses, we are unable to provide information about conflict of interest policies or forms. If you are seeking general information about IDA, please visit our website at www.ida.org." (Appendix E) After further research, POGO discovered that FFRDCs such as IDA have enjoyed the credibility of being regarded as an arm of the government, yet they are not subject to any such legal restrictions.

It is important to emphasize that POGO is in no way suggesting that Admiral Blair has violated any laws or regulations. There is a disconnect between the perception that FFRDCs have to comply with conflict of interest laws and the reality. This problem is worth Congress' further attention.

While this is perfectly legal, it raises many ethical concerns. IDA's report has been cited by Lockheed Martin, multiple Senators, and the Air Force as the primary evidence that the MYP of the F-22A will save the American taxpayer millions of dollars. On the floor of the Senate, many Senators claimed that the information provided by IDA was more accurate than that provided by the GAO.[16] IDA's report, in fact, was the pivotal document upon which MYP status for the F-22A was granted by the Senate.

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[14] McAleese, James, "Defense Industry Models Must Change to Draw New Investors," *National Defense*, June 2001, http://www.nationaldefensemagazine.org/issues/2001/Jun/Defense_Industry.htm (Downloaded July 24, 2006).

[15] "Aircraft," Industrial College of the Armed Forces, Industry Studies Program, http://www.ndu.edu/icaf/industry/IS2001/aircraft.htm (Downloaded July 24, 2006).

[16] *Congressional Record*, June 22, 2006, http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?dbname=2006_record&page=S6338&position=all (Downloaded July 24, 2006).

CANCELLATION COSTS – HOW TO BUY A LEMON

The decision last year by Congress to fully fund the C-130J multiyear procurement offers a relevant lesson for the current debate on the F-22A – that is a lesson on how the Air Force is forcing the American taxpayer to buy its lemons. Having succeeded in misleading Congress on the C-130J deal, the Air Force and Lockheed Martin are putting the same playbook into action on the F-22A. One of those plays is to lock the American taxpayer into buying the Air Force's pet projects, then create the impression that cancellation is impossible.

The C-130J is such a failure that the DOD sought its termination under Program Budget Decision 753, against the wishes of the Air Force. In 2005, although POGO released a copy of the C-130J contract showing a cancellation ceiling of $440 million, the Air Force misinformed the Secretary of Defense and Congress, stating that it would cost $1.78 billion to cancel the contract.[17] In June 2006, The Pentagon IG (DOD IG) issued a report confirming that $440 million was the most it would cost to cancel the contract, noting: "By definition, a contract cancellation ceiling represents the Government's maximum liability."[18]

As a result of the Air Force's misleading claims about the C-130J, the American taxpayer is now locked into paying an additional $4 billion on an aircraft that cannot even be taken into combat. Indeed, as the *New York Times* reported last year, the C-130J's primary use appears to be that it creates added justification to keep certain U.S. military bases open (because the C-130J must be deployed domestically), helping Members of Congress who are fighting base closures.[19] As the DOD IG noted in a June 2006 report, "... ten years after the first award in 1995, the contractor was still delivering non-compliant aircraft."[20]

As with the F-22A, the DOD IG report on the C-130J found that the Air Force failed to request cancellation funds – as is required under multiyear procurement rules – and then issued inaccurate cancellation estimates:

> ... the FY 2006 President's Budget did not include sufficient funds to terminate the Air Force C-130J aircraft procurement and accelerate the Marine Corps KC-130J aircraft procurement if the unsupported cost estimate was valid.[21]

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[17] "Letter from Project On Government Oversight and Taxpayers for Common Sense to Secretary of Defense Donald Rumsfeld," February 24, 2005, http://www.pogo.org/m/cp/cp-Rumsfeld-C130J-02242005.pdf (Downloaded July 24, 2006).

[18] "Contracting and Funding for the C-130J Aircraft Program," Department of Defense Inspector General, June 21, 2006, http://www.dodig.osd.mil/Audit/reports/FY06/06-093.pdf (Downloaded July 24, 2006).

[19] Wayne, Leslie, "The Flawed Plane Congress Loves," *New York Times*, March 24, 2005.

[20] "Contracting and Funding for the C-130J Aircraft Program," Department of Defense Inspector General, June 21, 2006, http://www.dodig.osd.mil/Audit/reports/FY06/06-093.pdf (Downloaded July 24, 2006).

[21] Ibid.

Of course, requesting the cancellation costs from Congress would require an accurate, publicly available figure subject to review and debate. So far, the Air Force has not provided such a figure for its proposed F-22A multiyear procurement, which could lead to the same exaggerated cancellation estimates as the C-130J if the F-22A program faces trouble.

Indeed, as recently as February 2006, a Power Point presentation from the Air Force showed that its plan was to get a special waiver from the Office of the Secretary of Defense that would allow the Air Force to fund cancellation costs outside the contract: "Termination liability and contract cancellation covered by Air Force outside F-22 budget authority. ... Need OSD(C) waiver to allow termination liability/cancellation ceiling to be an unfunded contingent liability." (Appendix B, page 18)

In March 2006 Congressional testimony, the CBO described how cancellation of a multiyear procurement would put the government and the taxpayer at greater risk if funds were not set aside:

> But with no funds set aside specifically for cancellation costs, the Air Force would have to terminate orders for some or all of the aircraft that had already entered production if a decision was made to cancel subsequent orders. Thus, if it canceled the remaining years of the multiyear contract at the end of the first year, the government would not only forgo the aircraft to be produced in later years but also would not receive all of the planes it had ordered in the first year – and the taxpayers' investment in those aircraft would be lost. In particular, at the end of the first year, the Air Force would have ordered 20 aircraft. If the government decided to cancel the contract at that point but had not set aside funds specifically for cancellation costs, it would not only forgo the 40 aircraft that had not entered production, but, to free up funds for cancellation costs, it would have to stop work on some of the 20 aircraft that had already been ordered. The Air Force's proposal differs from the practice of full up-front funding in two ways: it seeks incremental funding for acquiring capital assets, and it provides for a multiyear procurement without funding for possible cancellation costs.[22]

The CBO further stated, "On the basis of cancellation liabilities for other multiyear programs, that amount could be between 5 percent and 15 percent of contract costs. ... According to the AirForce, the 60 airplanes would cost about $10.5 billion in total." As a result, cancellation costs could reach as much as $1.6 billion if it follows the pattern set by other multiyear procurements.[23]

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[22] Statement of Donald B. Marron, "The Air Force's Proposal for Procuring F-22 Fighters," Congressional Budget Office, March 28 2006, http://www.cbo.gov/ftpdocs/71xx/doc7104/03-28-F-22.pdf (Downloaded July 24, 2006).

[23] Marron statement, pg 7.

CONCLUSION

In conclusion, it is clear that independent congressional analysts have significant concerns with accepting the F-22A program as a candidate for multiyear procurement. Based on its own research, POGO does not believe the F-22A program meets multiyear procurement requirements, and recommends that Congress strike language authorizing the MYP until such time that the program meets those requirements.

RECOMMENDATIONS

1. POGO recommends that the language authorizing multiyear procurement of the F-22A be struck immediately, to be reconsidered only when the program can more thoroughly justify its capabilities to fulfill the requirements of an MYP contractual agreement.

2. Define "substantial savings" in Requirement 1 of Title 10 U.S.C. Section 2306(b). POGO further recommends that substantial savings be defined as 10%, as has been done in the past. Establishing 10% as a permanent definition for substantial savings will provide a reasonable measure of accountability rather than leaving the standard open to interpretation.

3. Require an independent analysis of cancellation costs for the F-22A and all proposed multiyear procurements, and that those analyses be provided to Congress before it approves an MYP. Furthermore, the Pentagon should be required to request funding to cover those cancellation costs in the event the program is terminated.

4. Apply federal conflict of interest laws to federally funded research and development centers. These organizations are fully funded by the federal government and should be required to meet the same ethics standards as federal agencies.

APPENDICES

Appendix A: June 26, 2006, Letter to The Honorable C.W. Bill Young, Chairman, House Subcommittee on Defense, Committee on Appropriations from David M. Walker, Comptroller General of the United States Government Accountability Office (GAO-06-455R).

Appendix B: February 16, 2006, F-22 OIPT [Overarching Integrated Product Team] Brief (Selected Slides), Maj. General Rick Lewis, United States Air Force.

Appendix C: "F-22A Multiyear Procurement Business Case Analysis" (IDA Paper P-4116), Institute for Defense Analyses.

Appendix D: June 15, 2006, Email to Selected Senate Staff Members from Jack Overstreet, Vice President, Legislative Affairs, Aviation Systems, Lockheed Martin Corporation.

Appendix E: Background on EDO Corporation and Admiral Dennis Blair (Ret.), President, Institute for Defense Analyses.

Appendix F: June 22, 2006, Congressional Record, Senate Debate on Senator Saxby Chambliss' Amendment (Amendment 4261) to Authorize Multiyear Procurement of the F-22A.

Appendix G: Selected documents from Christopher Bolkcom, Specialist in National Defense, Congressional Research Service.

Appendix H: November 9, 2005, Selected Excerpts from: "Gaining an Understanding of Estimating Systems and Controls" by Larry Chanay, Defense Contract Audit Agency.

Appendix I: August 20, 2001, Letter to The Honorable Duncan Hunter, Chairman, Committee on Armed Services from The Honorable Christopher Shays, Chairman, Subcommittee on National Security, Veterans Affairs and International Relations.

Appendix A

June 26, 2006
Letter to
The Honorable C.W. Bill Young, Chairman
House Subcommittee on Defense, Committee on Appropriations
from
David M. Walker, Comptroller General of the United States
Government Accountability Office
GAO-06-455R

United States Government Accountability Office
Washington, DC 20548

June 20, 2006

The Honorable C.W. Bill Young
Chairman
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Subject: *Tactical Aircraft: DOD Should Present a New F-22A Business Case before Making Further Investments*

Dear Mr. Chairman:

The F-22A is the Air Force's next generation air superiority[1] fighter aircraft. It incorporates a low observable (stealth) and highly maneuverable airframe, advanced integrated avionics, and a new engine capable of sustained supersonic flight without the use of afterburners. It was originally desigued to counter threats posed by the Soviet Union and was intended to replace the F-15 fighter in the air-to-air combat role. However, the Air Force now plans to add a more robust ground attack and intelligence-gathering capability not previously envisioned but now considered "necessary" to increase the utility of the aircraft. In December 2005, the Air Force changed designations from the F/A-22 to the F-22A. The aircraft maintained all current capabilities as well as the expanded ground attack capabilities. Officials have initiated a modernization program to develop and integrate these new capabilities.

In March 2005,[2] we reported that despite substantial changes to the F-22A program since it started in 1986, Air Force leaders have not developed a new business case for investing billions more dollars to modernize the aircraft. Over time quantities have been reduced, and in recent years both funding and quantities have been in a state of flux. Given significant changes in quantities and planned capabilities, the large investments still planned, and the potential for further changes, you requested tbat we review the F-22A program. Specifically, we assessed the need for a new business case[3] before further investments are made in the F-22A program and statutory criteria the Air Force is required to meet to enter a multiyear contract for the remaining aircraft.

To assess the Air Force's business case for further investments in the F-22A program, we reviewed recent Office of the Secretary of Defense Program Budget Decisions (PBDs) and F-22A requirements documents. We also reviewed F-22A planned modernization scbedules and documents and interviewed

[1] Air superiority is the degree of air dominance that allows the conduct of operations by land, sea, and air forces without prohibitive interference by the enemy.

[2] GAO, *Tactical Aircraft: Air Force Still Needs Business Case to Support F/A-22 Quantities and Increased Capabilities*, GAO-05-304 (Washington, D.C.: Mar. 15, 2005).

[3] A business case provides demonstrated evidence that (1) the warfighter need exists and that it can best be met with the chosen concept and (2) the concept can be developed and produced within existing resources—technologies, design, funding, and time. Establishing a business case calls for a realistic assessment of risks and costs; doing otherwise undermines the intent of the business case and invites failure.

program officials from the F-22A program office, Air Combat Command, and the Air Force Program Executive Officer for Tactical Air. To assess the Air Force's proposed use of a multiyear contract for the remaining F-22As, we compared program documentation on cost, schedule, and performance with statutory criteria for entering into a multiyear contract. We conducted our review between August 2005 and April 2006 in accordance with generally accepted government auditing standards.

Summary

Based on our review, in our opinion, the DOD has not demonstrated the need or value for making further investments in the F-22A program. The Air Force's current stated "need" is for 381 F-22As to satisfy air-to-air missions and recently added requirements for more robust ground attack and intelligence-gathering capabilities. However, because of past cost overruns and current budget constraints, the Office of the Secretary of Defense (OSD) states that it can now afford only 183 F-22As. This leaves a 198-aircraft gap between the Air Force's stated need and what is currently affordable. The Air Force is planning to invest about $4.4 billion through 2011 to add more robust ground attack and intelligence gathering capabilities for the F-22A. However, because of the large aircraft gap between stated Air Force requirements and current and future budget realities, it may not be prudent to make additional investments for these new missions and capabilities. Furthermore, alternatives such as the Joint Strike Fighter and F-15 might be able to execute ground attack more cost-effectively given the substantially fewer numbers of F-22As that OSD has committed to buy.

In December 2005, OSD restructured the F-22A program by extending production to 2010, adding 4 aircraft for a total planned procurement of 183 F-22As and adding $1 billion to the procurement program. Under the restructured acquisition program, the Air Force is planning to procure a total of 60 F-22As in a multiyear procurement. However, in the Air Force's multiyear procurement justification package sent to Congress on May 16, 2006, it stated that an additional $674 million is needed to fully fund the multiyear program being proposed. Our work led us to make observations on issues that could affect the Air Force's ability to satisfy several of the statutory criteria for entering into a multiyear contract, including the documentation of savings, a stable design, and available funding.

We believe the Congress should consider withholding additional funding for procurement and modernization until the Department completes a comprehensive business case that addresses the concerns we have raised herein. In response to a draft of this report, the Department stated that a recently completed Joint Air Dominance (JAD) study conducted by DOD adequately identified the quantity and mix of tactical aircraft needed and thus already satisfied the intent of our recommendation. We have asked OSD to provide us access to the JAD study, but it has not yet done so. We plan to pursue this matter with the Department. However, because Congressional deliberations on this issue are ongoing, we believe it is important to provide the data and analysis in the report at this time. Given the way this program has unfolded, with frequently changing OSD-approved requirements, repeated cost overruns, and given that DOD did not object to the data and analysis contained in the report, we are not changing our matter for Congressional consideration. If Congress does decide to provide more funding for the F-22A program, that funding should be conditioned on DOD providing the JAD study and subjecting it to independent review to ensure that it provides adequate justification for sound investment of taxpayer resources.

Background

The F-22A began development in 1986 to replace the F-15 air superiority aircraft. The continued need for the F-22A, the quantities required, and modification costs to perform its mission have been the subject of a continuing debate within DOD and the Congress. Supporters cite its advanced features—

stealth, supercruise speed, maneuverability, and integrated avionics—as integral to the Air Force's Global Strike initiative and for maintaining air superiority over potential future adversaries.[4] Critics argue that the Soviet threat the fighter was originally designed to counter no longer exists and that its remaining budget dollars could be better invested in enhancing current air assets and acquiring new and more transformational capabilities that will allow DOD to meet evolving threats. The Air Force has already committed funds to acquire 122 F-22As. To complete the procurement program, it now plans to buy the remaining F-22As using a 3-year multiyear contract that ends procurement in 2010. To begin the multiyear strategy, the Air Force has included $2.0 billion for advance procurement of parts and subassembly activities in its fiscal year 2007 budget request. Additionally, it has included $800 million for continuing development and modifications of existing aircraft.

DOD Has Not Completed a New Business Case to Justify Further Investments in the F-22A Program

The Air Force's business case for the F-22A program is unexecutable as planned because there is a significant mismatch between the Air Force's stated "need" for the F-22A aircraft and the resources OSD is willing to commit. According to Air Force officials, a minimum of 381 F-22A aircraft are needed to satisfy today's national security requirements, yet OSD states it can only afford to buy 183 F-22A aircraft. This results in a 198-aircraft gap in capability. Additionally, the Air Force now states a "need" for greater ground attack and intelligence-gathering capabilities, not included in the existing business case that will require an extensive modernization program. The value of this planned investment in modernization is highly questionable absent a new business case that supports the minimum capability-based need, given credible current and future threats, and that considers various options that are both affordable and sustainable over time.

The Air Force states a need for one squadron of 24 F-22A aircraft for each of the 10 Air Expeditionary Forces, the planned organization of the Air Force aircraft and personnel for operations and deployments. This requirement is established to carry out missions including support in major regional conflicts, home land security, and others. According to the Air Force, this requires a total of 381 F-22As, 240 primary aircraft and 141 aircraft for training, attrition, and to allow for periodic aircraft depot maintenance.

OSD has restructured the F-22A acquisition program twice in the last 2 years (in December 2004 and December 2005) to free up funds for other priorities. These decisions have created a mismatch between the Air Force's stated requirements and what OSD considers an affordable quantity of F-22As. In December 2004, OSD reduced the program to 179 F-22As to save about $10.5 billion. This budget decision also terminated procurement in 2008. Then in December 2005, OSD changed the F-22A program again, adding $1 billion to extend production for 2 years to ensure a 5th generation fighter[5] aircraft production line would remain in operation in case the Joint Strike Fighter experienced delays or problems. OSD also added 4 aircraft for a total planned procurement of 183 F-22As.

The Air Force is currently planning to provide the F-22A with greater ground attack and intelligence-gathering capabilities. It estimates these will cost about $4.4 billion between 2005 and 2011. It is also

[4] Global Strike is one of six complementary concepts of operations laying out the Air Force's ability to rapidly plan and deliver limited-duration and extended attacks against targets.

[5] F-22A and F-35 are considered 5th generation fighter aircraft as compared to the F-15, F-16, F/A-18 and F-117. The primary characteristics are Very Low Observable (VLO) stealth and information fusion capabilities that make 5th generation aircraft more survivable and lethal.

planning additional modernization efforts for more of these capabilities in the future, but the cost, content, and timing has not yet been determined. However, the 198- aircraft gap between the Air Force's stated "requirement" and the planned procurement quantities raises questions on whether the F-22A will be able to carry out its planned missions. The Air Force is buying less than half the required 381 aircraft to fill out its planned organizational structure—necessary to carry out planned air-to-air, ground attack, and intelligence-gathering missions. Other alternatives could be available to carry out the ground attack and intelligence gathering capabilities. For example, DOD is also investing billions of dollars to develop the Joint Strike Fighter aircraft—a 5th generation fighter-intended for ground attack and billions of dollars to develop intelligence, surveillance, and reconnaissance platforms and sensors.

Air Force Is Requesting to Use a Multiyear Contract for the F-22A

The Air Force is proposing to buy the remaining 60 F-22As over a 3 year period with a multiyear contract and submitted its justification to the Congress on May 16, 2006.[6] To enter into a multiyear contract the Air Force must first meet the statutory criteria listed in 10 U.S.C. § 2306b (a). Table 1 shows the six criteria that must be satisfied before entering into a multiyear contract and our observations on issues that could affect the Air Force's ability to satisfy several of the criteria.

[6] The Air Force needs statutory authorization for its proposed multiyear contract under 10 U.S.C. § 2306b and the annual DOD appropriations act.

Table 1: Observations of F-22A Multiyear Contract Criteria as of April 2006

Multiyear criteria	GAO observations
Contract will result in substantial savings	The Air Force has not completed an estimate of savings, but its preliminary indications are a maximum of 5 percent savings. However, when the unit procurement costs for the planned multiyear approach is compared to how the Air Force had previously planned to buy the remaining aircraft, the unit procurement costs increase under multiyear.
Minimum need expected to remain substantially unchanged during contract period in terms of production rates and total quantities	Quantities have continually been in a state of flux in the F-22A program including changes in the last two budget submissions.
Reasonable expectation agency head will request funding at required level to avoid contract cancellation	The Air Force has indicated that its multiyear budget is currently under funded by $674 million. Further, it is proposing to use incremental funding rather than fully funding each aircraft lot.
There is stable design, and technical risks are not excessive	While the design for the baseline F-22A aircraft, designed primarily for an air superiority role, is stable, the design for the ground attack capability to be added has not been demonstrated and thus cannot be considered "stable."
Estimates of contract cost and cost avoidance are realistic	The Air Force has not completed its analysis of contract cost or cost avoidance at this time.
Use of contract will promote national security of the United States	No observation.

Source: GAO Analysis and 10 U.S.C. 2306b.

The Air Force has requested statutory authorization for a multiyear contract for the remaining F-22As as part of the fiscal year 2007 authorization and budget process in order to award the contract in early 2007. As shown in the table above, we believe there are some critical considerations that need to be addressed before the multiyear plan can be justified. These include the following considerations:

Savings—The Air Force stated in its May 16, 2006, multiyear justification package that cost avoidance would approximate $225 million or about 2.7 percent. This is based on comparing three annual contracts to a single multiyear contract to buy 56 aircraft. The document also identifies a need for an additional $674 million to fully fund a 60 aircraft multiyear contract as was proposed in the fiscal year 2007 President's budget. While building an estimate for three separate annual contracts provides a basis to compare to a multiyear approach, it is not how the Air Force had previously planned to buy the aircraft remaining in the F-22A program. The fiscal year 2006 President's Budget included procurement costs to buy the remaining 56 F-22As in two lots—29 F-22As in 2007 and 27 F-22As in 2008. If the unit procurement costs of this previous plan are compared to the planned multiyear procurement unit costs for 60 aircraft as proposed in the fiscal year 2007 President's Budget, the unit costs increase by 10 percent. In other words, the unit procurement costs increase from $166 million per aircraft to $183 million per aircraft for the proposed multiyear contract.

Funding—The Air Force has stated that the proposed multiyear plan for 60 aircraft is under funded by about $674 million. The Air Force believes it will need these funds in fiscal years 2009 and 2010. Additionally, the Air Force has proposed using incremental funding to pay for the multiyear contract. Instead of fully funding the buy for each fiscal year, it plans four funding increments—economic order quantity, advanced buy, subsystem, and final assembly. Incremental funding for multiyear procurement is neither permitted by the annual DOD appropriations act,[7] nor the multiyear authorizing statute which requires that funds only be obligated under a multiyear contract "for procurement of a complete and usable end item."[8] However, the Air Force is seeking an exception to these requirements in its request to Congress for statutory authorization for the multiyear contract. The Air Force's proposed F-22A multiyear strategy includes an increment of funding in each fiscal year to begin manufacturing subsystems, not considered a complete and useable end item. For example, the fiscal year 2007 budget request includes $1.5 billion for subassemblies. It would not be until fiscal year 2008 that the final assembly would be fully funded.

Design Stability—The baseline F-22A aircraft, designed primarily for the air superiority role, has successfully completed development and initial operational testing, and its design is stable for that particular mission. However, the Air Force has stated that to be "effective" in the future a more robust ground attack capability is needed for the F-22A. It plans to spend several billions of additional dollars to add this ground attack capability. A key to the success of this effort is the development and integration of a new radar. The Air Force expects to take delivery of the first aircraft with the new radar in November 2006 but the software needed to provide the robust ground attack capability will not be completed until 2010. According to a representative of the Director, Operational Test and Evaluation (DOT&E), the key to achieving a more robust ground attack capability will center on the integration of this new radar. A December 2005 report issued by the Defense Contract Management Agency stated that problems encountered during the test and integration of the new radar has added risk to the development program. Until software and integration testing in the F-22A have been successfully completed, we consider the design unstable creating the potential for significant cost overruns and schedule delays.

Conclusions

The F-22A development has spanned more than a 19-year period during which time requirements have changed both in terms of the quantity of aircraft needed and the capabilities that would be incorporated. At the same time, new budgetary constraints have grown and other priorities have come to the forefront in DOD, including the need for funding the war on terrorism. While the Air Force's stated need is 381 F-22As, OSD will commit to fund only 183. The Air Force also states the basic capabilities developed for the F-22 are not sufficient to be effective in the current and future national security environment. The conditions facing the F-22A program are significantly different than those addressed by the original business case, yet despite these significant changes the Air Force has not developed a new business case to justify currently planned and proposed additional investments in the F-22A. Given our nation's growing fiscal challenges, the changing security threats, and prevailing best business practices for acquisitions, it is highly questionable whether it is prudent to continue in the current path proposed by

[7] Section 8008 of the fiscal years 2005 and 2006 Department of Defense Appropriations Acts (Public Laws 108-287 and 109-148, respectively) require full funding of units to be procured.

[8] 10 U.S.C. § 2306b (i)(4)(A). This restriction was added by section 820 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314).

the Air Force. DOD must begin to make the difficult choices required to counter current and credible future threats at current and expected future resource levels because it will not have enough money to purchase everything that it wants. Furthermore, going to a multiyear procurement strategy appears to be more costly than previous Air Force plans and would tie up significant amounts of funds at a time when DOD already has more wants than it is likely to be able to afford and sustain over time. The Department needs to reevaluate the value delivered by continuing production of the F-22A past what it has already committed to by examining the likely future threat and risk environment, the funding it can make available relative to other demands, and the alternative ways to achieve air-to-air and air-to-ground military superiority.

Matters for Congressional Consideration

Because of the large disparity between what the Air Force wants for the F-22A program and what OSD has committed to fund, there is a significant break in the business case to justify buying more F-22As. For this reason, Congress may want to consider withholding additional funding for procurement and modernization until the Department completes a comprehensive business case that addresses the concerns we have raised herein. The additional issues surrounding this matter and our reporting are discussed in the Agency Comment section of this report.

Recommendation

Because of the significant and continuing changes in the F-22A program that have created an environment of investment uncertainty as well as the significant mismatch between stated Air Force needs and wants and future resource levels, we recommend that Secretary of Defense delay further investments in F-22A procurement and modernization until it completes a comprehensive business case analysis that adequately considers alternatives, justifies the need for further investments, and reconciles the numbers of F-22As that are needed (i.e. based on credible current and future threats and considering other alternative approaches) as well as affordable and sustainable (i.e., based on current and expected DOD resource levels).

Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD stated that it did not concur with our recommendation that the Secretary of Defense delay further investments in F-22A procurement and modernization until it completes a new business case analysis that adequately considers alternatives, justifies the need for further investments, and reconciles the numbers of F-22As that are needed. They stated a Joint Air Dominance (JAD) study conducted by DOD adequately identified the quantity and mix of tactical aircraft needed. DOD stated that delaying investments in the F-22A would disrupt production and create program instability. DOD also stated that keeping the F-22A production line active, preserves the Department's options and sustains the industrial base for efficient transition to Joint Strike Fighter production.

Preserving options and the industrial bases will be costly. The 2007 future year's defense plan added $1.05 billion for a 60 aircraft multiyear procurement contract and subsequently the Air Force identified an additional $674 million needed to fully fund this plan. Therefore, the total additional multiyear procurement cost is $1.724 billion. Furthermore, it will add two years to the F-22A procurement program. This represents significant opportunity cost. That is, the funding used here will not be available to support other DOD priorities. If preserving options and the industrial base are primary reasons for these added costs and the extension of the procurement program, DOD should make them more transparent to the Congress as it seeks authorizations and appropriations to execute this plan.

As to the Department's position that they have already conducted the business case called for in our recommendation, we asked OSD to provide us access to the JAD study, but they have not yet done so. Because Congressional deliberations are ongoing, we believe it is important to provide the data and analysis in the report at this time. Given the way this program has unfolded, with frequently changing OSD-approved requirements, repeated cost overruns, and delays in fielding capability to the warfighter, and given that DOD did not object to the data and analysis contained in the report, we are not changing our matter for Congressional consideration. If Congress does decide to provide more funding for the F-22A program, that funding should be conditioned on DOD providing the JAD study and subjecting it to independent review to ensure that it provides adequate justification for sound investment of taxpayer resources.

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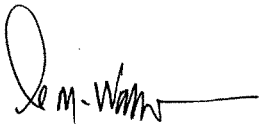
We are sending copies of this report to the Secretary of Defense; the Director, Office of Management and Budget; and interested congressional committees. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

Should you or your staff have any questions on matters discussed in this report, please contact Michael Sullivan on (202) 512-4163 or Michael Hazard on 937-258-7917. Principal contributors to this report were Marvin Bonner and Daniel Chen.

Sincerely



David M. Walker
Comptroller General
Of the United States

Enclosure

Enclosure

Comments from the Department of Defense

DEPUTY UNDER SECRETARY OF DEFENSE
3015 DEFENSE PENTAGON
WASHINGTON, DC 20301-3015

ACQUISITION AND TECHNOLOGY

JUN - 8 2006

Mr. David M. Walker
Comptroller General of the United States
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dave,

Dear ~~Mr. Walker~~:

This is the Department of Defense (DoD) response to the GAO draft report, 'Tactical Aircraft: DOD Should Present a New F-22 Business Case Before Making Further Investments,' dated May 8, 2006 (GAO Code 120474/GAO-06-455R).

The Department does not agree with draft GAO report's recommendation to delay further investment in the F-22. While the Department agrees with the GAO's emphasis on the importance of supporting our procurement decisions with appropriate "Business Case" analysis, we have performed such analysis to support F-22 and tactical aircraft force structure decisions, and will continue to do so. Additional information and rationale for the Department's position is summarized below.

Implementing the GAO's recommendation to delay investment in the F-22 would disrupt production and create program instability. This instability would be detrimental to our nation's defense capabilities and our tactical aircraft industrial base. Over the past several procurement lots, the Air Force has been very successfully working with the prime contractor to drive down costs. Unit flyaway costs have come down 35% between Lot 1 and Lot 5. If stopped, production re-start would be very costly and difficult to resume, breaking this positive trend. Likewise, there is considerable modernization work ongoing. To stop this work would result in large termination costs and would be very costly to resume. Multiple GAO reports have noted the negative impact that program instability has on program cost, schedule, and performance.

The assumptions on which the GAO's recommendations are based were not understood. The quantity and mix of tactical aircraft to be procured by the Department has been and remains an area of significant "Business Case" analysis. As the geopolitical and fiscal environment changes, we continually reassess national security requirements and adjust our force structure as needed. Keeping the F-22 production line active,

preserves the Department's options and sustains the industrial base for efficient transition to Joint Strike fighter production.

To support the Quadrennial Defense Review and preparation of the President's Fiscal Year 2007 Budget (PB07), the Department performed a Joint Air Dominance (JAD) Study. The JAD Study examined options for varying levels within the strike fighter mix. The Department looked at the war scenarios and cost implications of buying fewer variants of Joint Strike Fighters, increasing and decreasing the number of F-22s, and buying more legacy aircraft at the expense of fewer fifth generation platforms. The results of these analyses are reflected in PB07, which sets forth a balanced portfolio of tactical aircraft assets, including Joint Strike Fighter, F-22 and F/A-18E/F. The draft GAO report makes note of, "the large disparity between what the Air Force wants for the F-22A program and what OSD has committed to fund, there is a significant break in the business case to justify buying more F-22As." The 381 aircraft the Air Force analysis indicates are required is a fiscally unconstrained projection of Service needs. The QDR analysis reflects fiscal realities and the need to address competing defense priorities. The JAD analysis showed that a balanced force structure mix of fifth generation fighters, with legacy F/A-18E/Fs, F-15Es and conventionally armed bombers, best met our requirements. Buying fifth generation tactical aircraft assets (F-22 and JSF), for both the Air Force and the Department of the Navy, optimized capability, affordability, and mitigated risk better than other options.

A detailed response is attached.

Thank you for the opportunity to respond to this draft report.

Sincerely,

James I. Finley

Attachments:
As stated

GAO DRAFT REPORT - DATED MAY 8, 2006
GAO CODE 120474/GAO-06-455R

"TACTICAL AIRCRAFT: DOD SHOULD PRESENT A NEW F-22 BUSINESS CASE BEFORE MAKING FURTHER INVESTMENTS"

DEPARTMENT OF DEFENSE COMMENTS TO THE RECOMMENDATION

RECOMMENDATION: The GAO recommended that the Secretary of Defense delay further investments in F-22A procurement and modernization until it completes a comprehensive business case analysis that adequately considers alternatives, justifies the need for further investments, and reconciles the numbers of F-22As that are needed (i.e., based on credible current and future threats and considering other alternative approaches) as well as affordable and sustainable (i.e. based on current and expected DoD resource levels) (p. 7 GAO Draft Report).

DOD RESPONSE: Nonconcur with the GAO recommendation.

- The F-22 is currently in full rate production. A delay in F-22 procurement would result in production shut down and impact the entire F-22 supplier base consisting of thousands of companies. Once interrupted, it would be very costly, and time consuming to resurrect. The F-22 industrial base involves many of the same companies that will manufacture components for the Joint Strike Fighter when it enters production. Disruption of F-22 production could cause many of those suppliers to move to other business activities, seriously weakening the nation's tactical aircraft industrial base.
- The assumption on which this recommendation was made is not accurate. The quantity and mix of tactical aircraft to be procured by the department has been and remains the subject of continuous analysis. Most recently, in support of the Quadrennial Defense Review, the Department examined a number of options for varying levels within the strike fighter mix. The results of this Joint Air Dominance (JAD) study are reflected in the President's Fiscal Year 2007 Budget which sets forth a balanced portfolio of tactical aircraft assets, including Joint Strike Fighter, F-22 and F/A-18E/F Super Hornet aircraft that have already proven their worth in the Global War On Terrorism. We looked at the war fight and cost implications of buying fewer variants of Joint Strike Fighters, increasing and decreasing the number of F-22s, and buying more legacy aircraft at the expense of fewer fifth generation platforms. Our analysis showed that buying fifth generation tactical aircraft (F-22 and JSF), for both the Air Force and the Department of the Navy, optimized capabilities and mitigated risk better than other options.

- In the JAD studies supporting the Quadrennial Defense Review, the F-22 clearly demonstrated its superiority as an air dominance fighter with the JSF also showing strong capabilities. These fifth generation fighters are needed in the early days of a conflict to gain air dominance by neutralizing advanced air and surface threats, and thereby "opening the door" for follow-on joint forces, including non-stealthy legacy tactical aviation and long-range strike aircraft. The quantity of 183 F-22s, reflected in the PB07, incorporates the ability to reposition some of the F-22 aircraft to other theaters, or to the homeland, after suppression of the major threats to air dominance in the early days of a conflict. Changing the mix of F-22 and JSF aircraft only marginally increased effectiveness. When fielded, the tri-service Joint Strike Fighters, with their superior strike capability, will complement F-22 capabilities and can remain in theater with legacy aircraft to conduct strike missions and suppress any remaining air dominance threats. The logistics plans used in the analysis reflected the Combatant Commander's war plans.
- The analysis used the projected enemy's order of battle provided by the Central Intelligence Agency/Defense Intelligence Agency-approved Joint Capability Force Assessment for the 2024 timeframe. The selected scenario for the modeling was the most challenging to air dominance in terms of enemy capability and quantity, and it was in accordance with the Joint Staff Multi-Service Force Deployment. The results showed that a balanced force structure mix of fifth generation fighters with legacy F/A-18E/Fs, F-15Es, and conventionally armed bombers met our requirements and balanced cost and risk.
- Modernization and continuous improvement are characteristics of many defense programs and are essential to maintaining the military advantage of our forces in an environment of rapid proliferation of advanced technologies. The Department's decision to hold F-22 procurement at 183 aircraft, increases the importance of the modernization program. With fewer aircraft than originally envisioned, the F-22 must bring a high level of capability with continuous improvement, to maintain the U.S. advantage in air dominance.

(120558)

Appendix B

February 16, 2006
F-22 OIPT [Overarching Integrated Product Team] Brief
(Selected Slides)
Maj. General Rick Lewis
United States Air Force

For Official Use Only - Pre-Decisional

Headquarters U.S. Air Force

Integrity - Service - Excellence

F-22 OIPT Brief

U.S. AIR FORCE

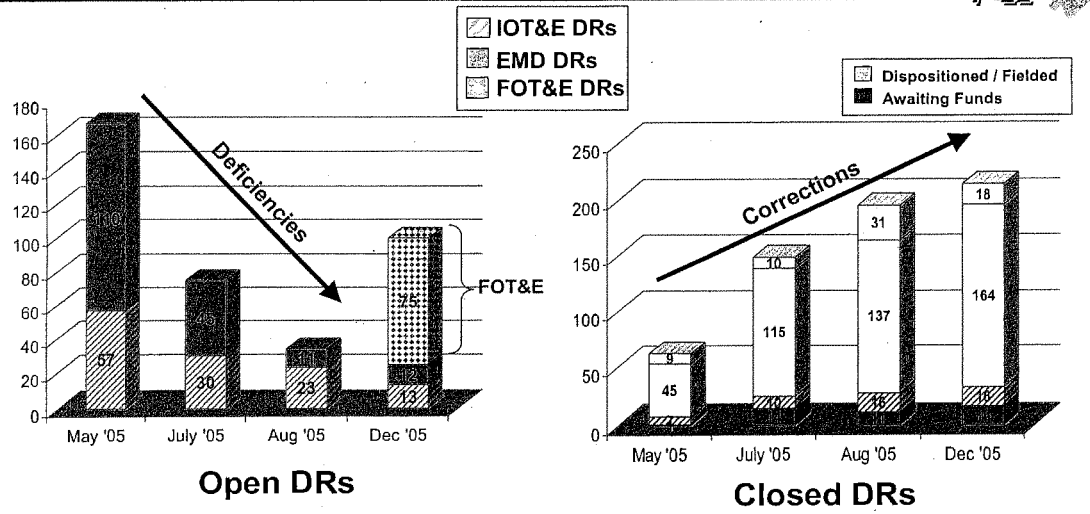
Maj Gen Rick Lewis
F-22 PEO
16 Feb 06

For Official Use Only - Pre-Decisional

U.S. AIR FORCE

F-22 Deficiency Reporting

F-22



Solid deficiency reporting and correcting process in place

Results based on quarterly DR Boards

U.S. AIR FORCE

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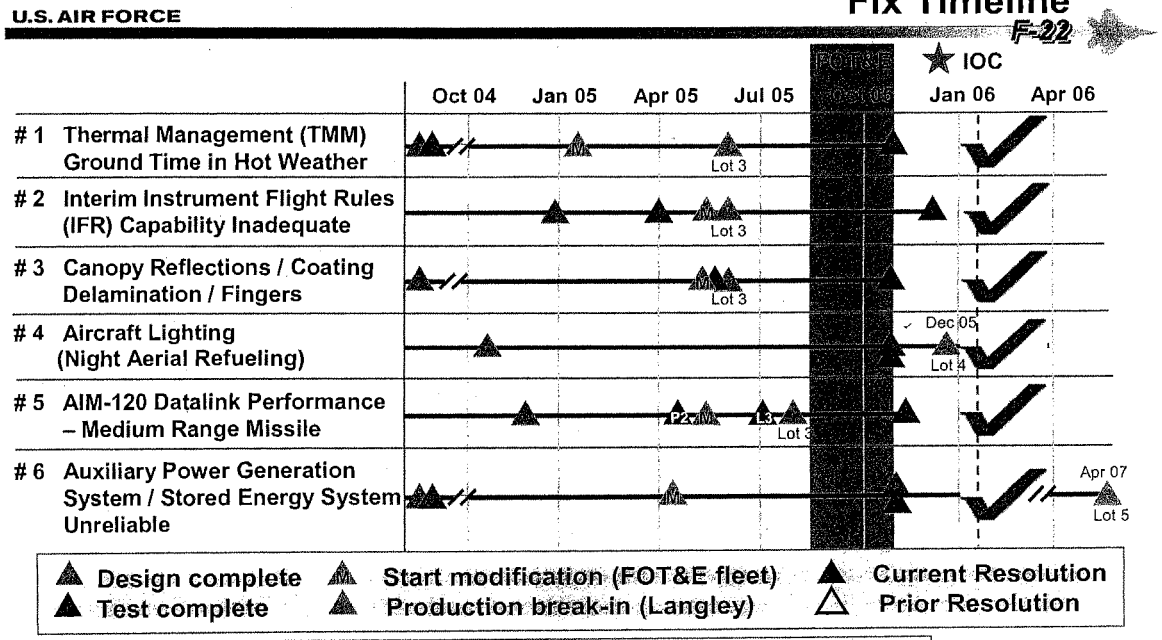
IOT&E Category 1 DRs

Fix Timeline



Request reporting relief

U.S. AIR FORCE

FOT&E Top 10 DRs

F-22

FOT&E Rank	DRs
	CAT - 2
1	Thermal Management System
2	RW Performance Issues
3	Weapons Employment Issues
4	IMIS Issues
5	Diagnostics Health Management (DHM) inaccurate false reporting and troubleshooting
6	JDAM Employment
7	F-Functions
8	AIM-9 missile plume deflector crushed #8 fuel pump lines causing a massive fuel leak
9	JDAM LAR
10	Fuel boost pump failure can lead to large fuel imbalance

No Category 1 FOT&E DRs

U.S. AIR FORCE

F-22 Maturity Assessment

F-22

- Stable Requirement - Green
  - F-22 ORD, 17 Feb 04, approved by JROC and signed by CSAF
  - 183 aircraft supported in FY07 PB
- Stable Configuration - Green
  - EMD flight testing concluded in Dec 05
  - Delivering Lot 4 to Langley AFB
  - F-22's robust / stable design will accommodate integration of modernization spirals and DMS with low technical risk
    - ACC drafting CPD to govern Spiral 3 development for JROC approval (Lot 8 cut-in)
- Realistic Cost Estimates - Yellow
  - IDA under contract to complete MY business case analysis—exhibits will be part of FY07 PB MY package submission
  - Exhibits due May 06

U.S. AIR FORCE

F-22 Multiyear Benefits

F-22

- Defense Industrial Base – Green
  - Ensures availability of F-22 supplier base / production
  - Serves as risk mitigation and production bridge for F-35
- Costs – Yellow
  - Three-lot MY should help offset cost increase from reduced annual buys
- Stable Funding – Yellow
  - PBD 720 carries funding for MY procurement
    - Termination liability and contract cancellation covered by Air Force outside F-22 budget authority
    - Need OSD(C) waiver to allow termination liability/cancellation ceiling to be an unfunded contingent liability
    - Need OSD(C) waiver to full funding policy

Appendix C

"F-22A Multiyear Procurement Business Case Analysis" (IDA Paper P-4116)
Institute for Defense Analysis

542

INSTITUTE FOR DEFENSE ANALYSES

IDA Paper P-4116

F-22A Multiyear Procurement Business Case Analysis

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PREFACE

The Institute for Defense Analyses (IDA) prepared this paper for the Office of the Director, Defense Systems, in the Office of the Under Secretary of Defense, Acquisition, Technology and Logistics, OUSD(AT&L), under a task titled "F-22 Multiyear Procurement Business Case Analysis." The task's objective was to accomplish the business case analysis needed for consideration of multiyear procurement (MYP) for the F-22A aircraft. This paper fulfills that objective by presenting the results of IDA's analysis of the cost savings of multiyear procurement versus annual procurement for three lots of F-22A aircraft. It also provides the MYP budget exhibits needed under Title 10 U.S.C. 2306b.

The IDA team sincerely appreciates the efforts of everyone in the Government and industry that contributed to and participated in this study. Naming every individual who helped the team would be impossible, but certain individuals should be mentioned for their efforts during the course of this study. First, we thank David Hersh, OUSD(AT&L)/Defense Systems/Air Warfare, who was our sponsor representative. Other individuals we thank include the following:

- Col. Kevin Lopez, Doug Mangen, and John Schirtzinger of the U.S. Air Force F-22 System Program Office, who were instrumental in setting up meetings and visits and arranging presentations and data exchanges for the IDA team.
- Lt.Col. Robert Atkins, Lt.Col. Cameron Holt, and Lt.Col. David King of the U.S. Air Force F-22 Program Executive Office and Program Element Monitor Office, who were also active in making arrangements and providing insights.

In addition to Doug Mangen, Ken Birkofer and Capt. Kyle Martin, also at the F-22 System Program Office, helped us understand details related to our analyses.

Foremost in participation from industry organizations were the following individuals at the primary companies involved in the F-22 program:

- Lockheed Martin Aeronautics Company—Jack Twedell (our principal point of contact, who provided assistance for visits and other arrangements), Larry Pierce, and Harry Stephen
- Boeing—William Cribb, Robert Jenkins, Kathleen Lenton, and Sam Fisher

- Pratt & Whitney—Jorge Alcorta, Patricia Walker, Daniel Turgeon, Matthew Pericolosi, and Richard Marco

Finally, the IDA technical reviewers, David R. Graham and Karen W. Tyson, provided valuable insights and rapid review of the draft report.

CONTENTS

Executive Summary S-1
I. Introduction 1
A. Background 1
B. Task Objective 1
C. Scope 2
D. Approach 3
E. Status of the F-22A Program 4
1. Program Overview 4
2. Program Responsibilities 7
F. About This Report 8
II. Multiyear Procurement Requirements 9
A. Criteria for Using MYP 9
C. Other Requirements 11
1. Sources of Savings 11
2. Requirement to Identify the Advantages of MYP 13
3. Impact on the Industrial Base 13
D. Financial Management Regulations MYP Exhibits 14
III. Other Programs' Experiences with Multiyear Procurement 15
A. Overview of Relevant Multiyear Programs 15
B. F/A-18E/F/G 16
C. C-17A 19
D. C-130J/KC-130J 20
E. F-16A/B/C/D 21
F. Observations 23
IV. Cost Analysis 25
A. Introduction 25
B. Cost Model 26
1. Overview 26
2. Flyaway Cost Model 29

a. Framework 29
b. Direct Labor Hour Costs 31
c. Material Costs 31
d. Overhead Costs 32
e. Propulsion Costs 33
f. Other Flyaway Cost 33
3. Below Flyaway Costs 33
a. Acquisition Logistics 34
b. Other Below Flyaway Cost 35
C. Estimating MYP Savings 35
1. Overview 35
2. Airframe and Subsystems 36
a. Supplier Savings 36
b. Labor Savings 39
3. Avionics 40
4. Propulsion 43
5. Administrative Savings 46
D. Summary and Observations 47
Appendix A: Schedule of Significant Events A-1
Appendix B: Scenarios 1 and 2 (Unconstrained Budget Analysis) B-1
Appendix C: Scenarios 3 and 4 (Constrained Budget Analysis) C-1
Appendix D: Avionics Baseline for MYP Savings Estimate D-1
Abbreviations E-1

LIST OF FIGURES

1. Program Overview 5
2. Aircraft Schedule 5
3. Aircraft Assembly 6
5. F-22A Aircraft Procurement Cost Template 27
6. Cost Module Structure 30
7. Depiction of Consolidation Model: Recurring Flyaway Cost 30
8. Sensitivity of F-22A MYP Cost Savings to Number of Lots 37
9. F/A-18E/F Supplier MYP Step-Down Example 38
10. F/A-18E/F MYP Cost Savings in Relation to F-22A Calculations 39

LIST OF TABLES

1. Sources of Data and Information for the F/A-22 MYP BCA 4
2. Aircraft Weights (lbs.) from Different Lots 7
3. F/A-22 Program Responsibilities 8
4. Characteristics of Other Relevant MYP Programs 17
5. Below Flyaway Cost Elements 34
6. Avionics MYP Savings Assessments 42
7. P&W AA03 Multiyear Savings 43
8. Engine Multiyear Savings Benchmarks 44
9. Summary of LMA/Boeing AA03 MYP Savings 46
10. LMA/Boeing AA03 MYP Savings by Lot (TY$M) 47
11. Summary of MYP Savings by Cost Element, 56-Aircraft Constrained Case 48

EXECUTIVE SUMMARY

This paper outlines the approach the Institute for Defense Analyses (IDA) took in conducting a Business Case Analysis (BCA) of a multiyear procurement (MYP) strategy for the U.S. Air Force's F-22A Raptor aircraft program and presents our results, which explain how the F-22A program would achieve substantial cost savings by using an MYP strategy. The basis for the BCA is Program Budget Decision (PBD) 720. The Air Force believes funding constraints implicit to PBD 720 will lead to production inefficiencies and significant execution risk. To address these constraints, the Air Force has proposed using the budget authority provided in PBD 720 to incrementally fund an MYP. IDA's BCA did not address the legality of the Air Force's incremental funding plan.

As this paper was being written, the F-22A System Program Office and the prime contractors were in the midst of Lot 6 negotiations. Therefore, this report does not contain any information at component levels that might be negotiation sensitive. Nonetheless, the report is For Official Use Only (FOUO) and should be handled accordingly (see notice on cover).

TASK OBJECTIVE AND APPROACH

IDA's task was to estimate the cost savings to the Government of pursuing an MYP contract for the three final planned lots of the F-22A. An MYP contract was compared to three single-year procurements (SYP) contracts.

The IDA study team first updated its existing F-22 cost model with new production cost data and other information collected to forecast the savings afforded by an MYP. Then we used the updated cost model to analyze the procurement strategies under constrained and unconstrained budgets for four different scenarios for the last three lots of production, as outlined in Table S-1. All scenarios involved the purchase of aircraft in the last three lots of production, Lots 7, 8, and 9.

For Scenarios 1 and 2, the unconstrained cases, IDA estimated the costs of building 60 aircraft in three lots regardless of whether the budgetary limits of PBD 720 would permit the Air Force to do so. For Scenarios 3 and 4, the constrained cases, IDA estimated the costs of the three-lot buy under PBD 720 budget authority limits. For

Scenario 4b, IDA applied the MYP savings in 4a towards procuring additional aircraft in Lot 9. Scenarios 3, 4a, and 4b assume funding flows are adequate to support the lot sequence 20, 20, and then x—where x is the incremental number of units afforded under the cumulative PBD 720 budget authority.

Table S-1. Scenarios Addressed in Study

Scenario	SYP/MYP	Lot Number (Number of Units)	Budget Constrained?
1	SYP	7 (20), 8 (20), 9 (20)	No
2	MYP	7 (20), 8 (20), 9 (20)	No
3	SYP	7 (20), 8 (20), 9 (16)	Yes
4a	MYP	7 (20), 8 (20), 9 (16)	Yes
4b	MYP	7 (20), 8 (20), 9 (18)	Yes

IDA used its existing integrated aircraft cost model to estimate the costs of the final lots of the F-22. The model, which IDA developed for its 2005 Independent Cost Estimate (ICE) for the F/A-22,[1] was updated to reflect recent production, negotiated Forward Pricing Rate Agreement wage rates, and Global Insights inflation rates (an inflation data series that corresponds to Bureau of Labor Statistics categories).

IDA used data provided by F-22A contractors and Government offices that included information from previous F-22 MYP studies and recent MYP experience with other aircraft programs. From these data, IDA developed "step-downs" for the cost elements in the model that would benefit from cost savings in an MYP. The total of these step-downs were the ultimate differentiating factor between the SYP baseline and the MYP; otherwise the approach was identical to the IDA's F/A-22 ICE.

SUMMARY OF RESULTS

For the F/A-22 ICE, IDA *assumed* the MYP savings were 5 percent of recurring flyaway cost, a value considered to be an upper bound that was not likely to be achieved. For the MYP BCA IDA *estimated* the savings to be 2.2 percent of procurement costs. We present MYP savings in the context of total procurement cost. Savings for the air vehicle contract (Lockheed Martin Aeronautics and Boeing) are 2.6 percent for both the

1 J. Richard Nelson, Bruce R. Harmon, John R. Hiller, Scot A. Arnold, Harold S. Balaban, Kristen M. Beal, John J. Cloos, Harley A Cloud, Waynard C. Devers, Howard J. Manetti, James A. Myers, Neang I. Om, and Joseph W. Stahl, "F/A-22 Independent Cost Estimate," Institute for Defense Analyses, Paper P-4029, For Official Use Only, August 2005.

constrained and unconstrained cases. Savings for the engine contract (Pratt &Whitney) are 2.7 percent, also for both cases. The percentage savings on total procurement are lower than on contract costs because substantial portions of the procurement budget would not be part of the multiyear contracts.

Table S-2 summarizes the BCA results. In the unconstrained budget case, Scenarios 1 and 2, MYP results in the maximum savings since the maximum number of aircraft are procured. The $235 million of savings is 2.2 percent of Procurement cost for Lots 7–9. Constraining the buy to the budget reduces the number of aircraft by 4 to 56 in the SYP Scenario 3. At 56 units, in three lots of 20, 20, and 16 aircraft, the MYP strategy reduces the cost by the same 2.2 percent, though for a lower total savings of $225 million. If the $225 million in savings were applied instead towards additional aircraft, the Air Force would be able to buy two more units for a total of 58.

Table S-2. MYP BCA Results Summary (Then-Year $ Millions)

	Scenario 1–2	Scenario 3–4a	Scenario 3–4b
SYP Budget (Scenarios 1 and 3)	$10,863	$10,438	$10,438
MYP Budget (Scenarios 2, 4a, and 4b)	10,628	10,213	10,423
MYP under/(over) SYP	$235	$225	$15
Savings Percentage of Procurement	2.2%	2.2%	N/A
Constrained to Budget	No	Yes	Yes
AURF of Lots 7-9 Aircraft (SYP/MYP)	$146/$142	$149/$145	$149/$144
AUFC of Lots 7-9 Aircraft (SYP/MYP)	$158/$154	$162/$158	$162/$156
AUPC of Lots 7-9 Aircraft (SYP/MYP)	$181/$177	$186/$182	$186/$180
PAUC of Lots 7-9 Aircraft (SYP/MYP)[a]	$330/$329	$335/$334	$335/$331
Aircraft in Lots 7-9 (SYP/MYP)	60/60	56/56	56/58
Total Quantity, including Production, Production Representative Test Vehicles (PRTVs), and Replacement Test Aircraft (RTA)	182	178	180

[a] Unit cost based on a budget total of $49,231 million for Research, Development, Test, and Evaluation (RDT&E), PRTVs, and Lots 1-6.

The addition of two aircraft using $225 million in MYP savings may seem optimistic. Note, however, that IDA's cost modeling approach takes into account fixed as well as variable costs, so the $225 million has to cover only the variable portion of aircraft costs. The fixed portion must be paid regardless of lot quantity.

I. INTRODUCTION

A. BACKGROUND

The 2006 Defense Appropriations Conference Report directed the Secretary of Defense to report on alternatives regarding the future procurement strategy for the U.S. Air Force's F-22A (formerly the F/A-22) Raptor aircraft program, including the feasibility of a multiyear procurement (MYP) strategy. The specific wording in the report is as follows:

> The conferees direct the Secretary of Defense to report to the congressional defense committees by March 30, 2006 on alternatives for the continued acquisition of the F/A-22. The report should consider, but not be limited to, the following: analyses of the advantages of a multiyear procurement program, of extending the F/A-22 procurement profile, and of the effects of F/A-22 procurement on the Joint Strike Fighter production line.

MYP is a special acquisition strategy authorized under Title 10 USC 2306b that allows the Department of Defense (DoD) to enter into contracts covering acquisitions for more than one year, but no more than five. The purpose of multiyear contracting is to reduce program cost and to introduce a more predictable acquisition environment. The Financial Management Regulation lists six criteria under which the Government may enter into a multiyear contract for a given program. These criteria are explained in Chapter II. This document addresses the first of these criteria, namely, how an MYP strategy for the F-22A would provide substantial savings.

B. TASK OBJECTIVE

The Institute for Defense Analyses (IDA) was tasked to conduct a Business Case Analysis (BCA) of a multiyear strategy for the F-22A program. OUSD(AT&L) selected IDA for this task because of its experience in accomplishing the F/A-22 Independent Cost Estimate (ICE)[1] and its familiarity with the aircraft program and associated

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[1] J. Richard Nelson, Bruce R. Harmon, John R. Hiller, Scot A. Arnold, Harold S. Balaban, Kristen M. Beal, John J. Cloos, Harley A Cloud, Waynard C. Devers, Howard J. Manetti, James A. Myers, Neang I. Om, and Joseph W. Stahl, "F/A-22 Independent Cost Estimate," Institute for Defense Analyses, Paper P-4029, For Official Use Only, August 2005.

contractors' cost databases. IDA was to estimate the cost savings to the Government of pursuing an MYP contract for the three final planned lots of the F-22A versus three single-year procurement (SYP) contracts. The task was accomplished in roughly two phases. In the first phase, IDA updated its existing F-22 cost model with new production cost data and information collected to forecast the savings afforded through an MYP. In the second phase, IDA used the updated cost model to analyze the procurement strategies under two different budget scenarios.

C. SCOPE

In the second phase of the task, IDA analyzed the MYP savings relative to the SYP case under different scenarios. The scenarios all included the purchase of aircraft in the last three lots of production, Lots 7, 8, and 9. In Scenario 1 (SYP) and 2 (MYP), IDA determined the MYP cost savings for three lots of 20 aircraft each. Scenarios 1 and 2 are referred to as the "unconstrained cases" since the estimate is for building 60 aircraft in three lots regardless of whether Program Budget Decision (PBD) 720 provides enough budget authority. In the "constrained cases" of Scenarios 3 (SYP) and 4 (MYP), IDA limited the total three-lot buy to the number of aircraft that could be purchased under the PBD 720 budget authority. For Scenario 4, IDA also considered the effect of applying MYP savings towards procuring additional aircraft in Lot 9, thus creating Scenarios 4a (no additional aircraft purchased) and 4b (additional aircraft purchased). Scenarios 3, 4a, and 4b assume funding flows are adequate to support the lot sequence 20, 20, and x—where x is the incremental number of units afforded under the cumulative PBD 720 budget authority.

It was not in IDA's mandate to address issues associated with full versus incremental funding of F-22A production lots. Incremental funding refers to the budgeting of only those funds required to meet program expenses such that a specified delivery schedule can be met. Full funding means that the entire lot is budgeted for in a single fiscal year although the outlays will occur for several calendar years in the future. Our analyses assumed that 20 aircraft will be purchased in each of the first two lots (Lots 7 and 8). PBD 720 does not provide enough funding for 20 more aircraft in Lot 9. Thus, in the constrained cases, we determined the total number of aircraft that can be bought for the budget available, including Lot 7 advanced funding budgeted in FY2006. (Note that our assumption for the constrained cases imposes the total spending constraint but not the year-by-year distribution of funds in PBD 720.)

D. APPROACH

IDA used its integrated cost model to estimate the costs of the final lots of the F-22A. The model was developed for the F/A-22 ICE in 2005 with cost data up to and, in some cases, including Lot 3. The model was updated to reflect recent production, negotiated Forward Pricing Rate Agreement (FPRA) wage rates, and Global Insight inflation rates.[2]

IDA analyzed possible F-22A MYP savings using contractor- and Government-provided data that included information from previous F-22A MYP studies and data on recent MYP experience for other aircraft programs. These historical programs served as a rich source of benchmarks for expected MYP savings. From these data, IDA developed "step-downs" for the cost elements in the model that would benefit from cost savings in an MYP. The total of these step-downs was the ultimate differentiating factor between the SYP baseline and the MYP; otherwise the approach was identical to that taken for IDA's F/A-22 ICE

In addition to data from the F-22A System Program Office (SPO) and prime contractors, IDA obtained historical data on other recent aviation MYP programs from their respective SPOs and contractors. Because the basic cost model was developed for the original ICE, only a subset of the previous sources needed to be used to update the model. The subset of ICE sources used was the F-22A SPO, Lockheed Martin Aeronautics (LMA), Boeing, Pratt & Whitney (P&W), Northrop Grumman, Raytheon, and BAE Systems North America. Table 1 lists the Government and industry data sources. Details are presented in Chapter IV. Appendix A lists relevant visits and meetings during the course of the analyses.

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2 Global Insight is an economic consulting firm that produces forecasts of data series widely used by industry. Global Insight's inflation data series corresponds to Bureau of Labor Statistics categories.

Table 1. Sources of Data and Information for the F/A-22 MYP BCA

Source	Data
Government	
F/A-22 SPO	Program overview; technical descriptions; latest program office cost estimate;
F-16 SPO	MYP exhibits and data for F-16
C-17 SPO	MYP exhibits and data for C-17 and engine
C-130J SPO	MYP exhibits and data for KC/C-130J
Naval Air Systems Command 4.2	MYP exhibits and data for F/A-18E/F/G and F-414
Industry	
Lockheed Martin Aeronautics/Boeing F-22 Team	Updated historical costs by aircraft and lots; FPRAs and business base information; past MYP cost studies
Pratt & Whitney	F119 propulsion and C-17 experience
Northrop Grumman	Radar and Communication, Navigation and Identification system, MYP studies
BAE Systems North America	Electronic Warfare MYP studies
Raytheon	Common Integrated Processor (CIP) MYP studies
Boeing	C-17 and F/A-18E/F/G MYP experience

E. STATUS OF THE F-22A PROGRAM

1. Program Overview

The F-22A program has undergone significant change since IDA completed its F/A-22 ICE in August 2005. The Quadrennial Defense Review (QDR) has validated the need for the aircraft program, which is confirmed in the President's Budget for FY 2007, and the QDR and PBD 720 have requested examination of a Multiyear Procurement for Lots 7, 8, and 9 at 20 aircraft each, as shown in the lower right corner of Figure 1. As the schedule in the upper portion of the figure shows, the Full Rate Production Decision was in March 2005, and Initial Operational Capability (IOC) was declared in December 2005.

Aircraft deliveries have improved to the extent that they are closer to being on time at about 2 aircraft per month (24 annually). This trend is displayed in Figure 2, where the deliveries (red line) are narrowing the gap with the delivery schedule (black line). Whereas deliveries were 6 to 9 months late, they are now on the order of 1 to 2 months late. Deliveries up to January 2006 represent about 20 more aircraft than in April 2005, the cutoff for data used for the F/A-22 ICE.

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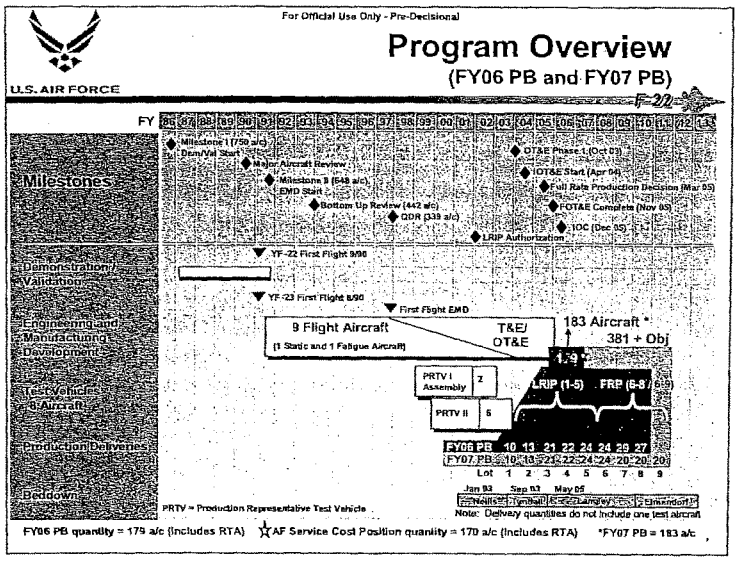

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Figure 1. Program Overview

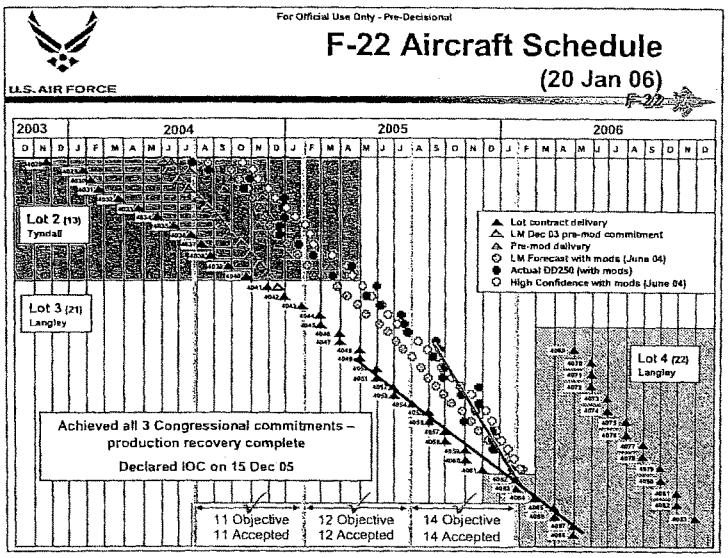

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Figure 2. Aircraft Schedule

Figure 3 presents the assembly line layout by tail numbers being assembled as of the end of January 2006 at LMA's production facility in Marietta, Georgia. The lower portion of the figure identifies aircraft preparing for or conducting contractor and Government acceptance flights before signoff of DD Form 250, Material Inspection and Receiving Report, and ferry to Langley Air Force Base. The upper portion shows aircraft in various states of assembly as they move through the factory.

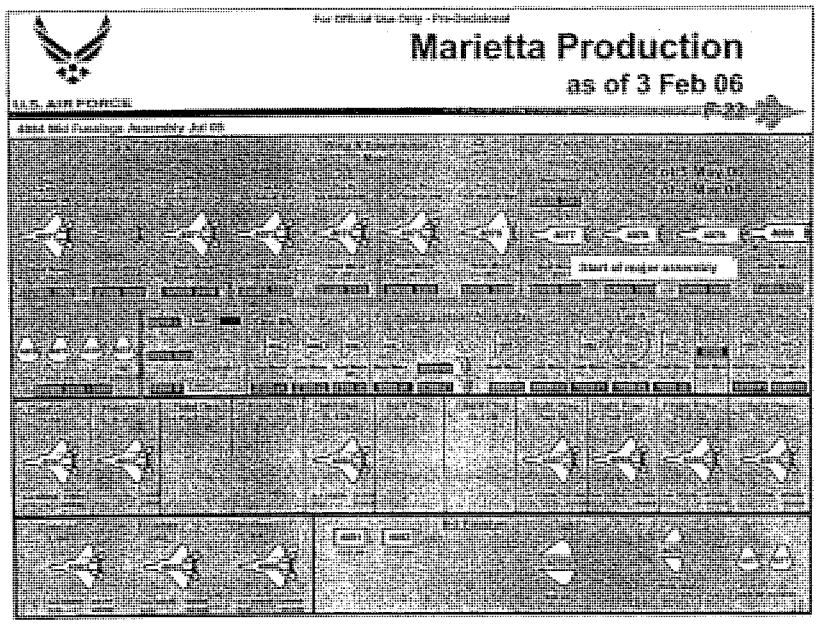

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Figure 3. Aircraft Assembly

The aircraft components in Figure 3 represent additional quantities delivered to LMA from major suppliers that were included in the data for cost analysis. IDA previously had data for about 60 units of major components (e.g., mid-fuselage from Fort Worth, wings from Seattle); now components with tail-numbers in the 80s are on the assembly line. Thus, significantly more data were available for detailed cost analysis for this MYP BCA task than were available to accomplish the F/A-22 ICE.

Table 2 presents details on how the aircraft weight has changed over time and by lot. The table lists selected aircraft by number and lot and shows their airframe, aircraft, fuel, and takeoff gross weights. Weights for Lots 5 and 6 aircraft are estimates.

Table 2. Aircraft Weights (lbs.) from Different Lots

Aircraft Number[a]	Total Airframe Weight Empty	Total Weight Empty	Fuel Weight	Takeoff Gross Weight
4012 (Production Representative Test Vehicle II Aircraft)	26,587	43,003	16,662	63,664
4028 (First Lot 2 Aircraft)	26,569	42,928	16,622	63,549
4041 (First Lot 3 Aircraft)	27,084	43,341	16,739	64,079
4063 (Second Lot 4 Aircraft)	27,263	43,610	16,819	64,440
4084 (First Lot 5 Aircraft)	27,179	43,466	16,779	64,261
4108 (First Lot 6 Aircraft)	27,230	43,623	16,824	64,464

Source: Weight and Balance Tracking Report No. 305, 18 January 2006.

[a] Aircraft numbers are sequential, with 4001 being the first Engineering and Manufacturing Development (EMD) aircraft.

The data in the table indicate that the airframe weight has increased over 500 pounds between aircraft numbers 4028 (Lot 2) and 4041 (Lot 3), while the weight has increased by less than 150 pounds between 4041 (Lot 3) and 4108 (Lot 6). Following the weight increase from aircraft 4028 to 4041, estimated weights seem to have stabilized.

We used the Lot 6 (4108) configuration as the baseline for procurement of Lots 7 through 9. Although avionics changes will continue during future procurements, the airframe and engine are expected to maintain their present configurations.

2. Program Responsibilities

The U.S. Air Force (USAF) Program Executive Officer (PEO) and F-22A SPO have management responsibilities for the Government conduct of the program. Industry management roles are split between LMA—with Boeing a major contributor—and P&W. P&W has sole responsibility for the propulsion system. Table 3 presents the apportionment of work between LMA and Boeing.

Table 3. F/A-22 Program Responsibilities

	LMA (67.5%)	Boeing (32.5%)
Weapons System Integration	Lead	Support
Aircraft Subsystems		
Crew Station, Environmental Control	Lead	Support
Electrical, Hydraulics, Fuel, Armament	Lead	Support
Flight Control System	Lead	Support
Engine Installation, Auxiliary Power	Support	Lead
Avionics		
Architecture	Lead	Support
Electronic Combat and Communications/Navigation	Lead	Support
Radar	Support	Lead
System Test and Evaluation	Lead	Support
Support System	Lead	Support
Training System	Support	Lead

Source: LMA's F-22 Raptor Web site, F-22 Team, Division of Work, available at http://www.f22-raptor.com/team/map.html, accessed May 5, 2006.

F. ABOUT THIS REPORT

Chapter II provides requirements that should be met if MYP is to be pursued, and Chapter III summarizes several other programs' experiences with MYP. Chapter IV presents the heart of the cost analysis in which the baseline program cost and cost savings due to MYP are explained. Appendix A lists visits and meetings accomplished during this 4-month study. Appendixes B and C present the MYP budget exhibits for the unconstrained and constrained scenarios. These exhibits are required as part of the President's Budget for any program contemplating MYP. Appendix D describes the avionics configuration used as a baseline for our analysis.

As this report was being written, the F-22A SPO and the prime contractors were in the midst of Lot 6 negotiations. Therefore, this report does not contain any proprietary information or cost details at component levels that might be negotiation sensitive. Nonetheless, this report is considered For Official Use Only (FOUO) and needs to be handled accordingly (see notice on cover). Note that we do not address the issue of the legality of incremental funding in our cost and budget analysis.

II. MULTIYEAR PROCUREMENT REQUIREMENTS

A. CRITERIA FOR USING MYP

A multiyear contract in comparison to a series of successive annual contracts offers cost savings and a stable procurement rate. However, this form of contracting also bears significant risks. MYP reduces congressional budgetary flexibility, both for the instant program and across other programs within the defense portfolio. Though multiyear programs are funded on an annual basis, they tend to require greater budgetary authority in the earlier years of the procurement. The Government also bears the risk of program cancellation, which can be quite high in the earlier years of the program. In certain cases, the requirement for design stability can also be a barrier to technology insertion.

Accordingly, Public Law 97-86 and Title 10 U.S.C. 2306b require MYP candidate programs to meet certain criteria with congressional approval. These criteria are as follows:

- ***Substantial Savings.*** The use of a multiyear contract should result in substantial savings when compared to a series of annual contracts. In the past, the goal for "substantial savings" has been 10 percent or more in then-year dollars. However, MYP strategies have been approved for some candidates with more modest savings estimates (lower than 5 percent in several cases, but still representing relatively large absolute savings). Care must be taken to ensure that the cost of an SYP strategy is not overstated to exaggerate the estimated multiyear savings. As a baseline for measuring the estimated savings, candidate programs have typically cited the difference in a multiyear versus a single-year procurement strategy as evidenced by proposals compliant with the Truth in Negotiations Act (TINA). However, in some cases, the estimated savings have been measured on a more definite basis, as evidenced by negotiated (versus proposed) multiyear and single-year strategies.
- ***Stability of the Requirement.*** Items procured under a multiyear strategy should be substantially unchanged during the multiyear period. While this does not prevent any configuration changes whatsoever over the multiyear period, it should prevent the major structural changes, such as Class I Engineering Change Proposals. The candidate program should be supported by a stable DoD inventory objective, as evidenced by top-level DoD planning and acquisition

documents such as the Program Budget Decisions (PBDs), Defense Planning Guidance (DPG), Acquisition Decision Memorandums (ADMs), Joint Requirements Oversight Council (JROC) recommendations, the Quadrennial Defense Review (QDR), service Concept of Operations (CONOPS), and similar documents. The production and procurement rate for the candidate program should also demonstrate stability, as quantity changes cause unit cost volatility and can potentially erode multiyear savings. The end item should be technically mature and have substantially completed its development phase. For instance, it would be preferable for a candidate program to have completed Developmental Testing and Initial Operational Test and Evaluation with only minor changes anticipated.

- ***Stability of Funding.*** Multiyear candidate programs should have a reasonable expectation that they will be funded and avoid cancellation over the proposed multiyear period. Both the Defense Department and the Congress must be committed to ensuring that sufficient funds are provided to complete the multiyear contract at planned production rates. A turbulent funding history for a weapon system may suggest an unstable requirement, a relatively low funding priority, or wavering support; thus rendering the system inappropriate for multiyear contracting. Forward-looking documents such as the President's Budget and Program Objectives Memorandum (POM) plus other defense planning documents lend credence to the assertion of stable funding, and such funding should be adequate to avoid the contract cancellation ceiling during the multiyear period.
- ***Stable Design.*** Candidate programs should be able to assert that they have low technical risk over the multiyear period. The units produced during the multiyear period are expected to be delivered in substantially the same configuration with minimal technical risk, and the items to be procured should be based on proven technologies. Demonstrations that the end item is already in operational use, as evidenced by operational flight hours and other metrics, lend credence to an assertion of credible design.
- ***Realistic Cost Estimates.*** Candidate programs should be able to demonstrate realistic contract cost and multiyear savings/cost avoidance through the use of a multiyear contract strategy. To support this assertion, estimates should be based on historical production costs and proven cost-estimating techniques. Realistic estimates can also be demonstrated by candidate programs whose estimates have been closely scrutinized and track closely with independent oversight groups such as the Office of the Secretary of Defense (OSD) Cost Analysis Improvement Group (CAIG).
- ***National Security.*** The use of a multiyear contracting strategy should promote the national security interests of the United States Government.

C. OTHER REQUIREMENTS

Multiyear candidate programs are also required to identify the sources of multiyear savings, the advantages of a multiyear contract strategy, and the impact on the U.S. industrial base.

1. Sources of Savings

Sources of multiyear savings must be identified, and a narrative description, the estimated savings, as well as an explanation of how the estimate was developed must be provided. Categories of savings to address in the multiyear justification include the following:

- ***Inflation Avoidance.*** Inflation avoidance stems from the fact that contractors will frequently change the timing of their operations in an MYP scenario over a series of annual contracts. Advanced procurement funding for MYP, whether in the form of Economic Order Quantity (EOQ) or long-lead funding, provides contractors the means to procure materials and produce items in larger lot sizes and at earlier stages for the entire multiyear period. Inflationary pressures translate this timing change into cost avoidance in then-year dollars, which can be measured by comparing expenditures over the multiyear period versus a series of annual contracts.
- ***Vendor Procurement.*** Vendor procurement savings are the savings prime contractors can extract from their suppliers in exchange for a more predictable procurement strategy. Sources of vendor procurement savings include EOQ, investments in cost-reduction initiatives, long-term agreements/long-term commitments with key vendors, multiyear contracts with certain suppliers, competition in the supplier base, dual-sourcing critical or high-cost components, and reduced supplier profit margin in exchange for requirement stability.
  - EOQ allow prime contractors to place large orders with suppliers covering requirements for multiple years, thereby reducing processing costs, minimum order fees, production line set up costs, and pre-production costs. EOQ funding also gives prime contractors more leverage in procuring essential materials and components necessary for manufacturing. For instance, a contractor with an MYP that includes EOQ funding may decide to deal directly with manufacturers for large orders of supplies rather than going through a distributor.
  - Vendors may be able to benefit from cost-reduction initiatives as requirements stabilize given the longer procurement horizon in a multiyear contract scenario. Projects that were not immediately beneficial to suppliers over a single-year horizon may offer meaningful savings over a multiyear

period. Whether these projects are funded through vendor capital investments or through EOQ funding, the longer procurement horizon associated with a multiyear contract may offer savings through investments in cost-reduction initiatives at the supplier level that would ordinarily be unavailable in an annual contracting scenario.

- Likewise, the stability and longer procurement horizon of a multiyear contract may entice prime contractors to enter into long-term agreements with or commitments to its suppliers. Prime contractors are typically less willing to enter into such arrangements without assurances from the Government in the form of a multiyear commitment. Prime contractors could also benefit from placing multiyear subcontracts with key suppliers, which could be negotiated with more favorable terms than under a series of successive annual contracts. However, in practice, this is rarely done.
- The longer-term procurement horizon allows prime contractors to maximize the use of competition in their supplier base and, in some cases, to dual-source key components or high-cost items. However, savings that result from competition or dual-sourcing must be balanced against the nonrecurring cost of vendor qualification. All the same, the threat of potential competition or dual-sourcing might be sufficient to allow prime contractors to negotiate more favorable terms with its suppliers.
- Finally, suppliers might be willing to forgo some profits in exchange for a stable requirement. Knowing that a firm commitment covering multiple years exists, suppliers can better manage their production operations and facilities and make better capacity decisions. Suppliers may be motivated to sell more of their product or service at a slightly reduced profit with reduced risk rather than sell fewer of their product or service at a higher profit with greater risk of whether there will be follow-on procurements. Vendors may also be motivated to reduce the profit margins for their products or services to bridge the gap between follow-on defense efforts or for other reasons, such as aftermarket sales, commercial applications of defense technologies, and foreign military sales.

- ***Manufacturing***. Manufacturing savings are the savings that prime contractors achieve through manufacturing cost-reduction efforts. Manufacturing savings are achieved primarily through producibility engineering, value engineering, and production optimization. Producibility engineering involves studying and improving the design of a system and its means of manufacture. Value engineering involves identifying more efficient or cost-effective materials and components. Production optimization involves carefully considering production planning for cost-reduction opportunities, such as the number of production line setups and equipment calibrations; the cost avoidance of annual start-up costs, such as pre-production testing, make-ready costs, phase-out costs, and so on;

and the savings/cost avoidance that could result from the stabilization of contractor and subcontractor work forces during the multiyear period.

- ***Design/Engineering.*** Design/engineering savings are the savings that result from configuration stability. Sources of design engineering savings include less configuration management, reduced sustaining engineering, reduced data maintenance, reduced customer coordination, reduced engineering and manufacturing product liaison efforts, and fewer work instruction changes. These savings can be estimated by comparing the single-year configuration stability against the potential multiyear configuration stability and assessing the related cost differential in the areas identified above. Class I Engineering Change Proposals are generally excluded in a multiyear scenario.
- ***Tooling Design.*** Similar to design/engineering savings, tooling design savings are the savings that result from configuration stability that affect tooling. Sources of tooling design savings include reduced sustaining tooling, reduced data maintenance, and reduced engineering and manufacturing product liaison efforts. Some prime contractors consider investments in new tooling and equipment as a means of achieving savings.
- ***Support Equipment.*** Support equipment savings are the savings associated with integrated logistics support of the end item. Sources of support equipment savings relate to inflation avoidance, vendor procurement, and manufacturing as they pertain to support equipment in a multiyear scenario.
- ***Other.*** This category of savings is a catch-all for any other possible sources of multiyear savings.

2. Requirement to Identify the Advantages of MYP

Candidate programs must identify the advantages of a multiyear contract strategy and how they will be achieved in qualitative terms. The justification for MYP should include general examples of how savings will be achieved through EOQs, reduced administrative burden in the placement and administration of contracts, avoidance of annual startup costs, broadening the competitive base, or stabilization of contractor and subcontractor work forces.

3. Impact on the Industrial Base

The justification for a multiyear strategy should address the effects on the industrial base, including both the prime contractors and their vendors/subcontractors. This requirement calls for a qualitative assessment of the impact to the domestic industrial base and should include such topics as improved competition, enhanced investment, improvement in vendor skills, training programs, the flow-down of multiyear

contracts to subcontractors, and increased production capacity. The stability in contractor and subcontractor operation associated with multiyear contracts has the potential to enhance the industrial base.

D. FINANCIAL MANAGEMENT REGULATIONS MYP EXHIBITS

The DoD Financial Management Regulations implements the statutory requirements of Title 10 U.S.C. 2306b through requiring the preparation of multiyear budget exhibits required as part of the President's Budget that goes to Congress for any program contemplating MYP. These exhibits are briefly described below:

- MYP-1: Multiyear Procurement Criteria—explains how candidate program addresses Title 10 U.S.C. 2306b criteria for MYP.
- MYP-2: Total Program Funding Summary—summarizes the procurement budget of the candidate program with and without MYP contract(s).
- MYP-3: Total Contract Funding Summary—presents SYP versus MYP for each proposed MY contract vehicle.
- MYP-4: Net Present Value Analysis—discounts the cash flows associated with SYP and MYP using U.S. Treasury rates as required by OMB Circular A-94.

Appendixes B and C contain the exhibits completed for the MYP BCA scenarios. Chapter IV describes the analyses leading to those exhibits.

III. OTHER PROGRAMS' EXPERIENCES WITH MULTIYEAR PROCUREMENT

A. OVERVIEW OF RELEVANT MULTIYEAR PROGRAMS

The IDA study team examined four programs that used multiyear procurement (MYP)—the F/A-18E/F/G Super Hornet, the C-17A Globemaster, the C-130J (and KC-130J) Hercules, and the F-16A/B/C/D Fighting Falcon—and assessed their similarities and differences to the F-22A. For each of these programs, we examined the relative level of savings, the sources of savings, and certain contracting details such as period of performance, planned procurement quantities, content and structure of the multiyear contracts, and special contracting provisions pertinent to the multiyear contract. Note that the only estimated data are reported to Congress for each of these multiyear programs; once Congress gives its approval to pursue MYP, there is no requirement to report on actual MYP savings.

By and large, we found that in comparison to these other aircraft programs, the F-22A is procuring substantially fewer aircraft and engine quantities over a shorter period of performance. Procuring more aircraft and components gives a program officer greater leverage with the prime contractor and, in turn, provides greater leverage to the prime contractor with its major and minor subcontractors. The average number of air vehicles procured under a multiyear contract was 308, and the average number of engines procured was 347. The F-22A MYP program would procure only 60 air vehicles and 120 engines.

Another source of potential multiyear savings is DoD- or contractor-funded Cost Reduction Initiatives (CRIs), known as Production Improvement Programs (PIPs) in the F-22A program. Because the F-22A SPO initiated CRIs earlier in the acquisition cycle than other programs, the opportunities now available to capture additional recurring cost savings are limited. The shorter contractual period of performance proposed for the F-22A multiyear contract also translates into a more abbreviated investment horizon than is typical in a multiyear procurement.

From our analysis of multiyear candidate programs, the average multiyear contractual period of performance was approximately 5 years, with some contracts as long as 7 years. In general terms, the longer the contractual period of performance, the more time suppliers are provided to invest in projects, capital equipment, facilities, studies, work force training, and other efforts that reduce program cost. Given a 3-year period of performance, the amount of time available to recoup investments in longer-term projects is limited. In fact, during our review, some suppliers indicated that components with long lead times in excess of 12 months essentially decrease the 3-year investment horizon down to just 2 years in certain cases. In summary, each of these considerations reduces the potential of multiyear savings for the F-22A program over conventional multiyear scenarios.

Table 4 summarizes the multiyear programs we examined. In the following sections, we briefly recount the multiyear experience of each of the programs. All costs in this chapter are in then-year dollars.

B. F/A-18E/F/G

The F/A-18E/F/G Super Hornet is a multirole aircraft designed to replace the F/A-18C/D and the F-14D on Navy aircraft carriers. This program has awarded two separate multiyear contracts to the Boeing Company for the air vehicle system, which is comprised of the airframe, aeromechanical equipment, most of the electronics and avionics systems, and selected alternate mission equipment.

The first air vehicle multiyear procurement contract, for the F/A-18E/F, was estimated to save 7.4 percent, or approximately $850 million, and covered a period of performance from FY2000 to FY2004 for a total of 222 aircraft. To maximize savings, the Government provided $200 million in funding for CRIs and $85 million in funding for Economic Order Quantity (EOQ). The emphasis of the first multiyear contract was primarily to reduce cost at the prime and first-tier subcontractor levels. Accordingly, $115 million of CRI funding was provided to Boeing and $85 million was provided to Northrop Grumman in exchange for a promised return ratio of 3.5 to 1, or an estimated $700 million in savings. The multiyear contract began immediately after three lots of Low Rate Initial Production (LRIP) contracting, thus providing ample opportunity to implement CRI investments, which could yield recurring cost savings over the remaining life of the program. Regarding the savings generated by EOQ funding, the prime contractor targeted approximately 10 percent savings in selected first-tier suppliers.

Table 4. Characteristics of Other Relevant MYP Programs

Program	Savings (%)	Savings (TY$M)	Prior Lots/Units	Period of Performance (years)	Procurement Timeframe	Quantity Procured	Amount of CRI Funding ($M)	Amount of EOQ Funding ($M)	FAR	TINA Waiver
F/A-18E/F Air Vehicle (MYP-1)	7.4%	$850	3/62	5	FY00–04	222	$200	$85	15	No
F414 Engine (MYP-1)	2.8%	$51	5/682	5	FY02–06	454	$0	$0	15	No
F/A-18E/F/G Air Vehicle (MYP-2)	10.95%	$1,052	8/284	5	FY05–09	210	$100	$0	15	Yes
C-17A Airframe (MYP-1)	5.0%	$760	8/40	7	FY97–03	80	$350	$300	15	No
C-17A Engine (F117-PW-100)	6.0%	$122	4/160	7	FY97–03	320	$0	$0	12	No
C-17A Airframe (MYP-1)	10.8%	$1,211	14/112	5	FY03–07	60	$0	$645	12	Yes
C-17A Engine (F117-PW-100)	5.7%	$92	14/448	5	FY03–07	267	$0	$0	12	No
C-130J/KC-130J	10.9%	$513	9/37	6	FY03–08	62	$0	$140	12	No
C-130J (Air Force)	10.9%	$340		6	FY03–08	42	$0	unknown	12	No
KC-130J (Marine Corps)	13.1%	$173		6	FY03–08	20	$0	unknown	12	No
F-16A/B/C/D Air Vehicle (MYP-1)	7.7%	$246	4/605	4	FY82–85	480	unknown	unknown	15	No
F-16C/D Air Vehicle (MYP-2)	10.1%	$467	8/1139	4	FY86–89	720	unknown	unknown	15	No
F-16C/D Air Vehicle (MYP-3)	5.7%	$262	12/1859	4	FY90–93	630	unknown	unknown	15	No
Average	8.00%	$469		5.25	N/A	292	N/A	N/A		
F-22A Air Vehicle	2.6%	$203	8[a]/122	3	FY07–09	60	$0	$255	15	No
F-22A Engine (F119-PW-100)	2.7%	$32	8[b]/244	3	FY07–09	120	$0	$45	15	No

[a] Includes Production Representative Test Vehicle (PRTV) Lot and units.
[b] Includes PRTV Lot and units, and Replacement Test Aircraft (RTA); installed engines only.

Chapter IV provides a more detailed analysis of data from selected F/A-18E/F suppliers. The prime contractor anticipated additional savings related to design engineering and configuration management as a result of the stable multiyear configuration requirement, which precluded Class I Engineering Change Proposals (ECPs) and anticipated a reduced administrative burden as a result of awarding a single 5-year contract over a series of successive annual contracts. Chapter IV presents an analysis of F/A-18E/F/G engineering and supplier savings. The multiyear contract included an Economic Price Adjustment (EPA) clause to address the potential risk of labor and material inflation over the 5-year period of performance and included a Variation in Quantity (VIQ) clause that allowed for the increase or decrease of up to six aircraft per year from FY2002 to FY2004. The contract also included a cancellation ceiling clause in the event the Defense Department decided to break the multiyear contract.

The program was approved for a second multiyear contract to procure the F414-GE-400 engine system. The estimated savings for this 5-year multiyear arrangement were 2.8 percent, or approximately $51 million from FY2002 to FY2006 for a total of 454 engines (2 per aircraft). The Government did not provide CRI or EOQ funding for this effort. The primary sources of savings for this multiyear include procuring selected components at economic order quantities (though without Government funding), reduced number of production line setups, and reduced administrative procurement burden.

The third air vehicle multiyear contract, for the F/A-18E/F/G, was estimated to save 10.95 percent, or approximately $1.052 billion, and covered a 5-year period of performance from FY2005 to FY2009 for a total of 210 aircraft. The Government provided $100 million of CRI funding for this effort, although EOQ funding was not provided for this second multiyear. A waiver of the Truth in Negotiations Act (TINA) was approved for this effort, under which cost or pricing data are not submitted. However, according to the program office, the primary sources of savings for this MYP included investments in longer-term capital equipment and manufacturing processes primarily targeted at the supplier base, reduced number of production line setups, design engineering and configuration management savings as a result of the stable multiyear configuration, and the reduced administrative burden of placing a single 5-year contract versus a series of successive annual contracts. As with the first multiyear air vehicle contract, EPA and VIQ clauses were included; however, the flexibility in procurement rate afforded by the VIQ clause was restricted to an increase of up to six aircraft only. Unlike the first multiyear contract, a cancellation ceiling clause was not included.

C. C-17A

The C-17A Globemaster is a strategic airlift aircraft designed to improve the overall capability to rapidly project, reinforce, and sustain combat forces deployed across the globe. This aircraft augments the C-5 and C-141 aircraft in the intertheater deployment role and the C-130 aircraft in the intratheater operations role. This program was awarded two separate but simultaneous multiyear contracts for the air vehicle and engine systems as part of the overall 7-year MYP from FY1997 to FY2003. A second 5-year MYP was likewise approved on both the air vehicle and engine systems from FY2003 to FY2007.

The first C-17A multiyear contract was estimated to save 5.5 percent, or approximately $900 million, and covered a 7-year period of performance from FY1997 to FY2003 for a total of 80 aircraft and 320 engines. The multiyear contract for air vehicle savings was estimated to save 5.0 percent, or approximately $760 million. The Government provided $250 million of CRI funding and $300 million of EOQ funding for this effort. Additionally as part of the 6 January 1994 settlement agreement between the program office and Boeing, the contractor agreed to invest $100 million in cost reduction projects. The Air Force estimated a 3 to 1 return ratio on the CRI funding and a 1 to 1 ratio on the EOQ funding. The CRI projects proposed were allocated between the prime contractor (the Boeing Company, which was McDonnell Douglas at the time) and its key suppliers. The remaining savings for the air vehicle multiyear contract are attributed to EOQ savings, supplier savings due to receiving a multiyear contract versus a series of successive annual contracts, securing a new supplier for winglet and doors, and other miscellaneous sources of savings. The air vehicle multiyear contract included an EPA clause with a ±2 percent trigger ban to address the risk of direct labor and overhead rate inflation plus inflation in the cost of special materials. The baseline for the direct labor and overhead rates for the EPA clause was tied to the McDonnell Douglas Forward Pricing Rate Agreement (FPRA) in effect at the time the multiyear contract was awarded. When the Boeing Company later acquired McDonnell Douglas, the resulting rate structure was higher than the originally estimated baseline and caused the EPA clause to activate. The contract did not include a VIQ clause, but did include a cancellation ceiling clause to address the risk of the Defense Department cancelling the multiyear contract.

The first engine multiyear contract for the C-17A was estimated to provide 6.0 percent savings, or approximately $122 million. The Government provided neither CRI nor EOQ funding for this effort. Because the engine was procured under Federal Acquisition Regulation (FAR) Part 12 as a commercial item, the savings attributed to the

engine multiyear contract are based on the Government receiving the most favored customer discount and are not supported by cost or pricing data, per se. The engine multiyear contract did not include EPA, VIQ, or cancellation ceiling clauses because the engine was procured as a commercial item.

The second C-17A multiyear contract for the air vehicle was estimated to save 10 percent, or approximately $1.3 billion, and covered a 5-year period of performance from FY2003 to FY2007 for a total of 60 aircraft and 267 engines (240 engines installed, plus 27 whole engine spares). The multiyear contract for air vehicle savings was estimated to save 10.8 percent, or approximately $1.2 billion. The Government provided approximately $645 million of EOQ funding for this effort. This contract was negotiated as a commercial item procurement under FAR Part 12. Accordingly, savings associated with the air vehicle multiyear contract are based on the Government receiving the most favored customer discount. Certified cost or pricing data were not included as part of the procurement, and no other data were provided to explain how these savings would be achieved. The program was eventually restructured as a traditional FAR Part 15 contract because the program failed to receive a commercial item designation for the air vehicle. However, the Assistant Secretary of the Air Force for Acquisition gave the program a waiver of the TINA, which requires certified cost or pricing data, so, again, no data were provided to explain how the contractor expected to achieve the estimated multiyear savings. According to the program office, savings were primarily a result of "just-in-time cash flow financing."

The second C-17A engine multiyear contract was estimated to save 5.7 percent, or approximately $92 million. The Government provided neither CRI nor EOQ funding for this effort. Like the first multiyear engine contract, the program procured the F117-PW-100 engine system as a commercial item under FAR Part 12, and savings are therefore based on the Government receiving the most favored customer discount. Certified cost data, pricing data, or any other data to support the estimated multiyear savings were not provided. The engine multiyear contract did not include EPA, VIQ, or cancellation ceiling clauses.

D. C-130J/KC-130J

The C-130J Hercules is a medium-range tactical airlift aircraft designed primarily to transport cargo and personnel intratheater for the Air Force. The KC-130J is a Marine Corps variant of the C-130J designed for aerial refueling of both fixed-wing and rotary-wing aircraft.

This program was awarded a single 6-year multiyear contract for the combined air vehicle and engine systems. The multiyear procurement contract was estimated to save 10.9 percent, or approximately $513 million, and covered a period of performance from FY2003 to FY2008 for a total of 62 aircraft and 248 engines (4 per aircraft). The Government provided $140 million of EOQ funding and $440 million of advance procurement funding to cover long-lead procurement items. According to the program office, approximately 750 parts had lead times of more than 24 months and approximately 7,700 parts had lead times of more than 12 months.

Because the C-130J was designated as a commercial item and a pilot program for acquisition reform in 1995, no certified cost or pricing data were provided in support of the estimated multiyear savings. The program office attributed the estimated savings to several sources, including efficiencies in planning and manufacturing that resulted from a stabilized production rate, implementation of longer-term business arrangements with key suppliers, and reduced configuration variability. The multiyear contract included an EPA clause to address the risk of inflation in labor and material costs with a ±3 percent trigger band. Like the C-17A, this contract was eventually converted from a FAR Part 12 to a FAR Part 15 procurement, and the EPA clause was deleted from this contract in the course of restructuring the program. According to the program office, if the inclusion of EPA clause would have cost the Government approximately $180 million.

While this contract did not have a VIQ clause, it had a similar provision for production rate adjustment that allowed downward adjustments to base aircraft prices for any years in which more than 18 aircraft were procured and upward adjustments for any year in which less than 16 aircraft were procured. This provision was also deleted when the program was restructured. Under the terms of the contract, the prime contractor, Lockheed Martin, and its suppliers were allowed to amortize the contractor-funded nonrecurring development costs of approximately $1.2 billion over the aircraft procured. The multiyear contract also included a cancellation ceiling of approximately $474 million at its maximum liability value in a single year.

E. F-16A/B/C/D

The F-16A/B/C/D Fighting Falcon is a lightweight, high-performance, fixed-wing, multipurpose fighter aircraft designed to perform a broad spectrum of tactical air warfare tasks. This program was awarded three separate MYPs. Each multiyear contract covered a 4-year period of performance and procured the air vehicle system, which in this case

was defined as the airframe and certain related equipment, but specifically excluded the engine system and most of the avionics.

The first air vehicle multiyear contract was estimated to save 10.5 percent, or approximately $326 million and covered the 4-year period of performance from FY1982 through FY1985 for a total of 480 F-16A/B aircraft. The Air Force adjusted the estimated savings from approximately $326 million to $350 million to include the anticipated benefits of planned improvements. The program was later restructured to procure 180 F-16A/B aircraft and 300 F-16C/D aircraft. At that time, changes were incorporated that reduced the estimated savings from 10.5 percent to 7.7 percent, or approximately $246 million. The Air Force's multiyear justification package included the $246 million savings estimate.

At the time the Air Force submitted its multiyear justification package to the Congress (October 1981), the type of supporting documentation required for an MYP was not specified. From the information we gathered, it was clear that the Air Force provided EOQ funding, but the amount of such funding was unavailable. According to testimony provided to the Government Accountability Office (GAO), contractor and program office personnel identified increased capital investment and stable production schedules as the primary sources of multiyear savings.[3] In the multiyear justification package provided to the Congress, the program office estimated that approximately 76 percent of the estimated savings were derived from economic order quantities of subsystems and general material, with the remaining 24 percent of the estimated savings attributed to manufacturing, engineering, and support equipment procurements.

Another source of potential savings involved co-production of domestic and foreign military sales requirements. These were not explicitly identified, however.

The multiyear contract included a VIQ clause to provide the Air Force with the flexibility to purchase an additional 20 to 85 air vehicles each in FY1984 and FY1985. Exercise of the VIQ had no effect on the Air Force's estimated multiyear savings; in fact, the unit prices negotiated for these additional air vehicles were approximately 7.5 percent higher than unit prices for the air vehicles procured under the multiyear contract.

The second F-16 air vehicle multiyear contract was estimated to save 10.1 percent, or approximately $467 million, and covered a 4-year period of performance from

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[3] GAO report GAO/NSIAD-86-38, "An Assessment of the Air Force's F-16 Aircraft Multiyear Contract," February 1986.

FY1986 to FY1989 for a total of 720 F-16C/D aircraft. According to the GAO, the estimated savings were only approximately $358 million and were based primarily on the cost experience from the first F-16A/B multiyear contract.[4] Lockheed Martin provided data that confirmed that approximately 86 percent of the estimated savings were attributed to EOQ procurements and vendor savings. This contract included a VIQ clause that gave the Air Force the flexibility to procure an additional 36 air vehicles per year.

The third F-16 air vehicle multiyear contract was estimated to save 5.7 percent, or approximately $265 million, and covered a 4-year period of performance from FY1990 to FY1993 for a total of 630 F-16 C/D aircraft. According to the GAO, the estimated savings were attributed to vendor and subcontractor items on a more economical basis than is possible under a series of successive single-year contracts.[5] The GAO noted that the cost and savings estimates were based primarily on extensive production cost history and actual multiyear experience gained from the two earlier F-16 air vehicle multiyear contracts.

F. OBSERVATIONS

The data enumerating MYP cost savings in this chapter represent before-the-fact estimates. Studies analyzing the actual execution of MYPs have shown mixed results. For example, a previous IDA study[6] could not find any evidence of cost savings for the first F-16 MYP, despite the 7.7 percent savings shown in the pre-MYP estimates reported here. A similar result was found for the Army's H-60 helicopter program (an MYP program not included here). In contrast, IDA analyses of the MYP programs of other aviation systems, such as the T700 engine and CH-47D helicopter modification, have shown solid MYP savings.

It is arguable whether CRI savings should be counted as MYP savings. In our approach to F-22A MYP savings, we contrast hypothetical SYP and MYP programs. Using that criterion, CRI savings should be credited to MYP only if there would be no CRI investment under the SYP scenario. The F-22A program itself contradicts that

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4 GAO report GAO/NSIAD-85-9, "Analysis of DoD's Fiscal Year 1985 Multiyear Procurement Candidates," October 1984.

5 From GAO report GAO/NSIAD-88-233BR, "Assessment of DoD's Multiyear Contract Candidates," September 1988.

6 Karen W. Tyson, J. Richard Nelson, Neang I. Om, and Paul R. Palmer, "Acquiring Major Systems: Cost and Schedule Trends and Acquisition Initiative Effectiveness," Institute for Defense Analyses, Paper P-2201, March 1989.

assumption, as an extensive CRI program was funded in the absence of MYP. If we subtract CRI savings from the two historical MYPs where data are available—the first MYPs for the F/A-18E/F and C-17A airframes—savings percentages fall from 7.4 percent to 1.3 percent and from 5.5 percent to 2.6 percent.

IV. COST ANALYSIS

A. INTRODUCTION

The basic tool the IDA team used in estimating multiyear procurement (MYP) savings was the procurement cost model IDA developed for the F/A-22 Independent Cost Estimate (ICE) completed in August 2005. We used the model to establish a single-year procurement (SYP) baseline and then incorporate MYP savings in those specific areas where we expected savings. The two estimates were then compared and MYP savings calculated. In constrained budget Scenarios 3 and 4, the quantity that can be purchased under the budget of record was determined by the costs generated by the IDA model.

The IDA model employs learning (or cost progress) curves as the core analytical tool in estimating future F-22A costs. Learning curves relate unit costs to the cumulative quantity of aircraft produced. IDA estimated learning curves for over 75 cost categories and components using statistical techniques and data from F-22A history to date. A consolidation model brings all of the learning curve modules and factored cost elements together into a single cost estimate for recurring flyaway costs. The consolidation model takes into account the economics of the production plants building the aircraft, including fixed and variable portions of overhead cost. These effects are important when estimating how cost changes with the different production rates in the scenarios examined. Section B of this chapter contains a basic overview of the modeling approach. The 2005 F/A-22 ICE report provides a more detailed explanation of the model.[7]

In most cases, MYP savings are implemented in the model through "step-downs" (downward displacements of the learning curves) for the components/cost categories affected. The estimation of step-downs for the various cost categories is the heart of the MYP analyses. Information was collected describing previous studies of F-22A MYP as well as experience for historical programs. Section C of this chapter describes how we used this information to develop the estimates.

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7 IDA Paper P-4029, p. 44.

B. COST MODEL

1. Overview

To better understand F-22A procurement costs, we tailored a generic template for presenting aircraft weapon system procurement costs to the F-22A program and contract structure. The Pratt & Whitney (P&W) propulsion contract structure is more traditional in its relationship to standard cost estimating categories, so our tailored template focused on the cost structure of the Lockheed Martin Aeronautics (LMA)/Boeing Integrated Defense Systems–Puget Sound prime contract.

Our modifications to accommodate F-22A cost analyses consisted primarily of adjustments in nomenclature and categories to match more closely the F-22A program's contract structure. We adhered to the overall spirit of the standard template; consistent comparisons at the major unit cost categories—Average Unit Recurring Flyaway (AURF), Average Unit Flyaway Cost (AUFC), and Average Unit Procurement Cost (AUPC)—can be made.

The following definitions of the contract cost categories are relevant to the LMA/Boeing prime contract and are identified in Figure 4:

- *Target Performance Curve (TPC)*—Costs necessary to produce and deliver the aircraft, including labor and materials required for the fabrication, assembly, integration, and test of aircraft. This is the major portion of LMA/Boeing recurring flyaway cost. TPC also includes some supplier nonrecurring costs and is funded on a fiscal year lot basis.
- *Production (or Program) Support/Annual Sustaining (PSAS)*—Costs for tasks associated with sustaining the production program, including design change activity, system integration and analysis, and other integration activity. PSAS plus TPC essentially yields recurring flyaway costs. PSAS is funded on an annual basis.
- *Program Support–Other (PSO)*—Costs for deliverables other than the flyaway aircraft, including such non-recurring and other flyaway elements as Diminishing Manufacturing Sources (DMS) and Production Improvement Program (PIP) developments, rate tooling, and useful loads. It also includes below-flyaway elements like Alternate Mission Equipment, air vehicle support equipment, and trainers. PSO is funded on a fiscal year lot basis.
- *Performance-based Agile Logistics Support (PALS)*—Costs for contractor logistics support of the aircraft. Procurement-funded items include interim contractor support through FY2005 and initial spares. PALS is funded on an annual basis.

These items together constitute total procurement cost. We refer to the portion of contract costs outside of flyway costs as "below flyaway" or "below the line" costs. In addition to costs associated with F-22 contracts, there are other costs to the Government. These are captured in the Other Government Costs (OGC) category. Figure 4 shows how the F-22A cost categories fit into the generic procurement template.

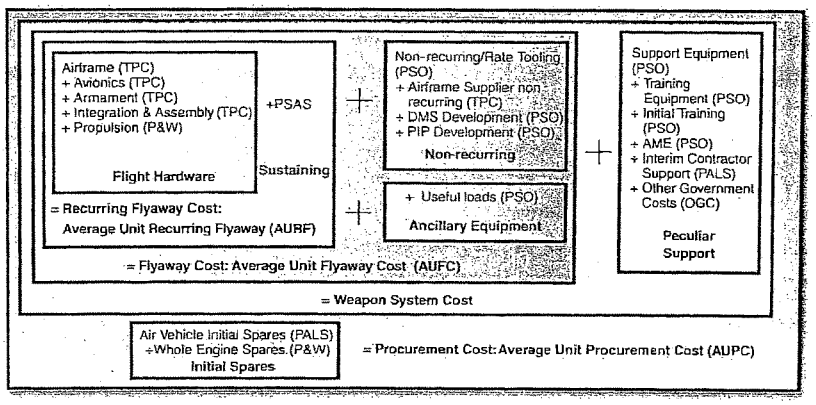

Figure 4. F-22A Aircraft Procurement Cost Template

In estimating costs for the recurring flyaway categories (TPC and PSAS for the LMA/Boeing and the P&W prime contracts),[8] we estimated direct costs separately from overhead costs. Overhead costs are relevant to the total activities of the operating units where the F-22A is built (i.e., corporate divisions or plants). Direct costs are uniquely associated with the F-22A contracts/categories under examination. Portions of overhead costs for each operating unit are allocated to F-22A contracts based on the proportion of activity associated with the relevant F-22A contract category. Adding direct and allocated overhead costs yields total cost; adding other allocated costs and profit yields total price, which corresponds to recurring flyaway cost in the procurement cost template.

The importance of estimating overhead costs separately lies in the fixed nature of portions of those costs. This fixed nature results in the nonlinear relationship between production rate and cost. That is, the higher the production rate (i.e., the number of

8 The portion of the Pratt & Whitney contract costs associated with whole engine spares is not included in recurring flyaway cost; it makes up the whole engine spares item under initial spares.

aircraft built over a fixed time), the lower the unit cost of the aircraft, because fixed overhead costs are allocated over a larger direct cost base. Selected portions of direct costs are fixed with production rate. The modeling approach allows us to better calculate the true marginal costs of additional aircraft bought within a given lot.

Another important issue in the estimation of TPC costs is the effect of PIP projects. PIP projects are specific investments made to bring about additional reductions in production costs. In our analyses, no PIPs are unique to the MYP case. In past programs where MYP began earlier in the program, much of the savings attributed to MYP were derived from CRIs, which are analogous to PIPs. The argument has been that the Government or contractors would only want to fund CRI/PIP investments if future production was assured through an MYP. In the prime contractors' Affordability Analysis 2003 (AA03) documentation,[9] most F-22A MYP savings were attributed to additional PIPs. However, as the program currently stands, almost all PIP investment decisions have been made, with little or no potential for new PIPs to yield additional savings in the MYP lots.

Data used in determining the model parameters reflect both data availability and analytical approaches used for the different procurement cost categories. The IDA team collected additional data describing F-22A procurement experience beyond that available for the ICE and used the data to re-estimate model parameters. Direct labor hour data reflecting the manufacture of most aircraft components were available through Lot 4 (aircraft number 4083) for LMA and Boeing efforts. Data associated with the last steps of the production process, however, were available only through Lot 3 aircraft due to the long production flows associated with building the F-22A. Data for purchased items reflected negotiated prices between the prime contractors and suppliers. Visibility into the actual cost structure of the suppliers was generally limited. However, we were able to collect actual cost data for selected avionics systems. Negotiated values for all purchased items were available through Lot 5, with some negotiated values available for Lot 6. For most of the analyses of cost categories below flyaway, IDA used analogies from historical fighter aircraft programs, adjusted for F-22A characteristics and experience.

Data used in developing overhead cost models reflect the overall cost structure of the prime contactors' operating units where the F-22A is built. Overhead and other plant-

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9 Lockheed Martin Corporation and the Boeing Company, "F/A-22 Affordability Analysis 2003," Volume 1, Team Summary, 2004.

wide data were in the form of an extensive calendar year time-series, including forecasts for future years. The data were obtained directly from the prime contactors, and Defense Contract Audit Agency (DCAA) personnel provided validation and insight.

In addition to these data, the prime contractors provided their Lot 5 post-negotiation positions. The F-22A SPO provided documentation of its Program Office Estimate (POE) for 2005, as well as the Air Force's standard budget submission document, AF-1537, reflecting the FY2007 President's Budget and including alternative planning scenarios. These data were used to help structure the estimates and insure that all cost categories were captured.

2. Flyaway Cost Model

a. Framework

The analytical heart of the cost model addresses the estimation of the TPC and PSAS elements of the prime contractor, less avionics. The TPC portion of these costs constitutes the airframe category shown. Other procurement cost elements were accounted for, but the analytical content behind these estimates reside outside of the model. The P&W propulsion cost estimates follow the general analytical approach described here; however, the actual mechanics of those estimates were embedded in a separate model and incorporated into the consolidation through a summary cost/quantity relationship. Avionics estimates were incorporated in a similar fashion.

The model framework is a modular design that allows an arbitrary number and order of cost elements to be estimated from learning curve models and cost factors, and a set of input such as wage and inflation rates. Figure 5 shows the structure of each cost module. Learning curves portray either direct labor hours or supplier or other direct dollars. The lot volumes, wage, fringe, profit, and inflation are specified for each module. Most MYP savings are introduced into the model in the individual cost modules.

Figure 6 shows the overall consolidation model that brings all of the learning curve modules and factored cost elements together into a single cost estimate for recurring flyaway costs. The figure shows that the labor components have overhead and inflation applied to them. Material, on the other hand, only has inflation applied. Propulsion is a single learning curve derived from the detailed analyses.

This section describes the development of labor and materials learning curves and other cost estimating relationships used to estimate the direct costs associated with total

recurring flyaway costs less avionics and propulsion. We used a broader definition of "airframe" here than in the procurement cost templates in Figure 4. We also estimated portions of non-recurring flyaway costs, including rate tooling and cost decrements associated with PIP investments.

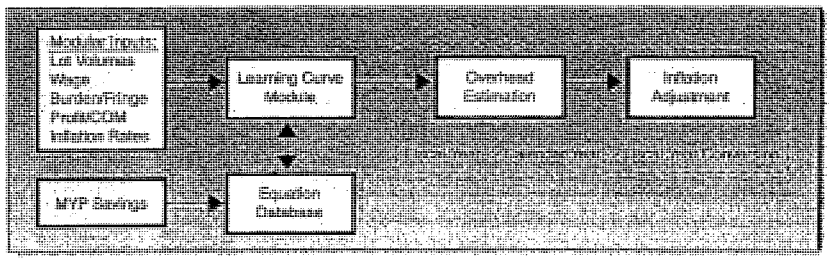

Figure 5. Cost Module Structure

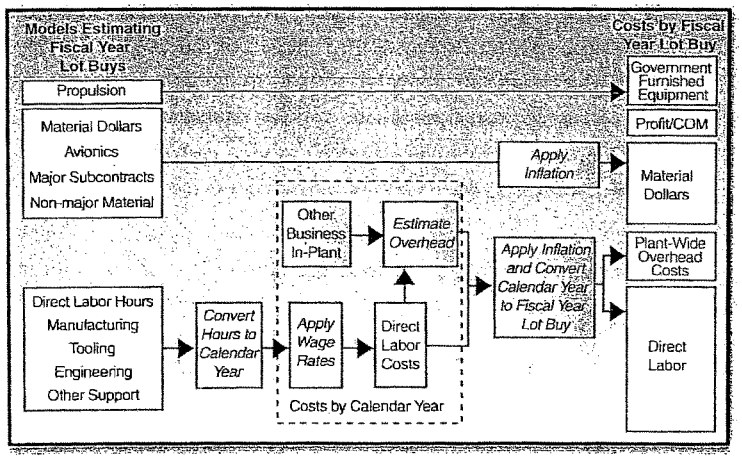

Figure 6. Depiction of Consolidation Model: Recurring Flyaway Cost

We estimated the following three broad categories of direct costs: labor, materials, and other direct costs (ODCs). The model estimates multiple subcategories/elements within the labor and materials categories. ODCs are small relative to other costs and are treated as factors on direct labor hours.

b. Direct Labor Hour Costs

Labor costs associated with the LMA/Boeing prime contract were broken into the following three basic recurring labor categories:

- Manufacturing,
- Engineering (TPC and PSAS) and tooling,
- Other support.

The model estimates manufacturing labor at the individual plant/component level, it estimates engineering and tooling and other support categories at the contractor level. We estimated labor learning curves using data provided by LMA and Boeing through the units of each component completed. For most manufacturing hour costs, data were available for each shipset/unit. For other labor categories, data were available only for fiscal year lots. In the case of PSAS engineering, monthly data were provided, reflecting annual funding (versus fiscal year lot funding for TPC). Learning curve parameters were estimated using least-square regression analyses.

In our analyses of MYP savings, only engineering and other support elements were affected by MYP.

c. Material Costs

Most MYP cost savings are associated with materials suppliers. We categorized material costs in the following major categories:

- Avionics,
- Other TPC major subcontracts,
- TPC production materials,
- TPC outside production, and
- PSAS materials.

We refer to the sum of production material, outside production, and PSAS material as non-major materials. In the prime contractors' definitions, avionics systems were classified as major subcontracts; because our approach to estimating avionics costs was substantially different than that of other material categories, we treated avionics as a separate category. The material costs were associated with either LMA or Boeing. Costs for major subcontracts were specific to each constituent subsystem, while production material and outside production were estimated at the aggregate level for LMA and Boeing. When estimating leaning curve parameters, lot prices were normalized to

constant year 2004 dollars prior to learning curve estimation using Bureau of Labor Statistics inflation data for aircraft and parts and Global Insight projections for 2006 and onwards. In most cases we included a fixed cost parameter in the leaning curves, making prices sensitive to production rate as well as cumulative quantity.

d. Overhead Costs

Indirect costs represent approximately 50 percent of defense contractors' overall costs and play an important but often understated role in the Department of Defense's cost estimating process. Under the auspices of the F/A-22 ICE, we collected and analyzed plant-wide company data on key defense contractor enterprises from LMA, Boeing, and P&W.

Both historical actual cost data as well as company forecasted data were provided by each of these companies during the F/A-22 ICE. We used this information to first estimate historic indirect costs at an aggregate level. This gave us an indication not only of how well we could predict historic indirect company costs, but also allowed us to assess the relative degree of fixed versus variable indirect cost relationships that existed at each enterprise. Insight into a company's fixed versus variable relationships allows us to more accurately adjust for changes in the procurement rate as well as changes in the general business base. We also compared the forecasted data from our model to each company's indirect cost forecast and attempted to understand the differences.

For the F/A-22 ICE, we collected actual cost data through calendar year 2004. For the present analysis, we asked each company to provide the latest actual cost data through calendar year 2005, plus the latest available company forecasts. Barring any significant accounting changes, we expected the newer data would offer only a marginal update to our analyses. By that, we mean that given an historical data set that ranged from calendar years 1989 to 2004 (in some cases, from calendar years 1971 to 2004), a major change in a single data point (calendar year 2005) would be unlikely to result in a significant recalibration of our cost models. Without exception, this was, in fact, our finding.

Based on this analysis, we opted to continue using the indirect cost models developed under the F/A-22 ICE in lieu of using the models that included calendar year 2005.

e. Propulsion Costs

The F119-PW-100 propulsion system is composed of a set of modules, including the fan, compressor, combustor, high-pressure turbine, low-pressure turbine, turbine augmentor, exhaust nozzle, and engine control system. This system incorporates high-technology features, such as a two-dimensional thrust-vectoring nozzle, the capability to achieve supersonic speed without afterburner use (a.k.a. supercruise), and low-observability features.

We developed a model to estimate the cost of the propulsion system under the F/A-22 ICE. The propulsion cost model estimates labor and material costs based on regressing actual cost data; applies cost estimating relationships to estimate other direct costs, engineering changes, Engineering Assistance to Production (EAP) cost, product markup factors, and cost of money; and estimates indirect costs based on the plant-wide overhead analysis for P&W.

As part of this effort, we asked P&W to provide the latest actual costs, negotiated Lot 5 values, and other data that pertain to estimating program cost. P&W provided manufacturing actual manufacturing costs, negotiated cost reduction savings per unit, projected risk-weighted cost reduction savings per unit during the multiyear period, and other data as requested. We used these data to update the existing cost model as appropriate.

f. Other Flyaway Cost

Portions of flyaway costs that are not recurring in nature include development costs associated with DMS and PIPs, as well as tooling and other production equipment needed to increase production rate. Also included in other flyaway are useful loads (e.g., bomb racks, electronic warfare consumables) that do not align one-to-one with the number of aircraft bought. None of these costs are affected by MYP, but they are included in total budget calculations.

Also included in the other flyaway category are one-time costs associated with the last lot of production. These "tail-up" costs affect both the prime contractors and suppliers. Those portions of tail-up costs associated with suppliers are affected by MYP to the same degree as supplier recurring costs.

3. Below Flyaway Costs

Below flyaway costs include acquisition logistics and a catch-all "other costs" category.

a. Acquisition Logistics

This cost category is generally broken out into two portions, Peculiar Support and Initial Spares. We classified these into three major cost elements:

- Air Vehicle Support, consisting of such cost items as training, peculiar support equipment and supply support/initial spares (Initial Spares);
- Engine Support, consisting of engine spares (Initial Spares), engine support products, and interim contractor support (Peculiar Support); and
- Other Government Costs, which are primarily common support equipment items (Peculiar Support).

IDA developed a "beddown" plan (an allocation of aircraft to operating bases and other uses) that helps determine some below flyaway cost. As the beddown plan is not sensitive to marginal changes in aircraft bought, we used the beddown for case of 179 aircraft (a quantity close to those being considered in this study) presented in IDA's ICE report. We estimated other below flyaway costs based on percentages of flyway cost. Of particular interest were initial spares. Spare parts are generally purchased from the same suppliers that provide parts to build the aircraft, and thus should also benefit from MYP cost reductions.

Table 5 lists below flyaway cost elements and the basis of their estimation. Elements in bold type are those affected by MYP savings.

Table 5. Below Flyaway Cost Elements

	Basis of Estimate
Air Vehicle Support	
Program Support–Other (PSO)	
Trainers	**Percentage of Recurring Flyaway Cost**
Air Vehicle Peculiar Support Equipment	Adjusted Throughput from AF-1537
Sustaining Engineering (SE)/Program Management (PM)/Integrated Logistics Support (ILS)	Adjusted Throughput from AF-1537
Performance-based Agile Logistics Support (PALS)	
Interim Contractor Support (ICS)	Throughput from AF-1537
Site Activation	Adjusted Throughput from AF-1537
Training Initial Consumables	Adjusted Throughput from AF-1537
Supply Support/Spares	**Percentage of Recurring Flyaway Cost**
Engine Support	
Whole Engine Spares	**Engine Unit Cost, SPO Quantity**
Engine Support Products	Adjusted Throughput from AF-1537
Engine ICS	Adjusted Throughput from AF-1537
Other Government Costs/Common Support Equipment	Adjusted Throughput from AF-1537

One important difference in methodology between the ICE and the current study was the treatment of whole engine spares. Whereas the ICE employed an independent estimate of the number of required spares, this study used F-22A SPO assumptions.

b. Other Below Flyaway Cost

This category includes other items that must be included to account for all of the costs that must be covered by the F-22A procurement budget. These costs are throughputs from the F-22A SPO and are not affected by MYP.

C. ESTIMATING MYP SAVINGS

1. Overview

In this section we explain data and methods used to estimate MYP savings for the affected cost elements. Because of unique aspects of the data and approach, the presentation is not parallel to the organization of the cost model section. However, the reader should be able to track the relevant cost categories between the two. Analyses of MYP savings are presented for the following major categories:

- Airframe and subsystems,
- Avionics,
- Propulsion, and
- Administrative savings.

Important data sources used included:

- ***LMA/Boeing and P&W AA03 analyses.*** These studies examined a hypothetical MYP covering Lots 7–11, including a total of 152 aircraft and 338 engines.
- ***LMA/Boeing 2005 supplier survey.*** Although sometimes referred to as "AA05," these data were not part of a formal Affordability Analysis (AA) effort. Assumptions include the purchase of 152 aircraft over six lots (7–12) with two separate MYPs. LMA/Boeing also provided IDA with their latest assessments of selected supplier data.
- ***Other supplier data.*** Newer data IDA collected from supplier visits and other contacts covered avionics suppliers and portions of the P&W engine.
- ***Data from historical MYP programs.*** Descriptions of these programs were included in Chapter III. More detailed data were also collected for the F/A-18E/F program.

We used the prime contractor studies as a jumping-off point in applying the data to estimated savings. Adjustments were then made taking into account new information relevant to the F-22A program, as well as data describing past MYPs. In most cases, MYP savings were estimated as percentages. The percentages were then used to calculate step-down factors that were multiplied by the relevant cost elements in the cost model.

2. Airframe and Subsystems

Most of the airframe and subsystems savings are associated with supplier efforts. We also estimated some savings for selected direct labor categories.

a. Supplier Savings

Our approach to estimating the MYP supplier cost savings included the following steps:

- Use AA05 data as a point of departure,
- Apply least-squares regression analysis to estimate the sensitivity of AA05 savings percentages to different variables,
- Use the resulting regression equation to adjust the AA05 data to capture the current assumptions,
- Estimate savings for suppliers not included in the AA05 data using the regression equation, and
- Compare savings calculated from historical F/A-18E/F MYP-1 data with those estimated for the F-22A.

The primary source of data was the AA05 supplier survey. We used the detailed data from the F/A-18E/F MYP-1 for validation and to assist in estimating labor savings.

The AA05 data include the following:

- 63 supplier responses,
- Estimates for MYP-1; Lots 7 and 8 (29 + 27),
- Estimates for MYP-2; Lots 9, 10, 11, and 12 (24 + 24 + 24 + 24),
- Economic Order Quantity (EOQ) dollars provided by suppliers.

The AA05 assumptions of a two-lot MYP-1 of 56 aircraft and a four-lot MYP-2 of 96 aircraft are quite different from the scenarios we are examining. Also, EOQ dollars reported in the data are somewhat fewer than those that were available for LMA/Boeing suppliers in this analysis.

We used least-squares regression with to the AA05 data to estimate parameters helpful in calculating the effects of changes in assumptions from the AA05 analyses. The dependent variable of the regression was the percentage savings for each of the two MYPs. We had two data points for most of the suppliers included in the survey and a total of 123 data points for use in the regression. The variable of most interest was the difference in the number of lots. The sample includes suppliers of airframe structural items as well as subsystems and avionics. Both LMA and Boeing suppliers provided data to the survey. The resulting equation is:

$$\text{Savings Percent} = 3.3\,(Lots - 1)^{.53}\,0.52(Structure)\,0.47(Boeing) + 5.9\,(EOQ\%)$$

All parameter estimates are statistically significant at the 0.05 level, except for the parameter on *EOQ%*, which is significant at the 0.10 level; the value of R^2 is 0.22. *Lots* – 1 distinguishes the two-lot MYP-1 from the four-lot MYP-2 (one is subtracted from the total because there must be at least two lots for an MYP to happen). *Structure* is a dummy variable with the value of 1 for structural components and 0 for other subsystems. *Boeing* is a similar dummy variable distinguishing Boeing from LMA suppliers. *EOQ%* is EOQ dollars expressed as a percentage of the total MYP value for a given supplier. Almost all EOQ dollars are associated with avionics systems. Figure 7 shows the relationship between MYP percentage cost savings and the number of lots included in the MYP.

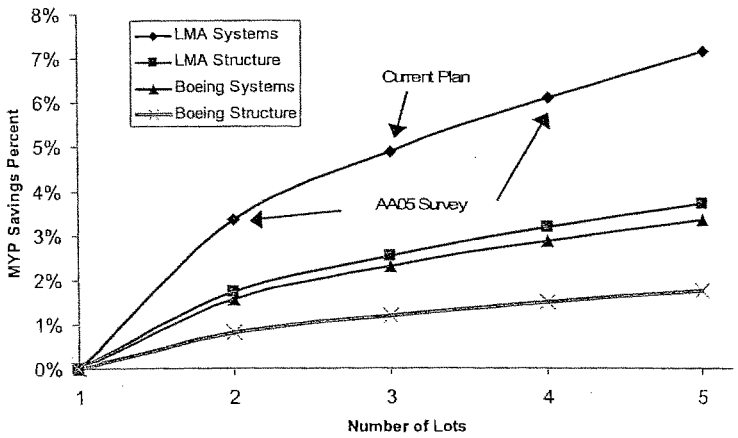

Figure 7. Sensitivity of F-22A MYP Cost Savings to Number of Lots

The figure shows the relationship between the supplier classifications embedded in the 1/0 dummy variables as well as the sensitivity to the number of lots. The difference in savings for structure compared to other subsystems is related to the nature and complexity of tasks for the suppliers. The lower value for Boeing suppliers is less intuitive. One explanation is the different approaches to supplier management between LMA and Boeing.

As the AA05 survey was not exhaustive of costs for all suppliers, the regression equation was also used to estimate savings for suppliers that were not included in the survey. When all of the adjustments are made, and savings calculated for all material items, less avionics, the weighted average savings are 3.0 percent. When the estimates for avionics are included, the value becomes 3.3 percent.

We analyzed historical F/A-18E/F MYP supplier data to create a crosscheck on the AA05 data and our adjustment methodology. We obtained data on selected material purchases from Boeing's St. Louis operations where the F/A-18E/F was built. The data cover 23 different items. This series portrays the transition from the first three SYP lots of production to the first 5-year MYP. Unit costs for each item were analyzed using a leaning curve relationship, where the transition between SYP to MYP is expected to result in step-down in the learning curve. Figure 8 illustrates this effect for an example supplier.

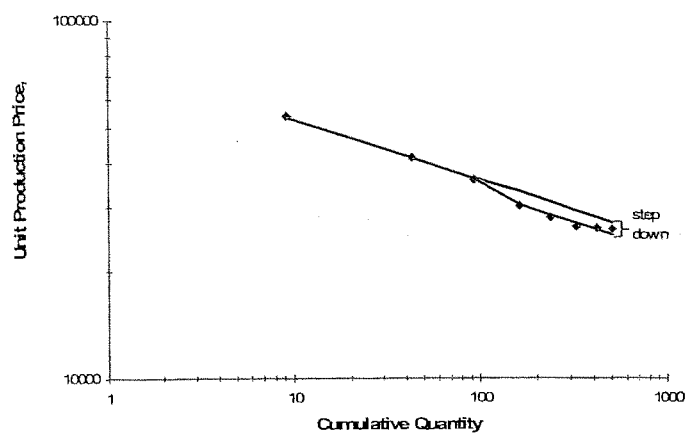

Figure 8. F/A-18E/F Supplier MYP Step-Down Example

We used the results of the step-down analyses to develop a weighted average supplier savings percentage. In some cases we estimated step-ups;[10] in our calculations, these were treated as zero savings. The resulting weighted average savings was 8 percent. A simple average of 6 percent was also calculated. Figure 10 shows the relationship between the calculated values and the regression equation estimates.

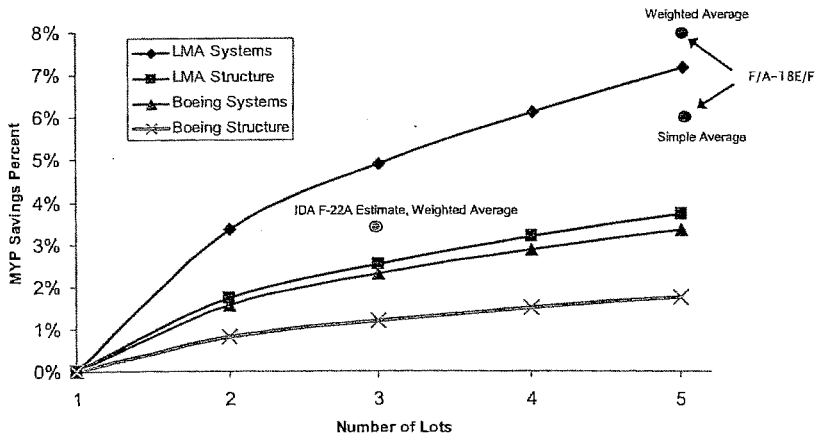

Figure 9. F/A-18E/F MYP Cost Savings in Relation to F-22A Calculations

The F/A-18E/F results generally confirm the estimates made using the adjusted AA05 data.

b. Labor Savings

In addition to the supplier analyses, we were also interested in possible labor hour cost savings. LMA and Boeing did not give any credit for labor savings in the AA05. Based on history, we thought this was an overly conservative assumption. Their arguments against savings for manufacturing labor were the strongest, so we concentrated our effort on support labor savings. An important portion of support labor effort is associated with managing suppliers and material items. This effort is often

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10 Step-ups may be caused by changes in component configuration or other design instabilities.

estimated as a percentage of material purchases. Given this, we applied the same 3.3 percent savings to these support hours as was estimated for the supplier items, including avionics. Another probable savings area for MYP is engineering hour costs. We used F/A-18E/F data to help us estimate the effect of MYP on these costs. Specifically, we analyzed engineering labor learning curves, and tested them for step-downs at the transition from SYP to MYP. We found step-downs of over 10 percent for the engineering categories. Given the large differences between the F/A-18E/F and the F-22A MYPs, we did not take full credit for F/A-18E/F savings in our estimates. Instead, we applied a savings percentage of 5 percent to F-22A TPC and PSAS engineering hours.

3. Avionics

IDA's approach to estimating the MYP cost savings associated with the avionics suppliers included the following steps:

- Define the avionics system that will be used as a baseline for MYP analysis.
- Divide the avionics suppliers into four major suppliers and "other."
  - The major suppliers and their subsystems are Northrop Grumman for Communication, Navigation, Identification (CNI) system and radar, BAE for Electronic Warfare (EW) equipment, and Raytheon for the Common Integrated Processor (CIP).
  - The four suppliers account for about 80 percent of the avionics cost and nearly all of the avionics capabilities.
- Assess information that relates to the MYP savings estimate, including the supplier analyses and the LMA assessments.
- Upon completion of an MYP savings estimate for each major supplier, calculate a weighted average of savings for the four suppliers as a whole, weighted by dollar value of their subsystem.
- Apply that weighted average savings to the entire cost of the avionics system.

Because the avionics systems are likely to be subject to the most change through the period of the MYP, it was important to establish a baseline for cost estimating purposes. The baseline for estimating the MYP savings was the Lot 6 avionics configuration, as defined in Appendix D.

IDA used four sources of information and data in estimating the likely savings that could be obtained through an MYP:

- The suppliers provided estimates of MYP savings in their AA03 submissions to LMA. Those submissions were not detailed, they were not assessed by LMA, and they were not firm supplier commitments to the prices. Also, the suppliers

obviously did not have in mind the current 20/20/20 production quantity profiles or even the total quantity of 60 aircraft when they submitted the numbers. However, their submissions did provide a notional range of possible savings and they indicated the potential areas of savings, such as reduced cost of annual proposal preparation. IDA obtained these submissions from suppliers for the previous ICE study.

- The suppliers were asked during the summer of 2005 to carry out a more detailed analysis of potential MYP savings. Again, the analysis was not based on the current production profile or total production quantity, but it did provide more detail on how the savings might be obtained.
- LMA provided IDA with an assessment of the 2005 supplier submissions. That assessment provided a range of savings and a general idea of the source of savings. The LMA assessments were based on the 20/20/20 quantity profile. However, there was some question as to whether the suppliers could achieve the full benefit of a 3-year MYP since long-lead items for the first of the MYP years were already being procured.
- IDA visited Northrop Grumman and BAE, and received information and data from Northrop Grumman and Raytheon. Our discussions with these suppliers clarified the sources of potential savings and allowed them the chance to adjust their estimates to the 20/20/20 production profile. Again, it became clear that in at least one case (radar), the need to proceed with long-lead items would rule out much of the savings for the first year of the MYP.

Table 6 summarizes the supplier, prime contractor, and IDA assessments of MYP savings. "Prime Assessments" are the LMA- and Boeing-provided assessments of previous supplier inputs. Supplier inputs included data from AA03, AA05 supplier survey as well as newer data provided as part of IDA's BCA. The estimates based on the higher number of aircraft are the earlier supplier numbers and are presented to demonstrate the sensitivity of savings to total number of aircraft. Based on these data, IDA assessments are averages of the supplier numbers, checked for realism against their earlier AA03 and AA05 estimates and based on detailed discussions with the supplier pricing staff. Although it is not possible to take account of the various terms and conditions noted by the suppliers, the savings do not appear to vary greatly once the correct quantity has been specified.

Using the IDA savings percentages, an average savings percentage was calculated, weighted by the dollar value of each of the major suppliers' contracts. The resulting dollar-weighted average savings for the major suppliers was 3.7 percent, which was then applied to the entire avionics cost within the cost model.

Table 6. Avionics MYP Savings Assessments

Supplier	Source	Lots	No. of Aircraft	Percent Savings: Prime	Percent Savings: Supplier	Percent Savings: IDA
Northrop Grumman (CNI)	Admin.; EOQ	7–9	60	Proprietary Information Removed		1.5
		9–12	96			
Northrop Grumman (Radar)	Admin.; EOQ	8–9	40[a]			2.5
BAE (EW)	Admin.; EOQ	7–9	60			4.5
		7–9	60[b]			
		7–12	152			
		7–11	152			
Raytheon CIP	Admin.; EOQ	7–9	60			8.5

[a] MYP is too late to impact Lot 7.

[b] MYP savings is only 4% if MYP is not in place by August 2006.

Several points should be noted regarding the estimates:

- The suppliers listed various terms and conditions on which their estimates are predicated.
- The LMA assessment attempted to bring the supplier estimates to the correct production profile (20/20/20). LMA indicated that reduction of administrative cost and the use of EOQs would be the bases for savings.
- Northrop Grumman did not believe that 100 percent of the material buys for CNI could be achieved for all three lots given the timing of the MYP.
- Northrop Grumman indicated that the lead time on long-lead radar items would mean that Lot 7 was not a realistic possibility for MYP savings.
- BAE-reported savings are based on labor efficiency, reduced proposal preparation cost, accelerated deliveries, and continuation of self-funded PIPs. The current estimate (AA06) is a savings of 5 percent if the MYP is in place by August 2, 2006. If that deadline is not met, the estimate falls to 4 percent.
- Raytheon indicated that savings could be achieved based on sub-tier EOQ, reduced infrastructure/special test equipment costs, avoidance of start-up costs, accelerated builds, buying high-risk equipment up front, and combining common configuration items with retrofit buys to increase production rates.

4. Propulsion

IDA's approach to assessing potential multiyear savings for the F119 engine program included the following steps:

- Review the P&W multiyear savings calculations provided in the Affordability Analysis 2003 (AA03),
- Consider the multiyear savings reported by similar engine programs for which data were available,
- Consider the detailed supplier information that was available from P&W's supplier base, and
- Consider the information provided by P&W in its supplier savings matrix.

Each of these steps is explained in further detail below.

We visited P&W in Hartford, Connecticut, to collect Lot 5 negotiated values, plant-wide actual costs for calendar year 2005, and information pertinent to the proposed multiyear contract. Where appropriate, we updated the F119 cost model IDA developed for the F/A-22 ICE with the latest available data.

First, we reviewed the P&W AA03 multiyear data, which consisted of a 5-year multiyear period from FY2007 to FY2011 for a total of 338 engines. Multiyear savings were estimated based on a Request for Information (RFI) sent by P&W to selected vendors from its supplier base, comprising 70 percent of the average Lot 2 engine procured value. Valid responses were received from suppliers comprising 57 percent of the procured engine value. This information indicated 5 percent savings for the top 40 suppliers, and P&W estimated an additional 3 percent savings from the remaining suppliers, resulting in savings of $91.9 million in then-year dollars. P&W observed instances of price projections in excess of internal company projections and adjusted the supplier savings down from $91.9 million to $81.6 million. The resulting savings were 4.45 percent of the supplier base; however, the traditional convention for calculating multiyear savings is to express the savings as a percentage of the total dollar cost over the SYP. Doing so would result in a 3.4 percent savings, as Table 7 shows.

Table 7. P&W AA03 Multiyear Savings

	TY$M
Single-Year Procurement	$2,424.725
Multiyear Procurement	$2,332.805
Savings	$91.920
Savings, Adjusted by P&W	$81.600
Savings %	3.4%

It is important to note that P&W required approximately $230 million of EOQ funding in advance of FY2007 to achieve these savings. Given that (1) the current proposed multiyear quantities are considerably less than proposed in AA03 (120 units versus 338 units), (2) the proposed contractual period of performance is shorter than proposed in AA03 (3 years versus 5 years), and (3) the amount of EOQ funding is substantially less than proposed under AA03 ($45 million versus $230 million), we consider the estimated savings of 3.4 percent an upper limit on estimated multiyear savings.

Second, we reviewed multiyear engine programs for which data were available to determine what might be feasible for the F119 program in a multiyear scenario. The programs we examined included the F414-GE-400 engine for the F/A-18E/F aircraft, the F117-PW-100 engine for the C-17 aircraft, the F118-GE-100 engine for the B-2B aircraft, and the T700-GE-401C engine for the UH-60L/MH-60S aircraft. We examined the multiyear budget exhibits for each of these programs and spoke with representatives from the program offices and prime contractors where possible to assess the relative similarities and differences of each candidate program. Table 8 provides a summary of these findings.

Table 8. Engine Multiyear Savings Benchmarks

Program	Savings (%)	Savings (TY$M)	Period of Performance (years)	Quantity Procured	Amount of EOQ Funding (TY$M)
F414-GE-400	2.8%	$51	5	454	$86
F117-PW-100 (MYP-1)	6.0%	$122	7	320	$0
F117-PW-100 (MYP-2)	5.7%	$92	5	267	$0
F118-GE-100	6.0%	N/A	5	428	N/A
T700-GE-401C	12.0%	$45	5	461	N/A
F119-PW-100 (AA03)	3.4%	$81.6	5	338	$230
Average	5.98%	$78.3	5	378	$79

P&W data for the F119 program from AA03 were included as a reference point. From Table 8, the average multiyear contract period of performance was for 5 years compared to the current 3-year multiyear planned for F-22A and the associated multiyear savings ranged from a low of 2.8 percent to a high of 12.0 percent. The average quantity of engines procured was 378 units, compared to 120 engines for the F-22A. The average amount of EOQ funding required, based on the four programs for which we had data, was $79 million, compared to $45 million of EOQ funding for the proposed F-22A multiyear.

This is especially pertinent given that P&W estimated that 99.3 percent of its multiyear savings in AA03 were derived from supplier procurement sources. Though P&W did not require any EOQ funding for either of its F117 multiyear contracts for the C-17, it stated a need of $230 million of EOQ funding for a 5-year multiyear in AA03, and it is likely to need an estimated $75 million to $92 million for a 3-year multiyear contract. Based on this analysis, we developed the following equation to estimate potential multiyear savings:

$$\text{MYP Percent Savings} = 0.35 \times PoP + 0.01175 \times QTY,$$

where:

PoP = the period of performance of the multiyear contract and

QTY = the quantity of engines procured under each multiyear contract.

Although the parameter estimates were not statistically significant at the 0.10 level, their values were generally intuitive. Using a 3-year period of performance for the F119 contract and 138 engines (120 installed engines plus 13 whole spare engines), we get an estimated multiyear savings of approximately 2.7 percent. In light of the multiyear benchmarks above, this estimate of potential savings appears reasonable, given the relatively shorter period of contract performance and the reduced number of units procured.

Third, we compared the data now available from P&W's supplier base to data from AA03 to assess potential multiyear savings. As of the time of this writing, only 8 of the top 40 suppliers had submitted information in response to multiyear savings under a restructured 3-year multiyear contracting arrangement. Most of the supplier responses indicated savings substantially less than what was proposed as savings under AA03. Of the data submitted, savings ranged from 0 percent to 9 percent. Some suppliers that proposed savings at the higher end of the spectrum required significant amounts of EOQ funding in excess of known sources, thus calling into question the achievability of such savings.

Finally, we examined information P&W provided regarding each potential area of savings available in an MYP. P&W consistently ranked estimated savings in the low to very low range (from $0 to $100 thousand per savings category).

In conclusion, estimated multiyear savings of 2.7 percent for a 3-year multiyear procurement of 138 engine systems (120 installed engines plus 13 whole engine spares) appears reasonable in light of our analysis.

5. Administrative Savings

We define administrative costs as those tasks performed to support the development and production of the F-22A aircraft. These primarily include the cost of proposal and contracting tasks normally required for each lot buy. The costs of additional AAs required by the Government are also included. With SYP and three lot buys, three proposal/contracting efforts would be needed; with MYP, essentially only one such set of tasks.

The primary basis for our estimate was the Lockheed Martin/Boeing AA03 report, which included a section on MYP. In that study, the companies considered an MYP to replace five lot buys (Lots 7 through 11). We adjusted the data to reflect our assessment of the differences between the MYP proposed now and the MYP considered in the ICE study.

The AA03 report projected a total MYP savings of $915 million after subtracting out MYP-related PIP investment of $250 million. Of these savings, a total $33 million or 3.6-percent was administrative cost savings. These results are in then-year dollars and result from an MYP for Lots 7 through 11. These savings cover both TPC and PSAS. Administrative savings for P&W, the engine manufacturer, are included in the total engine multiyear savings and, thus, are not part of this analysis.

The major MYP savings described in the report derive from a PIP investment of $250 million netting a savings of $625 million. EOQ savings are $146 million and economic order savings (without Government-provided EOQ funding) are $110 million. Table 9 summarizes these results.

Table 9. Summary of LMA/Boeing AA03 MYP Savings

Source	Savings (TY$M)
Administrative	
TPC	20.6
PSAS	12.7
Total	33.3
MYP PIP Savings	625.0
EOQ	146.1
Economic Orders (non-Gov't-provided EOQ funding)	110.2
Total Savings	$914.6

The report notes that (1) the administrative savings costs for TPC are the costs not incurred for doing lot proposals for Lots 8, 9, 10, and 11 and (2) the PSAS savings are similar proposal savings for LMA and Boeing. Also included are savings from avoiding AA estimates, the requirement for which would be phased-out, according to the report.

Table 10 shows the breakout of the savings by lot. Note that the Lot 7 savings are really those made in the Lot 7 buy-year and represent those costs associated with the Lot 8 proposal, the Lot 8 savings are really for the Lot 9 proposal, and so on. Therefore there are no savings during the last lot buy-year. The much lower costs in Lot 10 for the Lot 11 proposal are primarily for Lockheed supplier proposals. Presumably, the company has made a number of long-lead buys so the proposal effort for the last lot under SYP would be lower and, thus, the MYP savings are lower.

Table 10. LMA/Boeing AA03 MYP Savings by Lot (TY$M)

Administrative Savings by Source	Lot 7	Lot 8	Lot 9	Lot 10	Lot 11	Total
AA03 Data (5 Lots)						
Proposal	6.9	7.1	7.4	3.8	0	25.2
AA Preparation	2.8	2.8	2.0	0.5	0	8.1
Total	9.7	9.9	9.4	4.3	0	33.3
IDA Estimate (3 lots)	0	7	7			14

Savings for the AA estimates are no longer relevant as the Government has already ceased funding this activity. The other major difference in the AA03 estimates compared to the current MYP is that the current MYP is for a 3-year MYP, Lots 7, 8, and 9. Since Lot 7 has yet to be negotiated, the savings would seem to apply to all three lots. However, the Air Force is planning on having the contractor bid on both a SYP for Lot 7 as well as the 3-year MYP. Therefore, the equivalent savings for a 3-lot MYP would be for Lots 8 and 9, or about $14 million. This amount translates into a percentage savings of less than 0.1 percent on total program cost.

D. SUMMARY AND OBSERVATIONS

Table 11 presents a summary of total MYP savings broken out by the cost elements described above. The results are presented for the 56-aircraft constrained case.

Table 11. Summary of MYP Savings by Cost Element, 56-Aircraft Constrained Case

	Contract Category	MYP Savings (TY$M) Total Savings	Per Shipset
Airframe/Subsystems Suppliers (non-EOQ)	TPC	65	1.2
Avionics Suppliers (EOQ)	TPC	61	1.1
Airframe/Subsystems Labor Savings	TPC + PSAS	36	0.6
LMA/Boeing Administrative Savings	TPC + PSAS	14	0.3
Total LMA/Boeing Recurring Flyaway	TPC + PSAS	176	3.1
Engine	P&W	30	0.5
Total Recurring Flyaway	TPC + PSAS + P&W	206	3.7
Below Flyaway	PALS + PSO + P&W	19	
Total Savings		225	4.0

All estimates are at the price level including profit.[11] As almost all EOQ funding described in AA05 is associated with avionics systems, we considered avionics savings to be EOQ savings. Conversely, we considered airframe/subsystem supplier savings to be non-EOQ savings. Labor savings reflect both direct labor and corresponding variable overhead costs. The labor savings include only the support labor categories described above. No credit is given for possible savings in manufacturing labor. Also note that savings are included only for two lots of PSAS, consistent with the current contracting schedule. The labor savings are about one percent of total labor costs. Savings estimates for below flyaway costs reflect the relationship between recurring flyaway cost and initial spares and trainers, with initial spares being the dominant actor.

There are substantial differences between these estimates and those presented in the AA03 analyses. AA03 indicated a per-shipset savings of $6 million for 153 aircraft compared with $4 million for 56 aircraft in the above analyses. However two-thirds of the AA03 savings were attributed to MYP PIP savings. This pattern is consistent with that observed in the historical programs described in Chapter III. Supplier savings are higher in our analyses, while AA03 did not include any labor or below flyaway savings.

In addition to the specific savings enumerated above, other attributes of MYP could help further reduce the Government's cost of acquiring F-22s. We do not attempt to quantify the possible savings here. Instead, we present two general hypotheses.

11 Note that the cost categories here do not align perfectly with those in the MYP exhibits, although the bottom line results are the same.

Our first hypothesis is centered on contractor incentives and was presented with mathematical rigor in David Lee's *The Cost Analyst's Companion.*[12] Lee contrasts the incentives encountered by firms facing contracts where the price is closely coupled with cost versus those where price is loosely coupled with cost. As might be expected, contracts with prices loosely coupled tend to encourage additional effort to reduce costs. Although F-22A contracts are Firm Fixed Price (FFP), and any cost savings achieved within an individual contract provide the contractor with additional profit, costs are reported as they are incurred and are used in the negotiation of follow-on contracts. Thus, cost savings now can result in decreased prices and profits in subsequent lots. F-22A lot negotiations are usually conducted based on data from two lots prior to the lot being negotiated. For example, Lot 6 negotiations were initiated using data including Lot 4 experience. If there is an MYP contact at Lot 7, then any additional cost reductions in Lots 6 through 9 will lead directly to additional profits without any feedback on prices charged for the later lots—the MYP would effectively decouple price from cost. It may be possible for the SPO to take this into account during negotiations to determine the cost basis for the MYP contract.

The second hypothesis relates to the reduction in the prime contractors' revenue and profit risk that would come with a multiyear contract. The portion of the prime contractors' risk associated with the annual determination of budgets and lot quantities would be eliminated. The Government is to some extent acting as an insurer of the prime contractor's profit streams. The reduction in Government flexibility has a direct payback in reduced real costs, as enumerated in Table 11. However, the value the prime contractor gains from the Government reducing the risk or volatility of its profit streams is not captured anywhere in the cost analyses.[13] The prime contractor should be willing to give up some expected profit to reduce the risk of its profit streams.

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12 David A. Lee, *The Cost Analyst's Companion*, Logistics Management Institute, 1997.

13 The value of the risk reduction to the suppliers may be reflected in MYP savings data they have provided.

APPENDIX A:
SCHEDULE OF SIGNIFICANT EVENTS

Table A-1. Schedule of Significant Events

Date	Event and Organization/Offices Present	Location
Jan 11, 2006	Meeting—Lockheed Martin, Boeing, USAF, and IDA	Marietta, GA
Jan 18, 2006	Meeting— OUSD(AT&L), USAF, Lockheed Martin, Boeing, and IDA	Alexandria, VA
Jan 27, 2006	IDA Kickoff	Alexandria, VA
Jan 31, 2006	Meeting—F-22 SPO, IDA	Dayton, OH
Feb 7, 2006	IIPT	Pentagon
Feb 9–10, 2006	Visit—Pratt & Whitney	E. Hartford, CT
Feb 16, 2006	OIPT	Pentagon
Feb 21, 2006	Meeting—F-22 SPO and IDA	Dayton, OH
Feb 27, 2006	Visit—Northrop Grumman	Baltimore, MD
Feb 28, 2006	Visit—LMA, F-22 SPO, and IDA	Ft. Worth, TX
Feb 10, 2006	Visit—BAE Systems	Nashua, NH
Mar 24 2006	Visit—Boeing-St. Louis	St. Louis, MO
Mar 29 2006	Meeting—OUSD(AT&L), F-22 SPO, SAF/AQ, LMA, Boeing, Pratt &Whitney and IDA	Alexandria, VA
Apr 13, 2006	Meeting—OUSD(AT&L), F-22 SPO, SAF/AQ, and IDA	Alexandria, VA
Apr 27, 2006	Meeting—OUSD(AT&L), F-22 SPO, SAF/AQ, and IDA	Alexandria, VA

APPENDIX B:
SCENARIOS 1 AND 2 (UNCONSTRAINED BUDGET ANALYSIS)

Exhibit MYP-1, Multiyear Procurement Criteria

Program: F-22A Raptor (Air Force)

1. Multiyear Procurement Description.

In the scenario described herein, the proposed multiyear procurement (MYP) is fully-funded and covers the purchase of sixty (60) F-22A aircraft and one-hundred twenty (120) F119 engines. These systems will be procured from FY2007 through FY2009 (Lots 7—9) under two separate fixed-priced multiyear contracts: one for the Air Vehicle system (Airframe, Avionics, Logistics, Spares, etc) and one for the Engine. The proposed MYP strategy follows two lots of Production Readiness Test Vehicles (PRTVs), five lots of Low Rate Initial Production (LRIP),and a sixth lot at full rate procurement. To date, the program has delivered sixty-five (65) aircraft and over two-hundred (200) engines.

During the three year multiyear period, sixty aircraft (20, 20, 20) and one hundred twenty engines (40,40,40) will be procured under the unconstrained scenario, with deliveries through 2011. The U.S. Air Force hereby proposes the F-22A Raptor program as a multiyear contract for FY2007-2009 since it satisfies each of the elements of the Title 10, USC 2306b multiyear criteria as described below.

2. Benefit to the Government.

a. Substantial Savings.

Implementation of the proposed multiyear contract will yield significant cost savings/cost avoidance over a series of successive single-year procurements (SYP). Specifically, total savings/cost avoidance attributable to this multiyear strategy from FY2007-2009 are $235M (TY$).

b. Stability of Requirement.

The requirement for the F-22A Raptor program has been consistently validated and remains a high priority for the Air Force. The F-22 Operational Requirements Document (ORD), 304-83-I/II/IIIA, dated 17 February 2004, was approved by the Joint Requirements Oversight Council (JROC) and signed by the Chief of Staff of the Air Force. The Quadrennial Defense Review (QDR) supports restructuring the F-22A program and extending production deliveries through FY2011 with a multiyear acquisition contract to ensure the Department does not have a gap in the production of its 5th-generation tactical fighter aircraft.[1] This aircraft program will replace aging F-15C tactical fighter aircraft and is intended to partially bridge the

[1] The Quadrennial Defense Review Report, dated February 6, 2006, stated a decision to "[r]estructure the F-22A program and extend production through Fiscal Year 2010 with a multiyear acquisition contract, to ensure the Department does not have a gap in 5th generation stealth capabilities."

gap until production begins for the Joint Strike Fighter (F-35) program. The planned procurement rate for the proposed multiyear contract calls for twenty (20, 20, 20) aircraft per year and forty (40, 40, 40) engines per year for Lots 7–9, resulting in a total of sixty (60) aircraft and one-hundred twenty (120) engines. In order to maximize the benefits of economic order quantities, thirteen (13) spare whole engines will be procured during the multiyear period. Whole spare engine quantities are not shown on the multiyear exhibits as they will be procured with BP-16 procurement funding. Engineering and Manufacturing Development (EMD) and associated Developmental Testing (DT), Initial Operational Test & Evaluation (IOT&E), and Follow-on Operational Test and Evaluation (FOT&E)—Phase 1 activities for the F-22A are substantially complete. To date, the program has delivered sixty-five (65) aircraft and over two-hundred (200) engines.

c. Stability of Funding.

The Air Force has committed to provide a stable funding stream for the F-22A Raptor in the FY2007 President's Budget. This commitment was reaffirmed by the DoD in the QDR decision to continue the F-22A program. These documents emphasize the criticality of the F-22A Raptor to overall DoD planning and demonstrate the Department's commitment to fund this weapon system at the proposed multiyear quantities.

d. Stable Design.

The EMD phase for the F-22A is complete and FOT&E was completed in 2005. The aircraft procured during the multiyear period will be delivered in the Lot 7 configuration with some differences in avionics and subsystems planned to accommodate modernization and parts obsolescence programs. The full rate production lot immediately preceding the multiyear procurement will serve as the engineering baseline for Lots 7—9. Changes from lot to lot are not expected to result in significant structural changes to the aircraft or substantial changes to the F119 engine. Multiyear programs have been approved under similar circumstances for candidate programs with anticipated block upgrades for avionics enhancements, including the F/A-18E/F and the UH-60 programs. To date, sixty-five (65) aircraft and over two-hundred (200) F119 engines have been built and delivered, with components completed for over one-hundred (100) aircraft, representing production from EMD through Lot 5. The manufacturing technologies that provide such product features as low observability and super cruise without afterburner have been proven and are stable, and Full Rate Production (FRP) has been approved. Finally, the F-22A flight experience exceeds 14,000 flying hours, including EMD, training, and operational flying. Initial Operational Capability was declared in December 2005, and an operational squadron has been established at Langley Air Force Base, Virginia.

e. Realistic Cost Estimates.

The estimated cost and the anticipated cost savings/cost avoidance for the F-22A program are realistic. Both the single-year and the multiyear contract estimates for the F-22A program are based on historical cost data for EMD through Lot 4 and are based on proven cost-estimating techniques. The program's cost estimates also have been closely scrutinized by the OSD CAIG, the Air Force Cost Analysis Agency (AFCAA), and, most recently, by the Institute for Defense Analyses (IDA) in a congressionally mandated Independent Cost Estimate (ICE) conducted during FY2004–2005. Although large differences in cost estimates were evident early in the program, recent estimates of the remaining production have tended to converge.

f. National Security.

The QDR emphasizes the criticality of the F-22A to the overall National Security Strategy. The combination of stealth, super cruise, maneuverability, integrated avionics, and improved reliability and supportability of the F-22A represents a significant improvement in war fighting capabilities and will ensure U.S. air dominance. As stated in the QDR, extending production with the use of a multiyear contract will promote national security interests by ensuring that the Department maintains the capability to produce a 5th-generation tactical aircraft until production begins for the Joint Strike Fighter (F-35) aircraft.

3. Sources of Savings.

	$ in Millions	
	Air Vehicle[2]	Engine
Inflation	$ -	$ -
Vendor Procurement	$ 144.7	$ 31.5
Manufacturing	$ -	$ 0.1
Design/Engineering	$ 38.4	$ -
Tool Design	$ -	$ -
Support Equipment	$ -	$ -
Other	$ 20.7	$ -
Total Savings[3]	$ 203.8	$ 31.6

[2] Air Vehicle includes prime contractor support labor, initial spares, and other support items.

[3] Savings from the SYP have already been removed from the budget and are therefore considered cost avoidance to having a single-year procurement.

4. Advantages of the MYP.

The multiyear contract will allow savings primarily through vendor procurement and design/engineering sources. Regarding vendor procurement savings, the multiyear contract will allow the placement of long term supplier arrangements/commitments, reduced administrative burden of placing a series of purchase orders/contracts, and an overall more predictable procurement strategy. The multiyear procurement will allow the placement of Economic Order Quantity (EOQ) procurements with key suppliers, thereby reducing processing costs, minimum order fees, production line set up costs, and pre-production costs. Given the longer procurement horizon associated with a three year multiyear, there is also an increased possibility of vendor-funded cost reduction initiatives. Additionally, the potential for competition at third tier suppliers is enhanced. Regarding design and engineering savings, Class I Engineering Change Proposals (ECPs) are generally excluded in a multiyear scenario. Due to the stable configuration of the multiyear program, design and engineering savings will be realized in areas including configuration management, sustaining engineering, data maintenance, customer coordination, and in engineering and manufacturing product liaison. Finally, locking into three years of firm business is an important aspect for all participating contractors in establishing their future business rates.

5. Impact on Industrial Base.

Implementation of this proposed multiyear contract will yield a favorable impact on the defense industrial base. The stability afforded by a multiyear procurement is intended to allow the prime contractors to enter into longer-term agreements with suppliers, to provide maximum incentive for prime and subcontractor investments in process improvements, to provide maximum incentive for supplier investments in cost reduction initiatives, to provide maximum incentive for improvement in vendor skills and workforce training, and to help stabilize both prime and subcontractor operations during the multiyear period. Multiyear procurement for the F-22A program will also provide a bridge in the production of 5th generation fighter capabilities until the Joint Strike Fighter (F-35) becomes available. This is especially pertinent given the number of common vendors between F-22A and the F-35 and given the relative contribution of each of these major defense programs to the overall defense industrial base.

6. Multiyear Procurement Summary.

	Air Vehicle		Engine	
	Annual Contracts	Multiyear Contract	Annual Contracts	Multiyear Contract
Quantity	60	60	120	120
Total Contract Price	$ 7,765.0	$ 7,561.2	$ 1,169.8	$ 1,138.2
Cancellation Ceiling (highest point)				
Funded	n/a	$ --	n/a	$ --
Unfunded (FY07)	n/a	$ 201.2	n/a	$ --
$ Cost Avoidance over Annual	n/a	$ 203.8	n/a	$ 31.6
% Cost Avoidance over Annual	n/a	2.6%	n/a	2.7%

Exhibit MYP-2 , Total Program Funding Plan

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor)

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	Total
Procurement Quantity		20	20	20						60
Annual Procurement										
Gross Cost		$ 4,097.0	$ 3,400.6	$ 3,258.2						$ 10,755.8
Less Prior Year AP		(384.8)	(387.4)	(366.6)						(1,138.8)
Net Procurement (P-1)		3,712.2	3,013.2	2,891.6						9,616.9
Plus Current Year AP	384.8	387.4	366.6	-						1,138.8
Weapon Sys	384.8	4,099.6	3,379.8	2,891.6						10,755.8
Multiyear Procurement										
Gross Cost		$ 4,328.6	$ 3,024.9	$ 3,166.8						$ 10,520.4
Less Prior Year AP		(384.8)	(687.4)	(366.6)						(1,438.8)
Net Procurement (P-1)		3,943.8	2,337.5	2,800.2						9,081.6
Advance Procurement										-
For 2006	384.8									384.8
For 2007		687.4								687.4
For 2008			366.6							366.6
For 2009				-						-
Total AP	384.8	687.4	366.6	-						1,438.8
Weapon Sys	384.8	4,631.2	2,704.2	2,800.2						10,520.4
MYP Savings (TY$M)	$ -	$ (531.7)	$ 675.6	$ 91.4						$ 235.4
Cancellation Ceiling - Funded										
Cancellation Ceiling - Unfunded		201.2	100.6	50.3					MAX =	$ 201.2
Outlays										
Annual (TY$M)	$ 108.9	$ 1,320.6	$ 2,739.1	$ 3,031.6	$ 2,122.1	$ 860.7	$ 358.0	$ 142.3	$ 72.3	$ 10,755.8
Multiyear (TY$M)	108.9	1,471.1	2,769.6	2,825.0	1,990.2	810.1	351.9	123.6	70.0	10,520.4
Savings	-	(150.5)	(30.5)	206.6	131.9	50.6	6.2	18.7	2.3	235.4

FY07 assumes $110M Above Threshold Reprogramming (ATR) from regular procurement to Advance Procurement (AP).
Values provided by SPO based on a full-funding approach to acquiring a total of 60 F-22 a/c at a rate of 20 a/c per year.

Exhibit MYP-3, Total Contract Funding Plan

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Air Vehicle

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	Total
Procurement Qty	0	20	20	20						60
Annual Procurement										
Gross Cost		$2,414.4	$2,574.7	$2,775.9						$7,765.0
Less Prior Year AP		(381.0)	(384.3)	(362.5)						(1,127.8)
Net Procurement (P-1)		2,033.4	2,190.4	2,413.3						6,637.2
Plus Current Year AP	381.0	384.3	362.5	-						1,127.8
Contract Price	381.0	2,417.7	2,553.0	2,413.3						7,765.0
Multiyear Procurement										
Gross Cost		$2,356.6	$2,509.6	$2,695.0						$7,561.2
Less Prior Year AP		(381.0)	(639.3)	(362.5)						(1,382.8)
Net Procurement (P-1)		1,975.6	1,870.3	2,332.5						6,178.4
Advance Procurement										-
For FY2006	381.0									381.0
For FY2007		639.3								639.3
For FY2008			362.5							362.5
For FY2009				-						
Total	381.0	639.3	362.5	-						1,382.8
Contract Price	381.0	2,614.9	2,232.8	2,332.5						7,561.2
Multiyear Savings										
MYP Savings (TY$M)	$ -	$ (197.2)	$ 320.1	$ 80.8						$ 203.8
MYP Savings (%)		-8.2%	12.5%	3.4%						2.6%
Cancellation Ceiling - Funded										
Cancellation Ceiling - Unfunded		$ 201.2	$ 100.6	$ 50.3					MAX =	$ 201.2
Outlays										
Annual (TY$M)	$ 107.8	$ 843.1	$1,803.1	$2,231.7	$1,656.2	$ 682.4	$ 268.4	$ 112.1	$ 60.3	$7,765.0
Multiyear (TY$M)	107.8	898.9	1,794.7	2,112.8	1,574.5	650.1	261.6	102.5	58.3	7,561.2
Savings	-	(55.8)	8.4	118.9	81.7	32.2	6.7	9.6	2.0	203.8

FY07 assumes $110M Above Threshold Reprogramming (ATR) from regular procurement to Advance Procurement (AP).

Exhibit MYP-4, Present Value Analysis

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Air Vehicle

	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	Total
Annual Proc										
TY$M Outlay	107.823	843.085	1803.059	2231.692	1656.200	682.358	268.369	112.091	60.334	7765.011
BY06$M Outlay	107.823	857.954	1856.416	2332.783	1746.697	720.689	282.188	118.033	64.289	8086.872
PV (BY06$M)	107.823	835.805	1761.803	2156.738	1573.192	632.344	241.204	98.286	52.151	7459.346
Multiyear Proc										
TY$M Outlay	107.823	898.889	1794.691	2112.786	1574.480	650.132	261.641	102.471	58.312	7561.227
BY06$M Outlay	107.823	914.971	1845.892	2207.381	1660.397	686.636	274.944	107.959	62.135	7868.139
PV (BY06$M)	107.823	891.350	1751.816	2040.800	1495.465	602.465	235.012	89.897	50.404	7265.032
Difference										
TY$M Outlay	0.000	-55.804	8.367	118.906	81.720	32.226	6.728	9.620	2.021	203.784
BY06$M Outlay	0.000	-57.017	10.524	125.402	86.299	34.053	7.244	10.074	2.154	218.733
PV (BY06$M)	0.000	-55.545	9.987	115.938	77.727	29.878	6.192	8.389	1.747	194.314
MYP Savings (PV$)	0.000	-55.545	9.987	115.938	77.727	29.878	6.192	8.389	1.747	194.314
MYP Savings (%)	0.0%	-6.6%	0.6%	5.4%	4.9%	4.7%	2.6%	8.5%	3.4%	2.605%

Remarks

Constant year dollars in FY06 dollars using OSD inflation indices (Air Force Aircraft Procurement-Other, issued 19 Jan 2006).
Present value analysis based on a 2.65% real discount rate per OMB circular A-94 dated January 2006.

Exhibit MYP-3, Total Contract Funding Plan

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Engine

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	Total
Procurement Qty	0	40	40	40						120
Annual Procurement										
Gross Cost	$ -	$ 389.9	$ 389.4	$ 390.5						$ 1,169.8
Less Prior Year AP		(3.8)	(3.1)	(4.1)						(11.0)
Net Procurement (P-1)		386.1	386.3	386.4						1,158.8
Plus Current Year AP	3.8	3.1	4.1	-						11.0
Contract Price	3.8	389.2	390.4	386.4						1,169.8
Multiyear Procurement										
Gross Cost	$ -	$ 379.4	$ 378.9	$ 380.0						$ 1,138.2
Less Prior Year AP		(3.8)	(48.1)	(4.1)						(56.0)
Net Procurement (P-1)		375.6	330.8	375.9						1,082.2
Advance Procurement										-
For 2006	3.8									3.8
For 2007		48.1								48.1
For 2008			4.1							4.1
For 2009				-						-
Total	3.8	48.1	4.1	-						56.0
Contract Price	3.8	423.7	334.9	375.9						1,138.2
Multiyear Savings										
MYP Savings (TY$M)	$ -	$ (34.5)	$ 55.5	$ 10.5						$ 31.6
MYP Savings (%)		-8.9%	14.2%	2.7%						2.7%
Cancellation Ceiling - Funded										
Cancellation Ceiling - Unfunded		$ -	$ -	$ -						$ -
Outlays										
Annual (TY$M)	$ 1.1	$ 111.7	$ 273.5	$ 346.3	$ 260.7	$ 106.7	$ 42.7	$ 17.5	$ 9.7	$ 1,169.8
Multiyear (TY$M)	1.1	121.5	272.2	326.8	248.0	101.7	41.7	15.9	9.4	1,138.2
Savings	-	(9.8)	1.3	19.6	12.7	4.9	0.9	1.6	0.3	31.6

Exhibit MYP-4, Present Value Analysis

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Engine

	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	Total
Annual Proc										
TY$M Outlay	$ 1.075	$ 111.725	$ 273.493	$ 346.333	$ 260.673	$ 106.669	$ 42.653	$ 17.488	$ 9.660	$ 1,169.769
BY06$M Outlay	1.075	114.119	281.829	362.194	275.013	112.755	44.851	18.419	10.293	1,220.548
PV (BY06$M)	1.075	111.173	267.465	334.861	247.695	98.933	38.337	15.337	8.350	1,123.226
Multiyear Proc										
TY$M Outlay	$ 1.075	$ 121.481	$ 272.158	$ 326.750	$ 247.970	$ 101.747	$ 41.719	$ 15.889	$ 9.396	$ 1,138.185
BY06$M Outlay	1.075	124.087	280.122	341.550	261.611	107.559	43.842	16.746	10.012	1,186.606
PV (BY06$M)	1.075	120.883	265.846	315.775	235.625	94.374	37.475	13.944	8.122	1,093.119
Difference										
TY$M Outlay	$ -	$ (9.756)	$ 1.335	$ 19.583	$ 12.703	$ 4.922	$ 0.934	$ 1.599	$ 0.264	$ 31.584
BY06$M Outlay	-	(9.968)	1.706	20.644	13.402	5.196	1.008	1.673	0.281	33.942
PV (BY06$M)	-	(9.711)	1.620	19.086	12.071	4.559	0.862	1.393	0.228	30.107
MYP Savings (PV$)	$ -	$ (9.711)	$ 1.620	$ 19.086	$ 12.071	$ 4.559	$ 0.862	$ 1.393	$ 0.228	$ 30.107
MYP Savings (%)	0.0%	-8.7%	0.6%	5.7%	4.9%	4.6%	2.2%	9.1%	2.7%	2.680%

Remarks

Constant year dollars in FY06 dollars using OSD inflation indices (Air Force Aircraft Procurement-Other, issued 19 Jan 2006).
Present value analysis based on a 2.65% real discount rate per OMB circular A-94 dated January 2006.

APPENDIX C:
SCENARIOS 3 AND 4 (CONSTRAINED BUDGET ANALYSIS)

Exhibit MYP-1, Multiyear Procurement Criteria

Program: F-22A Raptor (Air Force)

1. Multiyear Procurement Description.

In the scenario described herein, the proposed multiyear procurement (MYP) is incrementally-funded and covers the purchase of fifty-six (56) F-22A aircraft and one-hundred twelve (112) F119 engines. These systems will be procured from FY2007 through FY2010 (Lots 7—9) under two separate fixed-priced multiyear contracts: one for the Air Vehicle system (Airframe, Avionics, Logistics, Spares, etc) and one for the Engine. The proposed MYP strategy follows two lots of Production Readiness Test Vehicles (PRTVs), five lots of Low Rate Initial Production (LRIP),and a sixth lot at full rate procurement. To date, the program has delivered sixty-five (65) aircraft and over two-hundred (200) engines.

During the four year multiyear period, fifty-six aircraft (0, 20, 20, 16) and one hundred twelve engines (0, 40, 40, 32) will be procured under the constrained scenario, with deliveries through 2011. The U.S. Air Force hereby proposes the F-22A Raptor program as a multiyear contract for FY2007-2010 since it satisfies each of the elements of the Title 10, USC 2306b multiyear criteria as described below.

2. Benefit to the Government.

a. Substantial Savings.

Implementation of the proposed multiyear contract will yield significant cost savings/cost avoidance over a series of successive single-year procurements (SYP). Specifically, total savings/cost avoidance attributable to this multiyear strategy from FY2007-2010 are $225M (TY$).

b. Stability of Requirement.

The requirement for the F-22A Raptor program has been consistently validated and remains a high priority for the Air Force. The F-22 Operational Requirements Document (ORD), 304-83-I/II/IIIA, dated 17 February 2004, was approved by the Joint Requirements Oversight Council (JROC) and signed by the Chief of Staff of the Air Force. The Quadrennial Defense Review (QDR) supports restructuring the F-22A program and extending production deliveries through FY2011 with a multiyear acquisition contract to ensure the Department does not have a gap in the production of its 5th-generation tactical fighter aircraft.[1] This aircraft program will replace aging F-15C tactical fighter aircraft and is intended to partially bridge the

[1] The Quadrennial Defense Review Report, dated February 6, 2006, stated a decision to "[r]estructure the F-22A program and extend production through Fiscal Year 2010 with a multiyear acquisition contract, to ensure the Department does not have a gap in 5th generation stealth capabilities."

gap until production begins for the Joint Strike Fighter (F-35) program. The planned procurement rate for the proposed multiyear contract calls for approximately twenty aircraft per year (0, 20, 20, 16) and approximately forty engines per year (0, 40, 40, 32) for Lots 7–9, resulting in a total of fifty-six (56) aircraft and one-hundred twelve (112) engines. In order to maximize the benefits of economic order quantities, thirteen (13) spare whole engines will be procured during the multiyear period. Whole spare engine quantities are not shown on the multiyear exhibits as they will be procured with BP-16 procurement funding. Engineering and Manufacturing Development (EMD) and associated Developmental Testing (DT), Initial Operational Test & Evaluation (IOT&E), and Follow-on Operational Test and Evaluation (FOT&E)—Phase 1 activities for the F-22A are substantially complete. To date, the program has delivered sixty-five (65) aircraft and over two-hundred (200) engines.

c. Stability of Funding.

The Air Force has committed to provide a stable funding stream for the F-22A Raptor in the FY2007 President's Budget. This commitment was reaffirmed by the DoD in the QDR decision to continue the F-22A program. These documents emphasize the criticality of the F-22A Raptor to overall DoD planning and demonstrate the Department's commitment to fund this weapon system at the proposed multiyear quantities.

d. Stable Design.

The EMD phase for the F-22A is complete and FOT&E was completed in 2005. The aircraft procured during the multiyear period will be delivered in the Lot 7 configuration with some differences in avionics and subsystems planned to accommodate modernization and parts obsolescence programs. The full rate production lot immediately preceding the multiyear procurement will serve as the engineering baseline for Lots 7—9. Changes from lot to lot are not expected to result in significant structural changes to the aircraft or substantial changes to the F119 engine. Multiyear programs have been approved under similar circumstances for candidate programs with anticipated block upgrades for avionics enhancements, including the F/A-18E/F and the UH-60 programs. To date, sixty-five (65) aircraft and over two-hundred (200) F119 engines have been built and delivered, with components completed for over one-hundred (100) aircraft, representing production from EMD through Lot 5. The manufacturing technologies that provide such product features as low observability and super cruise without afterburner have been proven and are stable, and Full Rate Production (FRP) has been approved. Finally, the F-22A flight experience exceeds 14,000 flying hours, including EMD, training, and operational flying. Initial Operational Capability was declared in December 2005, and an operational squadron has been established at Langley Air Force Base, Virginia.

e. Realistic Cost Estimates.

The estimated cost and the anticipated cost savings/cost avoidance for the F-22A program are realistic. Both the single-year and the multiyear contract estimates for the F-22A program are based on historical cost data for EMD through Lot 4 and are based on proven cost-estimating techniques. The program's cost estimates also have been closely scrutinized by the OSD CAIG, the Air Force Cost Analysis Agency (AFCAA), and, most recently, by the Institute for Defense Analyses (IDA) in a congressionally mandated Independent Cost Estimate (ICE) conducted during FY2004–2005. Although large differences in cost estimates were evident early in the program, recent estimates of the remaining production have tended to converge.

f.. National Security.

The QDR emphasizes the criticality of the F-22A to the overall National Security Strategy. The combination of stealth, super cruise, maneuverability, integrated avionics, and improved reliability and supportability of the F-22A represents a significant improvement in war fighting capabilities and will ensure U.S. air dominance. As stated in the QDR, extending production with the use of a multiyear contract will promote national security interests by ensuring that the Department maintains the capability to produce a 5th-generation tactical aircraft until production begins for the Joint Strike Fighter (F-35) aircraft.

3. Sources of Savings.

	$ in Millions	
	Air Vehicle[2]	Engine
Inflation	$ -	$ -
Vendor Procurement	$ 138.7	$ 29.5
Manufacturing	$ -	$ 0.1
Design/Engineering	$ 36.8	$ -
Tool Design	$ -	$ -
Support Equipment	$ -	$ -
Other	$ 19.8	$ -
Total Savings[3]	$ 195.3	$ 29.6

[2] Air Vehicle includes prime contractor support labor, initial spares, and other support items.

[3] Savings from the SYP have already been removed from the budget and are therefore considered cost avoidance to having a single-year procurement.

4. Advantages of the MYP.

The multiyear contract will allow savings primarily through vendor procurement and design/engineering sources. Regarding vendor procurement savings, the multiyear contract will allow the placement of long term supplier arrangements/commitments, reduced administrative burden of placing a series of purchase orders/contracts, and an overall more predictable procurement strategy. The multiyear procurement will allow the placement of Economic Order Quantity (EOQ) procurements with key suppliers, thereby reducing processing costs, minimum order fees, production line set up costs, and pre-production costs. Given the longer procurement horizon associated with a three year multiyear, there is also an increased possibility of vendor-funded cost reduction initiatives. Additionally, the potential for competition at third tier suppliers is enhanced. Regarding design and engineering savings, Class I Engineering Change Proposals (ECPs) are generally excluded in a multiyear scenario. Due to the stable configuration of the multiyear program, design and engineering savings will be realized in areas including configuration management, sustaining engineering, data maintenance, customer coordination, and in engineering and manufacturing product liaison. Finally, locking into three years of firm business is an important aspect for all participating contractors in establishing their future business rates.

5. Impact on Industrial Base.

Implementation of this proposed multiyear contract will yield a favorable impact on the defense industrial base. The stability afforded by a multiyear procurement is intended to allow the prime contractors to enter into longer-term agreements with suppliers, to provide maximum incentive for prime and subcontractor investments in process improvements, to provide maximum incentive for supplier investments in cost reduction initiatives, to provide maximum incentive for improvement in vendor skills and workforce training, and to help stabilize both prime and subcontractor operations during the multiyear period. Multiyear procurement for the F-22A program will also provide a bridge in the production of 5th generation fighter capabilities until the Joint Strike Fighter (F-35) becomes available. This is especially pertinent given the number of common vendors between F-22A and the F-35 and given the relative contribution of each of these major defense programs to the overall defense industrial base.

6. Multiyear Procurement Summary.

	Air Vehicle		Engine	
	Annual Contracts	Multiyear Contract	Annual Contracts	Multiyear Contract
Quantity	56	56	112	112
Total Contract Price	$ 7,336.0	$ 7,140.7	$ 1,095.6	$ 1,066.0
Cancellation Ceiling (highest point)				
Funded	n/a	$ --	n/a	$ --
Unfunded (FY07)	n/a	$ 201.2	n/a	$ --
$ Cost Avoidance over Annual	n/a	$ 195.3	n/a	$ 29.6
% Cost Avoidance over Annual	n/a	2.7%	n/a	2.7%

Exhibit MYP-2 , Total Program Funding Plan

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor)

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Procurement Quantity		0	20	20	16						56
Annual Procurement											
Gross Cost		$ 2,049.5	$ 3,209.6	$ 2,906.8	$ 1,722.7						$ 9,888.6
Less Prior Year AP		(569.2)	(277.4)	(366.6)	-						(1,213.2)
Net Procurement (P-1)		1,480.3	2,932.2	2,540.2	1,722.7						8,675.4
Plus Current Year AP	569.2	277.4	366.6	-	-						1,213.2
Weapon Sys	569.2	1,757.7	3,298.8	2,540.2	1,722.7						9,888.6
Multiyear Procurement											
Gross Cost		$ 2,565.9	$ 2,625.0	$ 2,831.5	$ 1,641.3						$ 9,663.7
Less Prior Year AP		(569.2)	(477.4)	(366.6)	-						(1,413.2)
Net Procurement (P-1)		1,996.7	2,147.6	2,464.9	1,641.3						8,250.5
Advance Procurement											-
For 2006	569.2										569.2
For 2007		477.4									477.4
For 2008			366.6								366.6
For 2009				-							-
Total AP	569.2	477.4	366.6	-	-						1,413.2
Weapon Sys	569.2	2,474.1	2,514.2	2,464.9	1,641.3						9,663.7
MYP Savings (TY$M)	$ -	$ (716.4)	$ 784.6	$ 75.3	$ 81.4						$ 224.9
Cancellation Ceiling - Funded											
Cancellation Ceiling - Unfunded		201.2	100.6	50.3	-				MAX =		$ 201.2
Outlays											
Annual (TY$M)	$ 161.1	$ 734.8	$ 1,774.7	$ 2,465.4	$ 2,299.2	$ 1,464.8	$ 602.3	$ 245.2	$ 98.0	$ 43.1	$ 9,888.6
Multiyear (TY$M)	161.1	937.5	1,851.4	2,253.1	2,142.2	1,379.9	584.2	218.8	94.4	41.0	9,663.7
Savings	-	(202.7)	(76.7)	212.4	157.0	84.9	18.1	26.4	3.5	2.0	224.9

Based on FY07 President's Budget.

Exhibit MYP-3, Total Contract Funding Plan

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Air Vehicle

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Procurement Qty	0	0	20	20	16						56
Annual Procurement											
Gross Cost		$1,036.5	$1,006.9	$2,637.6	$2,655.0						$7,336.0
Less Prior Year AP		(565.4)	(274.3)	(362.5)	-						(1,202.2)
Net Procurement (P-1)		471.1	732.6	2,275.1	2,655.0						6,133.8
Plus Current Year AP	565.4	274.3	362.5	-	-						1,202.2
Contract Price	565.4	745.4	1,095.1	2,275.1	2,655.0						7,336.0
Multiyear Procurement											
Gross Cost		$1,722.9	$ 262.9	$2,572.8	$2,582.1						$7,140.7
Less Prior Year AP		(565.4)	(444.3)	(362.5)	-						(1,372.2)
Net Procurement (P-1)		1,157.5	(181.4)	2,210.3	2,582.1						5,768.5
Advance Procurement											-
For FY2006	565.4										565.4
For FY2007		444.3									444.3
For FY2008			362.5								362.5
For FY2009				-							
Total	565.4	444.3	362.5	-	-						1,372.2
Contract Price	565.4	1,601.8	181.1	2,210.3	2,582.1						7,140.7
Multiyear Savings											
MYP Savings (TY$M)	$ -	$ (856.4)	$ 914.1	$ 64.8	$ 72.9						$ 195.3
MYP Savings (%)		-114.9%	83.5%	2.8%	2.7%						2.7%
Cancellation Ceiling - Funded											
Cancellation Ceiling - Unfunded		$ 201.2	$ 100.6	$ 50.3	$ -				MAX=		$ 201.2
Outlays											
Annual (TY$M)	$ 160.0	$ 446.7	$ 728.2	$1,278.9	$1,967.9	$1,639.6	$ 692.9	$ 245.5	$ 110.0	$ 66.4	$7,336.0
Multiyear (TY$M)	160.0	689.1	826.6	1,042.1	1,802.2	1,554.6	677.9	216.6	106.9	64.6	7,140.7
Savings	-	(242.4)	(98.4)	236.8	165.7	85.0	14.9	28.9	3.1	1.8	195.3

Exhibit MYP-4, Present Value Analysis

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Air Vehicle

	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Annual Proc											
TY$M Outlay	160.008	446.727	728.192	1278.896	1967.894	1639.612	692.862	245.453	109.976	66.374	$ 7,335.994
BY06$M Outlay	160.008	451.311	748.437	1344.056	2106.489	1769.059	748.424	264.854	118.390	72.231	7783.260
PV (BY06$M)	160.008	439.660	710.293	1242.626	1897.245	1552.199	639.726	220.544	96.038	57.081	7015.421
Multiyear Proc											
TY$M Outlay	160.008	689.090	826.635	1042.111	1802.241	1554.621	677.931	216.568	106.898	64.552	$ 7,140.655
BY06$M Outlay	160.008	698.942	843.381	1093.014	1930.895	1678.365	731.665	234.472	115.077	70.248	7556.067
PV (BY06$M)	160.008	680.898	800.398	1010.529	1739.093	1472.623	625.401	195.244	93.351	55.514	6833.060
Difference											
TY$M Outlay	0.000	-242.363	-98.443	236.785	165.654	84.991	14.931	28.885	3.078	1.822	$ 195.339
BY06$M Outlay	0.000	-247.630	-94.944	251.042	175.595	90.693	16.760	30.383	3.313	1.983	227.193
PV (BY06$M)	0.000	-241.238	-90.105	232.097	158.152	79.576	14.325	25.300	2.687	1.567	182.361
MYP Savings (PV$)	0.000	-241.238	-90.105	232.097	158.152	79.576	14.325	25.300	2.687	1.567	$ 180.794
MYP Savings (%)	0.0%	-54.9%	-12.7%	18.7%	8.3%	5.1%	2.2%	11.5%	2.8%	2.7%	2.577%

Remarks

Constant year dollars in FY06 dollars using OSD inflation indices (Air Force Aircraft Procurement-Other, issued 19 Jan 2006).
Present value analysis based on a 2.65% real discount rate per OMB circular A-94 dated January 2006.

Exhibit MYP-3, Total Contract Funding Plan

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Engine

TY$M	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Procurement Qty	0	0	40	40	32						112
Annual Procurement											
Gross Cost	$ -	$ 147.0	$ 242.9	$ 389.4	$ 316.3						$ 1,095.6
Less Prior Year AP		(3.8)	(3.1)	(4.1)	-						(11.0)
Net Procurement (P-1)		143.2	239.8	385.3	316.3						1,084.6
Plus Current Year AP	3.8	3.1	4.1	-	-						11.0
Contract Price	3.8	146.3	243.9	385.3	316.3						1,095.6
Multiyear Procurement											
Gross Cost	$ -	$ 147.0	$ 232.4	$ 378.9	$ 307.7						$ 1,066.0
Less Prior Year AP		(3.8)	(33.1)	(4.1)	-						(41.0)
Net Procurement (P-1)		143.2	199.3	374.8	307.7						1,025.0
Advance Procurement											-
For 2006	3.8										3.8
For 2007		33.1									33.1
For 2008			4.1								4.1
For 2009				-							-
Total	3.8	33.1	4.1	-	-						41.0
Contract Price	3.8	176.3	203.4	374.8	307.7						1,066.0
Multiyear Savings											
MYP Savings (TY$M)	$ -	$ (30.0)	$ 40.5	$ 10.5	$ 8.5						$ 29.6
MYP Savings (%)		-20.5%	16.6%	2.7%	2.7%						2.7%
Cancellation Ceiling - Funded											
Cancellation Ceiling - Unfunded		$ -	$ -	$ -	$ -						$ -
Outlays											
Annual (TY$M)	$ 1.1	$ 43.0	$ 130.7	$ 238.8	$ 306.1	$ 224.0	$ 93.7	$ 34.4	$ 16.0	$ 7.9	$ 1,095.6
Multiyear (TY$M)	1.1	51.5	131.8	224.6	293.5	216.4	91.3	32.6	15.5	7.7	1,066.0
Savings	-	(8.5)	(1.0)	14.2	12.6	7.6	2.4	1.8	0.4	0.2	29.6

Exhibit MYP-4, Present Value Analysis

Date April 2006

Appropriation (Treasury) Code/CC/BA/BSA/Item Control No
Aircraft Procurement, Air Force, Budget Activity 01, Combat Aircraft, Item No. 03

P-1 Line Item Nomenclature
F-22 (Raptor) Engine

	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	Total
Annual Proc											
TY$M Outlay	$ 1.075	$ 42.988	$ 130.750	$ 238.781	$ 306.097	$ 223.969	$ 93.673	$ 34.361	$ 15.958	$ 7.907	$ 1,095.559
BY06$M Outlay	1.075	43.887	135.080	250.960	326.750	241.158	100.909	36.946	17.147	8.605	1,162.517
PV (BY06$M)	1.075	42.754	128.196	232.021	294.293	211.596	86.253	30.765	13.910	6.800	1,047.663
Multiyear Proc											
TY$M Outlay	$ 1.075	$ 51.478	$ 131.791	$ 224.606	$ 293.546	$ 216.376	$ 91.306	$ 32.583	$ 15.524	$ 7.694	$ 1,065.979
BY06$M Outlay	1.075	52.562	135.893	235.978	313.405	233.019	98.335	35.061	16.681	8.372	1,130.383
PV (BY06$M)	1.075	51.205	128.968	218.170	282.274	204.454	84.054	29.195	13.532	6.616	1,019.543
Difference											
TY$M Outlay	$ -	$ (8.490)	$ (1.041)	$ 14.175	$ 12.551	$ 7.593	$ 2.366	$ 1.779	$ 0.434	$ 0.213	$ 29.580
BY06$M Outlay	-	(8.675)	(0.813)	14.982	13.344	8.140	2.573	1.885	0.466	0.232	32.135
PV (BY06$M)	-	(8.451)	(0.772)	13.851	12.019	7.142	2.200	1.570	0.378	0.184	28.120
MYP Savings (PV$)	$ -	$ (8.451)	$ (0.772)	$ 13.851	$ 12.019	$ 7.142	$ 2.200	$ 1.570	$ 0.378	$ 0.184	$ 27.937
MYP Savings (%)	0.0%	-19.8%	-0.6%	6.0%	4.1%	3.4%	2.6%	5.1%	2.7%	2.7%	2.7%

Remarks

Constant year dollars in FY06 dollars using OSD inflation indices (Air Force Aircraft Procurement-Other, issued 19 Jan 2006).
Present value analysis based on a 2.65% real discount rate per OMB circular A-94 dated January 2006.

APPENDIX D.
AVIONICS BASELINE FOR MYP SAVINGS ESTIMATE

We defined the avionics system that will be used as a baseline for MYP analysis by:

- Beginning with Lot 6 as the baseline
- Dividing the baseline by development Spiral, by Group (A and B) and by subsystem
- Determined what should be included or excluded from the baseline
- Considering excluded items to be ECPs to the baseline for purpose of estimating MYP savings

The baseline for estimating the MYP savings is the Lot 6 avionics configuration, as defined in the following table. As noted above, items that are excluded are considered for this purpose to be ECPs.

Table D-1. Lot 6 Avionics Configuration

	Included in Lot 6 MYP Baseline:	Excluded from Lot 6 MYP Baseline:
Spiral 2		
CIP2K2	All	None
PICC-2	All	None
CNI	All	None
Displays	All	None
MLD	All	None
Power supplies	All	None
DMVR	All	None
Radar I/O	All	None
Spiral 3A		
Radar 4G	Group A and B	MIF Board, GINs, I/O
DMVR/EDTC (30G)	Group A	Group B
CNI 2010 Processor	Group A	Group B
TTNT	None	All (outside funding)
ECIP	Group A	Group B
Display Processor	Group A	Group B
Digital EW	Group A and B	None
Spiral 3B-1		
ESMS/PICC-3	Group A	Group B
EDTC (60G)	None	All
PICC-2 Module AGCAS	None	All
DCE Modules AIM-120D	None	All
Alarm 120-D	None	All
EW Digital Flight Data Recorder	None	All
Spiral 3B-2		
CNI 2010 RF	Group A	Group B
GPS Receiver Module In GINS	None	All

ABBREVIATIONS

AA	Affordability Analysis
ADM	Acquisition Decision Memorandum
AUFC	Average Unit Flyaway Cost
AUPC	Average Unit Procurement Cost
AURF	Average Unit Recurring Flyaway
BCA	Business Case Analysis
CAIG	Cost Analysis Improvement Group
CIP	Common Integrated Processor
CNI	Communication, Navigation, Identification
COM	Cost of Money
CONOPS	Concept of Operations
CRI	Cost Reduction Initiative
DCAA	Defense Contract Audit Agency
DMS	Diminishing Manufacturing Sources
DMVR	Data Mass Memory–Video Recorder
DoD	Department of Defense
DPG	Defense Planning Guidance
DT	Developmental Testing
EAP	Engineering Assistance to Production
ECP	Engineering Change Proposal
EMD	Engineering and Manufacturing Development
EOQ	Economic Order Quantity
EPA	Economic Price Adjustment
EW	Electronic Warfare
FAR	Federal Acquisition Regulation
FFP	Firm Fixed Price
FOT&E	Follow-On Test and Evaluation
FOUO	For Official Use Only
FPRA	Forward Pricing Rate Agreement
GAO	Government Accountability Office
GINS	Global Inertial Navigation System
GPS	Global Positioning System
I/O	Input/Output
ICE	Independent Cost Estimate

ICS	Interim Contractor Support
IDA	Institute for Defense Analyses
ILS	Integrated Logistics Support
IOC	Initial Operational Capability
IOT&E	Initial Operational Test and Evaluation
JROC	Joint Requirements Oversight Council
LL	Long Lead
LMA	Lockheed Martin Aeronautics
LRIP	Low Rate Initial Production
M	Million
MLD	Missile Launch Detector
MYP	Multiyear Procurement
ODC	Other Direct Cost
OGC	Other Government Cost
OSD	Office of the Secretary of Defense
OT&E	Operational Test and Evaluation
OUSD(AT&L)	Office of the Under Secretary of Defense, Acquisition, Technology and Logistics
P&W	Pratt & Whitney
PALS	Performance-based Agile Logistics Support
PB	President's Budget
PBD	Program Budget Decision
PEO	Program Executive Officer
PICC	Processor Interface Control and Communications
PIP	Production Improvement Program
PM	Program Management
POE	Program Office Estimate
POM	Program Objectives Memorandum
PRTV	Production Representative Test Vehicle
PSAS	Production Support/Annual Sustaining
PSO	Program Support—Other
QDR	Quadrennial Defense Review
RDT&E	Research, Development, Test, and Evaluation
RFI	Request for Information
RTA	Replacement Test Aircraft
SE	Sustaining Engineering
SPO	System Program Office
SYP	Single-Year Procurement

T&E	Test and Evaluation
TINA	Truth in Negotiations Act
TPC	Target Performance Curve
USAF	United States Air Force
USC	United States Code
VIQ	Variation in Quantity

Appendix D

June 15, 2006
Email to Selected Senate Staff Members from
Jack Overstreet, Vice President, Legislative Affairs, Aviation Systems
Lockheed Martin Corporation

From: Overstreet, Jack C [mailto:jack.c.overstreet@lmco.com]
Sent: Thursday, June 15, 2006 1:36 PM
Subject: Chambliss F-22 Multiyear Amendment
Importance: High

PLEASE VOTE "YES" ON THE PROPOSED CHAMBLISS AMENDMENT ON F-22 MULTIYEAR PROCUREMENT

We request your vote in supporting the DoD/USAF-requested authorization to produce the next 60 F-22A aircraft under a 3 year multiyear contract and save the American taxpayers $235M- $335M!

- **Saves a minimum of a quarter of a billion dollars by producing the next 60 aircraft under a multiyear contract, as opposed to three annual buys of 20 each**
- **This amendment is supported by the Dept of Defense, the USAF, and the nationwide F-22 Manufacturing Industry Team**
- **The independent Institute fo Defense Analyses (IDA) found the F-22A meets all Title 10 entrance criteria for a multiyear contract**

Comparing projected multiyear (MYP) cost savings estimates per jet between what Congress approved 6 years ago for the F-18E/F and this F-22A proposal:

F-18E/F MYP: $700M divided by 222 a/c = $3.2M saved per aircraft

F-22A MYP: $235M-335M divided by 60 a/c = $3.9M-5.5M saved per aircraft

- **This multiyear will manufacture the last 60 of 183 F-22As, but several independent studies have validated the combat requirement is at least 260 aircraft**

<<06-6-15 F-22 Amdt.pdf>> <<F-22A WP Multiyearv5 06-12-06.doc>> <<F-22A Fast Facts TP 06-12-06.doc>>

Thank you in advance for your consideration.

Jack

Jack Overstreet
Vice President, Legislative Affairs, Aviation Systems
Lockheed Martin Corporation
1550 Crystal Drive, Suite 300
Arlington, VA 22202
(O)703-413-5634
(C)703-819-7465
(F)703-413-5963

LOCKHEED MARTIN PROPRIETARY INFORMATION

Why Multiyear Procurement for F-22 Raptor

Background: The FY07 President's Budget requests to begin multiyear procurement for 60 F-22A aircraft over a three year period. Recently, the AF and OSD submitted the final business case and justification package.

Discussion: The AF and OSD are trying to expeditiously complete this process, in order to capture FY07 savings. The AF hired the Institute for Defense Analysis (IDA) to prepare their business case analysis. IDA was chosen because they had just finished the year long Independent Cost Estimate directed by Congress. This made IDA an ideal independent reviewer.

IDA's preliminary analysis showed a multiyear procurement cost avoidance of $231M (nearly two airplanes) over an annual lot by lot buy. After the AF reviewed the IDA preliminary analysis, an additional $100M in savings was identified, for a total of $331M.

Comparing projected MYP cost savings estimates per jet between what Congress approved 6 years ago for the F-18E/F, (even before OPEVAL was finished), and this F-22A proposal:

F-18E/F MYP: $700M divided by 222 a/c = $3.15M saved per aircraft
F-22A MYP: $231M-330M divided by 60 a/c = $3.8M-5.5M saved per aircraft

Continued procurement of the F-22 represents an urgent imperative to maintain production of the only operational advanced 5th generation tactical aircraft to meet national defense requirements in an uncertain world. The multiyear procurement strategy:

- Extends F-22 production through 2010 (keeping the assembly line open through 2011)
- Mitigates the cost impacts associated with an annual buy due to:
  - Lower annual production rates
  - Increases in raw materials (titanium has increased 300% in the last two years)
  - Increases in supplier prices toward the end of a production run
- Retains 5th generation tactical aircraft procurement options to counter growing proliferation of advanced 4th generation fighter threats and advanced SAMs
- Benefits the F-35 Joint Strike Fighter program by helping reduce supplier overhead rates and retaining technical expertise across the tactical stealth aircraft industrial base.

Recommendation:
Support the Multiyear Proposal in the Defense Authorization Bill vote in order to allow DOD and the AF to continue to produce the F-22A at the lowest practical taxpayer cost

Recommended Report Language:
Sec. XXX Multi-Year Procurement Authority for Air Force Program

(a) Beginning with the Fiscal Year 2007 program year, the Secretary of the Air Force may, in accordance with section 2306b of Title 10, United States Code, enter into multiyear contracts for the procurement of F-22 aircraft and F-119 engines.
(b) Notwithstanding section 2306b of Title 10, the Secretary of the Air Force may enter into contracts for advance procurement of an economic order quantity of components, parts, and materials for aircraft or engines programmed under the contracts authorized in subsection (a)

F-22 Program Update Fast Facts & Talking Points

Program is Healthy, Solid, and On Track

- 107 F-22 Raptors under contract through Lot 5
- 79 Raptors built to date
- 71 Raptors delivered to the USAF *(72nd could be delivered today)
- 11 Raptors built and 12 delivered for 2006 *(13th of the year could be delivered today)
- 24 Raptors built and 23 delivered in 2005
- 1000 suppliers in 42 states
- Four bases operating Raptors: Edwards AFB, CA, Nellis AFB, NV, Tyndall AFB, FL, and Langley AFB, VA.
- Future bases identified: Elmendorf AFB, AK, Holloman AFB, NM and Hickham AFB, HI.

One Very Satisfied Customer

- Met all congressional commitments with the successful delivery of 38 aircraft during the 18 month period of July 2004 to January 2006. Continuing on track for commitments for 2006.
- In the last three years we have gone from low rate initial production of F-22s to Full Rate Production. Other highlights include:
  - Raptor performing very well thus far in joint training exercise "Northern Edge" underway now in Alaska. First deployment out of CONUS for the Raptor.
  - USAF declared Initial Operational Capability (IOC) for the F-22 on Dec. 15, 2005 with the 27th FS of the 1st FW at Langley AFB, VA
  - Successful IOT&E results released in Feb 05 = "Overwhelmingly Effective" performance
  - Successful Follow On Test and Evaluation (FOT&E) = "Mission Capable"
  - Langley AFB Raptors have flown Operation Noble Eagle sorties

- Lot 6 contract proposal went to USAF March 16, 2006 - up to 24 a/c authorized by Congress
- The Air Force requires sufficient numbers of F-22 Raptors to meet its needs to support the Air and Space Expeditionary Force (AEF), plus the necessary additional assets to support test, training and spares.
- Fly-away cost for Lot 5 aircraft is $130 million. Lot-to-Lot cost reductions have been greater than 10%. Further reduction is unlikely to be realized for future lots due to the reduction in quantity change from 277 to 183 per FY07 budget request. This plan spreads out production to CY11 but with annual production of aircraft reduced to 20 F-22s.
- Multiyear contract proposal by USAF is good for the nation. The aerospace industrial base also benefits as it spreads work out, keeps the line "hot" through December 2011 and bridges to F-35 production stabilization.

Why Raptor?

The F-22 Raptor's unique combination of stealth, speed, agility, situational awareness, air-to-ground and air-to-air combat capabilities make it unlike any other military aircraft in the world. We believe the F-22 is a critical weapons system. Combat commanders need it today and for the next four decades. It will prove to be a great value to warfighters and taxpayers.

- Faster to the fight, 2 times more reliable, 1/2 the airlift required, 3 times more effective than the F-15.
- The F-22's expanding information capabilities increase the pilot's, his flight's and other combatants' ability to engage targets with unmatched battlespace awareness.
- The F-22 will fundamentally change how America will fight – shortening wars and saving lives. Dominant for the next 40 years.

The Threat?

The current reality is that the Department of Defense is developing the F-22 and the F-35 to replace an aging fleet of F-15s, F-16s, F/A-18s, A-10's, and A-V8's etc., many of which are more than 30 years old. This process does not happen quickly, and in today's world it can take 10 -20 years to develop and field a new weapons system. Modern air forces cannot be fielded on the spur of the moment when a threat materializes – it's not realistic.

What we do know is that Russia, China and other countries continue to build advanced airplanes, which are equal to, and in some cases superior to our current legacy fighter fleet. These new aircraft are being delivered around the world today. Also being built and delivered are the next generation of surface-to-air missiles. In order for our pilots to survive over the battlefield and accomplish the mission, they need to safely penetrate these surface-to-air missile layers and deal with both current and emerging air and surface-to air threats. Our joint air forces don't want a fair fight. We are building 5th Generation fighters that promise overwhelming air dominance to ensure that any fight we decide to enter is patently unfair – to the other guy.

No matter what you do to any legacy fighter to update it, you can not match the overall capability the F-22 Raptor offers the warfare commander when it comes to stealth (built into the design of the Raptor), speed with its supercruise capability, agility, maneuverability and maintainability. The fly-away cost of new 5th Generation fighters like the F-22 and later the F-35 are not much different that the cost of a new legacy aircraft which offers much less capability dollar for dollar!

The pillars of performance that make the F-22 and F-35 revolutionary, transformational and dominant for the next four decades aren't capabilities you can simply add to an existing platform, but must be part of the design from the beginning.

Brig. Gen. Taco Gilbert, USAF ***"We have made it look so easy so long, people don't realize how hard it is to establish air dominance."*** (Washington Post, April 19, 2005)

Appendix E

Background on EDO Corporation and Admiral Dennis Blair (Ret.), President, Institute for Defense Analyses

1. Message from Admiral Blair (Ret.), Institute for Defense Analyses Web site, downloaded 7/7/2006.

2. Page from EDO Corporation's web site describing the product it manufactures for the F-22A, the LAU-142/A AMRAAM Vertical Eject Launcher. Downloaded July 24, 2006. On web here: http://www.edocorp.com/AMRAAMAVEL.htm

3. Excerpt from the 2005 Annual Report of EDO Corporation showing that Admiral Blair (Ret) sits on the company's Board of Directors. On the web here: http://www.edocorp.com/EDO2005AnnualReport.pdf

4. Securities and Exchange Commission forms showing Admiral Blair's stock ownership in EDO Corporation, dated July 7, 2006 and January 18, 2006.

5. July 17, 2006 email from Lynne Johnson, Human Resources Center Service Center, Institute for Defense Analysis, regarding conflict of interest policy.

Admiral Dennis C. Blair, USN (Ret.)
President
Institute for Defense Analyses

In recent months, defense planning has focused increasingly on two issues: terrorism and transformation. The attacks on September 11 changed the way many people think about national security, as defending the homeland against large-scale terrorism moved from hypothetical scenarios to real-world operations. In coordination with other government organizations, the Department of Defense is working to enhance U.S. security at home, while taking the fight to terrorists in Afghanistan and elsewhere.

The demands of the war on terrorism have not diminished DoD's commitment to force transformation. Instead, the challenge in Afghanistan has highlighted the need for transformation in force concepts and capabilities, both to exploit technological opportunities and to deal effectively with enemies as they adapt to avoid U.S. strengths. Some of the concepts underlying transformation—such as decision superiority and effects-based operations—are being demonstrated in Afghanistan and are the subjects of rigorous analysis and experimentation at home.

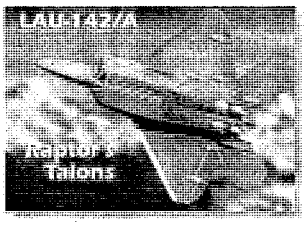
Other important defense needs remain as priorities. The Department must still maintain forward deployments in critical areas, support contingency operations in the Balkans and elsewhere, sustain force readiness, and recruit and retain high-quality personnel. Many aging systems must be replaced and the supporting infrastructure modernized to increase efficiency and effectiveness.

The government continues to need analytic help in addressing these complex issues, and our sponsors continue to call on IDA for objective analyses and advice. In the days following September 11, IDA researchers helped define options for accelerating production of items likely to be needed in the war on terrorism and developed plans for deploying chemical and biological sensors in Washington. In subsequent months, we have been assessing and reconstructing operations in Afghanistan, improving understanding of future terrorist threats, and evaluating equipment, technologies, and processes for dealing with chemical and biological attacks.

IDA is dedicated to the sole mission of providing high-quality analyses of important national security issues. For over 45 years, that mission has led to exciting technical and analytic challenges for our staff.

Suspension & Release Equipment: LAU-142/A AMRAAM Vertical Eject Launcher

Stealth plays a major role in many of today's aircraft missions. The Lockheed-Martin F-22 Raptor is the state-of-the-art in stealth technology. With the need to carry and eject AMRAAM missiles from within concealed weapons bays, EDO, as part of the F-22 Team, developed a new launcher capable of achieving all internal bay armament delivery requirements.



The result is the LAU-142/A AMRAAM Vertical Eject Launcher (AVEL), which carries and ejects AIM-120C missiles from shallow internal missile bays for safe aircraft separation at mach speeds.

Compact design, optimized for weight-to-stiffness performance, was achieved for the AVEL through state-of-the-art computer engineering, analysis and manufacturing processes.

The AVEL employs a highly-reliable, non-pyrotechnic energy system controlled by aircraft electrical and hydraulic power. When commanded for in-flight missile launch, the AVEL system charges, and then safely ejects the missile through the air-flow boundary layer in less than 1/10 of a second. Safe ground loading operations are conducted with the AVEL in a ground-safe extended position.

AVEL CHARACTERISTICS

Weight: 115 pounds

Stroke Length: 9 inches

End-of-Stroke Velocity: 27 fps nominal

Ground Extend and Retract Time: 3 seconds each

- Triaxial missile restraint throughout stroke
- Extends out of bay for easy ground loading
- Optimized weight-to-performance design minimizes deflection

Documentation Support :

- S&RE AMRAAM AVEL Brochure

Related Topics:

- Mine Countermeasures - OASIS
- Missile Launchers
- Pneumatic Suspension and Release Technology
- S&RE: BRU-46/A and BRU-47/A
- S&RE: BRU-57

For additional information contact:

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EDO Defense Systems
N. Amityville, NY

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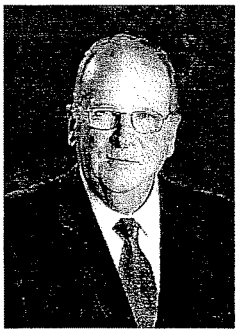

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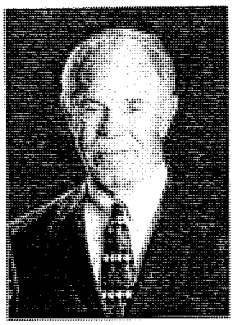

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SEC Form 4

FORM 4

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

OMB APPROVAL	
OMB Number:	3235-0287
Expires:	January 31, 2008
Estimated average burden hours per response	0.5

☐ Check this box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. *See* Instruction 1(b).

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(h) of the Investment Company Act of 1940

1. Name and Address of Reporting Person*	2. Issuer Name and Ticker or Trading Symbol	5. Relationship of Reporting Person(s) to Issuer (Check all applicable)
BLAIR DENNIS C (Last) (First) (Middle) 60 EAST 42ND STREET SUITE 5010 (Street) NEW YORK NY 10165 (City) (State) (Zip)	EDO CORP [(EDO)] 3. Date of Earliest Transaction (Month/Day/Year) 07/05/2006 4. If Amendment, Date of Original Filed (Month/Day/Year)	X Director — 10% Owner Officer (give title below) — Other (specify below) 6. Individual or Joint/Group Filing (Check Applicable Line) X Form filed by One Reporting Person Form filed by More than One Reporting Person

Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned

1. Title of Security (Instr. 3)	2. Transaction Date (Month/Day/Year)	2A. Deemed Execution Date, if any (Month/Day/Year)	3. Transaction Code (Instr. 8)		4. Securities Acquired (A) or Disposed Of (D) (Instr. 3, 4 and 5)			5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4)	6. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	7. Nature of Indirect Beneficial Ownership (Instr. 4)
			Code	V	Amount	(A) or (D)	Price			
Common Shares	07/05/2006		A		141	A	$24.4	1,787	D	

Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	3A. Deemed Execution Date, if any (Month/Day/Year)	4. Transaction Code (Instr. 8)		5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4 and 5)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Securities Underlying Derivative Security (Instr. 3 and 4)		8. Price of Derivative Security (Instr. 5)	9. Number of derivative Securities Beneficially Owned Following Reported Transaction(s) (Instr. 4)	10. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	11. Nature of Indirect Beneficial Ownership (Instr. 4)
				Code	V	(A)	(D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares				

Explanation of Responses:

/s/ Dennis C. Blair signed by Lisa M. Palumbo under Power of Attorney by Mr. Blair — 07/07/2006

** Signature of Reporting Person — Date

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

* If the form is filed by more than one reporting person, *see* Instruction 4 (b)(v).

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations *See* 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, *see* Instruction 6 for procedure.

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SEC Form 4

FORM 4

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

OMB APPROVAL	
OMB Number:	3235-0287
Expires:	January 31, 2008
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☐ Check this box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. See Instruction 1(b).

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(h) of the Investment Company Act of 1940

1. Name and Address of Reporting Person*	2. Issuer Name and Ticker or Trading Symbol	5. Relationship of Reporting Person(s) to Issuer (Check all applicable)
BLAIR DENNIS C (Last) (First) (Middle) 60 EAST 42ND STREET SUITE 5010 (Street) NEW YORK NY 10165 (City) (State) (Zip)	EDO CORP [EDO] 3. Date of Earliest Transaction (Month/Day/Year) 01/13/2006 4. If Amendment, Date of Original Filed (Month/Day/Year)	X Director — 10% Owner Officer (give title below) — Other (specify below) 6. Individual or Joint/Group Filing (Check Applicable Line) X Form filed by One Reporting Person Form filed by More than One Reporting Person

Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned

1. Title of Security (Instr. 3)	2. Transaction Date (Month/Day/Year)	2A. Deemed Execution Date, if any (Month/Day/Year)	3. Transaction Code (Instr. 8)		4. Securities Acquired (A) or Disposed Of (D) (Instr. 3, 4 and 5)			5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4)	6. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	7. Nature of Indirect Beneficial Ownership (Instr. 4)
			Code	V	Amount	(A) or (D)	Price			

Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned
(e.g., puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	3A. Deemed Execution Date, if any (Month/Day/Year)	4. Transaction Code (Instr. 8)		5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4 and 5)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Securities Underlying Derivative Security (Instr. 3 and 4)		8. Price of Derivative Security (Instr. 5)	9. Number of derivative Securities Beneficially Owned Following Reported Transaction(s) (Instr. 4)	10. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	11. Nature of Indirect Beneficial Ownership (Instr. 4)
				Code	V	(A)	(D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares				
Stock Option (1)	$27.39	01/13/2006		A		5,000		01/13/2006	01/12/2016	Common Shares	5,000	$27.39	30,000	D	

Explanation of Responses:

1. Grant of a stock option pursuant to the EDO Corporation 2004 Non-Employee Director Stock Option Plan.

Remarks:

Signed by Lisa M. Palumbo under Power of Attorney by Mr. Bla — 01/18/2006

** Signature of Reporting Person — Date

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

* If the form is filed by more than one reporting person, see Instruction 4 (b)(v).

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations See 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

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From: Johnson, Lynne [ljohnson@ida.org] on behalf of HR Service Center [hrservice@ida.org]
Sent: Monday, July 17, 2006 3:19 PM
To: [redacted]
Subject: Conflict of Interest Policy

Ms. [redacted]

Due to the nature of our work at the Institute for Defense Analyses, we are unable to provide information about conflict of interest policies or forms. If you are seeking general information about IDA, please visit our website at www.ida.org.

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Appendix F

June 22, 2006 Congressional Record
at Column 3, Amendment 4261

Senate Debate on Senator Saxby Chambliss' Amendment to
Authorize Multiyear Procurement of the F-22A

amendment by the distinguished Senator from Texas, and I am told by the Senator that she will seek a voice vote. That has been cleared on both sides. The next amendment will be offered by our distinguished colleague from Georgia, a member of the committee, Mr. CHAMBLISS. That will take perhaps an hour or more and will require a record vote. Thereafter, I ask unanimous consent that the Senate then recognize the Senator from Minnesota, Mr. DAYTON, to address the Senate with regard to amendments and the bill as a whole.

I would also say to colleagues, subject to confirmation by the leadership, that I am recommending there be no votes from now until 3:30. There are two very serious functions taking place, both of a religious nature, in our city, and Members are attending either the last rites of Philip Merrill, a personal friend of mine, a wonderful man who recently lost his life on the Chesapeake Bay, and then I understand a distinguished archbishop of the Catholic Church is being installed with a ceremony today.

Therefore, the bill will continue its momentum in this period of time, and following those votes, I am certain the leadership will give the managers such guidance as to when we can conclude this bill, which again I hope will be today.

So at this time, I yield the floor.

Mr. MCCAIN. Mr. President, if the chairman will yield just for a second, we don't need an hour on this amendment, I say to my friend from Virginia. I think 40 minutes equally divided would be sufficient for my purposes. I don't know about the author of the amendment; he might want more time.

Mr. CHAMBLISS. Mr. President, the only thing I would say is I have several folks who want to speak on it. If we could get an hour equally divided, my guess is we won't use it.

Mr. WARNER. Mr. President, I ask unanimous consent that there be an hour equally divided between the distinguished Senators from Georgia and Arizona on the Chambliss amendment.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. WARNER. We have covered as much ground as we can procedurally at this point, and I yield the floor.

AMENDMENT NO. 4377

Mrs. HUTCHISON. I call up amendment No. 4377 and ask for its immediate consideration.

The PRESIDING OFFICER. Without objection, the pending amendment is set aside.

The clerk will report.

The legislative clerk read as follows:

The Senator from Texas [Mrs. HUTCHISON] proposes an amendment numbered 4377.

Mrs. HUTCHISON. Mr. President, I ask unanimous consent that the reading of the amendment be dispensed with.

The PRESIDING OFFICER. Without objection, it is so ordered.

The amendment is as follows:

(Purpose: To include a delineation of the homeland defense and civil support missions of the National Guard and Reserves in the Quadrennial Defense Review)

At the end of subtitle C of title IX, add the following:

SEC. 924. INCLUSION OF HOMELAND DEFENSE AND CIVIL SUPPORT MISSIONS OF THE NATIONAL GUARD AND RESERVES IN THE QUADRENNIAL DEFENSE REVIEW.

Section 118(d) of title 10, United States Code, is amended—

(1) by redesignating paragraph (15) as paragraph (16); and

(2) by inserting after paragraph (14) the following new paragraph (15):

"(15) The homeland defense mission and civil support missions of the active and reserve components of the armed forces, including the organization and capabilities required for the active and reserve components to discharge each such mission.".

Mrs. HUTCHISON. Mr. President, this amendment would require the Department of Defense to clarify in the Quadrennial Defense Review the homeland defense and civil support missions of the National Guard and Reserves.

The QDR is a comprehensive examination of national defense strategy, force structure, force mobilization, and modernization plans, infrastructure, budget plans—all elements of the defense program. It is the planning that goes on every 4 years. The QDR is in process now for the next 4 years. The goal of the QDR is to determine the defense strategy of the United States and its established defense programs for the next 20 years, and it is updated every 4 years.

For decades, homeland defense has been a mission of the Department of Defense. However, only after the 9/11 attacks in 2001 did this very important mission really come to the forefront in defense planning. Unfortunately, the present QDR lacks sufficient guidance for the Guard and Reserve components in this very important mission they have.

The amendment I am proposing would require the Department of Defense to include in the QDR a definition of the homeland defense and civil support missions of the National Guard and Reserves. The Department has not really formalized the requirements for the role of the National Guard and Reserve in homeland security. We know the President has ordered the deployment of Guard and Reserve to our borders to try to secure our borders, so we need a really comprehensive look and guidance for the Reserve component, particularly the Guard, concerning their roles and how they will be able to train and equip for homeland security missions.

Today, the National Guard and Reserve must debate the merits of their initiatives and their equipment procurement. That is not the way it should be. Our Guard and Reserve do a fabulous job. They are on active duty in Iraq and Afghanistan today. They have gone through several cycles of deployment to Iraq and Afghanistan. There is a Texas Guard unit in Bosnia in command and control today, continuing the peacekeeping mission there. They are doing their jobs, they are being called up at a level that is very high, but ambiguities remain in their homeland security mission.

Competition for resources continues, and there is a lack of clarity about what role the Department actually expects them to have. This omission was painfully obvious after 9/11. After Hurricanes Rita and Katrina and now with the deployment to the border, which I totally support, their mission is once again expanding. This amendment will provide the DOD with the information it needs to determine the role the National Guard and Reserves should have, must have, and will continue to have, but with more clarification, in the defense of our country.

This is a very important amendment. I believe it will add to their responsibilities, and they will be able to get the equipment and the training they need to do the jobs we are asking them to do in homeland defense and for the other civil emergencies we have.

Mr. President, I ask for the support of my colleagues for this amendment.

The PRESIDING OFFICER. Is there further debate on the amendment?

Mrs. HUTCHISON. Mr. President, I urge the adoption of the amendment.

The PRESIDING OFFICER. There being no further debate, the question is on agreeing to the amendment.

The amendment (No. 4377) was agreed to.

Mr. WARNER. Mr. President, I move to reconsider the vote.

Mrs. HUTCHISON. I move to lay that motion on the table.

The motion to lay on the table was agreed to.

Mr. WARNER. Mr. President, we will turn to the distinguished Senator from Georgia for his amendment, with 1 hour equally divided.

The PRESIDING OFFICER. The Senator from Georgia.

AMENDMENT NO. 4261

Mr. CHAMBLISS. I rise today to call up amendment No. 4261 and ask for its immediate consideration.

The PRESIDING OFFICER. Without objection, the pending amendment is set aside and the clerk will report.

The legislative clerk read as follows:

The Senator from Georgia [Mr. CHAMBLISS], for himself, Mr. HATCH, Mr. ISAKSON, Mr. INHOFE, Mr. LIEBERMAN, Mr. CORNYN, Mr. THUNE, Mr. BENNETT and Mr. STEVENS, proposes an amendment numbered 4261.

Mr. CHAMBLISS. I ask unanimous consent that the reading of the amendment be dispensed with.

The PRESIDING OFFICER. Without objection, it is so ordered.

The amendment is as follows:

(Purpose: To authorize multiyear procurement of F–22A fighter aircraft and F–119 engines)

On page 29, strike lines 6 through 15 and insert the following:

SEC. 146. FUNDING FOR PROCUREMENT OF F–22A FIGHTER AIRCRAFT.

(a) PROHIBITION ON USE OF INCREMENTAL FUNDING.—The Secretary of the Air Force shall not use incremental funding for the procurement of F–22A fighter aircraft.

(b) MULTIYEAR PROCUREMENT.—The Secretary of the Air Force may, in accordance with section 2306b of title 10, United States Code, enter into a multiyear contract beginning with the fiscal year 2007 program year for procurement of not more than 60 F–22A fighter aircraft.

SEC. 147. MULTIYEAR PROCUREMENT OF F–119 ENGINES FOR F–22A FIGHTER AIRCRAFT.

The Secretary of the Air Force may, in accordance with section 2306b of title 10, United States Code, enter into a multiyear contract beginning with the fiscal year 2007 program year for procurement of the following:

(1) Not more than 120 F–119 engines for F–22A fighter aircraft.

(2) Not more than 13 spare F–119 engines for F–22A fighter aircraft.

Mr. CHAMBLISS. Let me say, it is very difficult, any time you have to oppose your subcommittee chairman—and in this case the full committee chairman—on an issue, particularly two Senators whom I hold in such high esteem. But we do have a disagreement in a very professional way on this issue. At the end of the day, all of us intend to do what is in the best interests of the men and women who fight for America.

The F–22A Raptor is the U.S. Air Force's top priority for providing a joint force with air dominance, operational access, homeland and cruise missile defense for the next 20-plus years. The F–22A is a first-of-a-kind multimission fighter aircraft that combines Stealth, supercruise, advanced maneuverability, and integrated avionics to make it the world's most capable combat aircraft.

This amendment authorizes a 3-year multiyear procurement contract for the F–22. This is not about spending money, it is about saving money, and it is about good acquisition practices and policy.

This amendment will save approximately $235 million as a minimum amount, allowing DOD to use this money for other priorities or allow us, the Congress, to return these dollars to the taxpayers.

An independent study, commissioned by the Office of the Secretary of Defense, is the only independent study yet to be done for the F–22 multiyear contract. In that study, the Institute for Defense Analysis, or IDA, concluded that the proposed F–22A multiyear contract, first of all, meets all the criteria provided in the law and does, in fact, save the taxpayer a minimum of $235 million over the next 3 years.

The study was not completed in time for the Senate Armed Services Committee markup back in early May, which is why it was not included in the Senate bill at that time, or at least we didn't have an amendment at that time. However, the study was submitted to the Armed Services Committee on the 16th of May.

Since I have been on this committee, we have been talking about the need to conduct acquisitions better, cheaper, and more efficiently. This amendment does exactly that. We know we are going to buy 60 F–22s over the next 3 years. That is the current plan. The DOD budget provides for the funding, and I have heard no one in Congress question the need for the airplane. As a matter of fact, this airplane today is flying in rotation around the country and soon will be flying around the world as it is scheduled to go into rotation to Iraq shortly. As we are sitting here today, I suspect there is an F–22 flying over Washington, DC, protecting the skies over our Nation's Capital.

The only question is how are we going to buy these airplanes? Are we going to buy them with 3 1-year contracts and pay more money, or are we going to buy them with a 3-year multiyear contract and save a quarter of a billion dollars?

We need to have a high standard for what qualifies for a multiyear contract. As a matter of comparison, the F–414 engine for the F–18 saved 2.8 percent and $51 million. The multiyear contract for two previous F–16 multiyears saved $246 million and $262 million respectively.

By comparison, the proposed F–22A multiyear contract saves 2.6 percent and a minimum of $235 million.

The point is that the F–22 multiyear is in the same category in terms of percent savings and total savings of multiyear contracts that this body has previously approved.

Also, the per-plane savings on the F–22 multiyear will be identical to the per-plane savings on the F/A–18 multiyear, that being $3.8 million per plane. That is why the authors of the independent business case analysis at IDA judge this multiyear to have significant savings, and I agree with them.

Much has been made over the old criteria for multiyear savings, which was a minimum of 10 percent. But, frankly, that was changed early on in law and now, instead of 10 percent the statute does say, "substantial savings."

The 2005 QDR, which was provided to Congress in concert with the fiscal year 2007 budget request, restructures the F–22A program to extend production through the fiscal year 2010 with a multiyear acquisition contract to ensure the Department does not have a gap in fifth-generation Stealth capabilities. To obtain a more favorable cost, DOD's strategy requested authority for a 3-year multiyear procurement contract to buy 60 F–22s, 20 in each of the years 2007 through 2009. This strategy was outlined in a letter from Undersecretary of Defense Ken Krieg in a letter to the Senate Armed Services Committee on February 13, 2006.

Mr. President, I ask unanimous consent to print that letter in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

THE UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY AND LOGISTICS,

Washington, DC, February 13, 2006.

HON. JOHN W. WARNER,

Chairman, Committee on Armed Services, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: Consistent with the Conference Report on the Department of Defense Appropriations Act, 2006, Public Law 109–148, the Department has studied alternatives for the continued acquisition of the F–22A aircraft beyond Fiscal Year (FY) 2008. This has culminated in the procurement strategy identified in the President's Budget for FY 2007 (PB07).

The Quadrennial Defense Review Joint Air Dominance study and budget deliberations addressed alternative procurement quantities, rates, and force structure mixes. The Department's PB07 plan provides for procurement of F–22A aircraft through FY 2010. To obtain a favorable cost, the strategy employs multiyear procurement of 20 aircraft each, in Lots 7, 8, and 9, beginning in FY 2008, providing a total force structure of 183 aircraft. FY 2007 funds will be used to contract for delivery of economic-order-quantity items, sub-assemblies and material required for Lot 7, advance procurement for Lot 8 aircraft, and for other allowable costs including, sustainment support, production engineering, laboratories and combined test force infrastructure. This strategy also procures titanium one-year earlier than normal advanced procurement to accommodate the long-lead now required to buy titanium. This plan substantially reduces the F–22A procurement funds required by the Department in FY 2007, allowing the Department to meet other high-priority requirements.

Continuing the F–22A procurement through FY 2010 retains fifth-generation tactical aircraft procurement options in the event of delays in the Joint Strike Fighter (JSF) program. These actions also benefit the JSF program by helping to reduce overhead rates and by retaining technical expertise across the tactical aircraft industrial base, including the prime contractor, subcontractors, and suppliers.

The Department is preparing the business case cost comparison of multiyear and successive annual procurements required by subsection 2306b(a)(1) of title 10, United States Code. We intend to make the business case available to the congressional defense committees by May 15, 2006, to support FY 2007 Congressional budget deliberations.

I appreciate the foresight of the Congress in directing the Department to study alternatives for the continued acquisition of the F–22A. I believe that we have developed a fiscally responsible strategy that will allow us to sustain this viable tactical aircraft production line.

Similar letters have been sent to the chairmen and ranking members of the other Congressional defense committees.

Sincerely,

KENNETH J. KRIEG.

Mr. CHAMBLISS. The business case for the F–22 is clear and was validated during the QDR by the Joint Army Dominance Study. This study included any number of options of tactical air mixes, including various combinations of F–22s, FA–18s, and joint strike fighter and other airborne weapons systems, so we are not proceeding with a random plan but one that has been validated by careful analysis.

The business plan was also validated by the IDA study, again the only independent organization that has looked at this multiyear plan.

There are six criteria for meeting a multiyear contract. The independent IDA business case analysis judges the F-22 program according to each of these six criteria. I mention this because there is a GAO study that came out, coincidentally, this week relative to the multiyear procurement of the F-22. It is critical of the multiyear contract.

The GAO study, though, contains, frankly, false factual information. For example, in the GAO study they talk about the cost of the airplane actually increasing under the multiyear contract. But what they fail to take into consideration is that originally, before the reprogramming to do 20 airplanes this year and 20 in the next budget and 20 in the next budget, the Air Force was going to ask for 29 planes in the next budget and 27 in the following budget.

If you build 29 versus 20, it is going to be cheaper. But that is the factual information that the GAO plugged into their numbers—29 instead of 20. That is why there is a higher price cost that the GAO came up with.

Second, the GAO report talks about the fact that under the Air Force proposal, there is not enough funding in the budget to pay for these airplanes. We are going to have to use what is called incremental funding.

That was talked about early on in the process but abandoned. Here we are in the end of June of this year. The reprogramming took place the end of last year and the early part of this year. The facts were known at that time. GAO ignored those facts.

Second, the incremental funding issue that was talked about early on was abandoned early in the year. GAO ignored that and included those false facts in its report. So the GAO study, frankly, is not correct because it is not based on the actual, as we say in the law—the facts in evidence.

There is one other issue relative to the GAO that I am going to conclude with and that is this. It gives a list of the factors that it took into consideration in doing its report. There is one glaring factual statement, one factual provision that is left out of consideration by the GAO. That is talking to pilots that fly this airplane.

I have talked to several of those guys. We had a red flag operation that was done several weeks ago by the Air Force. In talking to a couple of those pilots afterward, it was unbelievable what they had to say about flying the F-22.

One of them said this:

> In the United States Air Force, we don't look to win 51-49. We look to win 100-nothing, and that is what the Raptor gives us.

The Raptor is the follow-on for the F-15 and F-16. It is the fifth-generation fighter. It is going to allow us to continue air superiority and air dominance against any potential threat that might be forthcoming. I urge my colleagues to support the multiyear proposal that is included in the President's budget, that is included in the authorization bill that comes to the Senate from the House, that will go into conference. We will save the taxpayer a minimum of $225 million over the next 3 years. I reserve the remainder of my time.

Mr. DOMENICI. Will the Senator yield 5 minutes to the Senator from New Mexico?

Mr. CHAMBLISS. I will be happy to yield 5 minutes to the Senator from New Mexico.

Mr. DOMENICI. Mr. President, I say to Senator MCCAIN, I understand he wants to speak in opposition to the amendment. I will not be long.

Mr. MCCAIN. No problem.

Mr. DOMENICI. Understand, we will each speak our piece here. It is not a pleasure to come and oppose my colleague. Nonetheless, I must say that it seems to me we are always talking in the Senate about trying to do things that are more efficient; trying to do good business, do things in a way they ought to be done. Here we have an opportunity to do that.

We have a situation where the new fighter, the world-class F-22—but I am not going to take the Senate's time praising its qualities. We have heard some of that from the distinguished Senator from Georgia. We could spend all afternoon talking about what a fantastic airplane it is. That is not the issue before us.

The issue before us is that the Defense Department needs a multiyear procurement authority to acquire these airplanes. The administration requested a multiyear procurement authority for the F-22s. The House Defense Authorization bill granted the request. It makes plain, good business sense that the Senate do the same—that we give the Department what it needs.

I also support this because, as indicated by the principal sponsor of the amendment, the distinguished senior Senator from Georgia, this authority will save money.

We are going to hear something to the contrary, but the contrary evidence is from reports that do not apply to the 20-per-year acquisition of the F-22. That is what we are trying to do. That is what the Defense Department's final studies were based upon—acquisition of 20 per year, for multiple years. A multiyear procurement of this nature would net a savings of between $225 million and $325 million.

It seems to this Senator that this is precisely what we ought to be doing. We ought to be doing more of this, not less. Is anybody doubting we are going to buy this many of these Raptors? I don't hear that talk. I thought I was going to hear it 6 or 8 months ago when we were talking about a number of systems, some of which are on hold, but this one is not.

Therefore, we ought to proceed and save millions of dollars that can be used for other needs. $300 million, for example, would pay for 4,200 National Guard troops in active duty for 1 year. That is a lot of money. This is a monster bill, and one might say what is the difference here? $225 million to $325 million in savings doesn't amount to much. I submit it is a pretty big amount.

There has been some talk this week about a new GAO report that is critical of this multiyear procurement. But this report rehashes old arguments and uses old data that is not relevant to the Department's data regarding the multiyear acquisition, which has been stated in detail by the senior Senator from Georgia.

Therefore, I submit that the airplane we are going to rely on—which without question the Quadrennial Defense Review says we must have—we ought to go ahead and procure on a multiyear basis today when we vote on this amendment.

I thank the Senator for yielding time. I believe he has a compelling argument, and I hope the Senate will follow his lead.

I yield the floor.

Mr. CHAMBLISS. Mr. President, I yield 2 minutes to the Senator from Utah.

The PRESIDING OFFICER. The Senator from Utah is recognized.

Mr. HATCH. Mr. President, I thank my colleague from Georgia and my colleague from Arizona.

What is the bottom line here? Simply put, Senator CHAMBLISS has offered an amendment that is supported by the ministration that will enable the Air Force to buy 20 F-22s Raptors a year for the next 3 years. By entering into this multiple year contract, the independent Institute for Defense Analysis believes that the American taxpayer will save at least $225 million.

Why are we buying the F-22? Because it is a war-winner. This fighter, which is also a very capable bomber, is now operational with the 1st Fighter Wing. The Raptor is stealthier than the famous F-117 Nighthawk, which dropped the first bombs during the first gulf war. But unlike the Nighthawk, that must fly at night in order to survive in a combat environment, the F-22 brings stealth capability out of the night, enabling operations in high threat areas 24 hours a day 7 days a week.

I have been to the Air Force base where I have talked with the pilots and have seen this plane and have seen it fly. It is a marvel.

The Raptor is the world's most lethal and maneuverable fighter aircraft. This is accomplished in no small part by its supercruise engines. Supercruise engines do not need to go to after-burner in order to achieve supersonic flight. This provides the F-22 with a strategic advantage by enabling supersonic speeds to be maintained for a far greater length of time. By comparison, all other fighters require their engines to go to after-burner to achieve supersonic speeds. This consumes a tremendous amount of fuel and greatly limits an aircraft's range.

Another legitimate question is why not just rely on the aircraft we have today? Over the past 30 years, the United States has been able to maintain air superiority in every conflict largely due to the F–15C. However, with the great advancements in technology over the past several years, the F–15 has struggled to keep pace. For example, the F–15 is not a stealth aircraft and its computer systems are based on obsolete technology. My colleagues should remember that the F–15 first flew in the early 1970s. During the ensuing years, nations have been consistently developing new aircraft and missile systems to defeat this fighter.

Obviously, we need the F–22 and we have identified a means to save money while we are buying it.

The PRESIDING OFFICER. The Senator from Arizona.

Mr. MCCAIN. Mr. President, I don't oppose the F–22 program. In fact, the Armed Services subcommittee provided and the Senate Armed Services Committee marked down an additional $1.4 billion for 20 F–22s.

The issue is not, frankly, whether we support the F–22. Rightly or wrongly, we all do—and every member of the committee does. The question is, Are we going to act responsibly? The question is, Are we going to authorize a multiyear procurement of an aircraft that has—and it is not unusual—experienced time after time dramatic delays and cost overruns? Are we ready to do that? Not according to the GAO, not according to the OMB, not according to the Congressional Research Service, and not according to every outside observer of this program.

Let me give a small example. The F–22 experienced an initial operational capability delay of 9 years 9 months; initial operational test and evaluation delayed 5 years 3 months; full rate production delay of 5 years 3 months; low rate initial production, 4 years 9 months; first delivery of operational aircraft delayed 4 years 7 months; first flight delayed 2 years; and completion of critical design review delayed 1 year 4 months. The record is not good. In fact, the record is terrible. In 1991, the estimated cost, according to the U.S. Air Force, for the aircraft was going to be $114 million—in then-year dollars; now, $354 million per copy.

This program—not atypically—has experienced significant delays and cost overruns, which, by the way, maybe we will get into at some point. Then they received incentive bonuses, even for violations of Nunn-McCurdy. We are not talking about the purchase of F–22s. What we are talking about is, are we going to violate the basic principles and the law which requires certain criteria to be met before multiyear acquisition of these aircraft? The report prepared by the Comptroller General of the United States clearly states that four of the six criteria set forth in the law have not been met by the Air Force. They have not been met. Yet here we are debating a measure that would effectively permit the Air Force to be held unaccountable, to end run a good Government provision in Federal law that is specifically designed to ensure accountability in our Government.

There have been two Nunn-McCurdy violations, according to the Comptroller General. Since its inception, this program has been subject to 2 Nunn-McCurdy violations and has been rebaselined 14 times just to avoid additional breaches. Fourteen times they have rebaselined the cost of this weapons system. We all know the game. They come and they say: This weapons system is going to cost X. They get it authorized, then we get it, and guess what happens. It ends up costing dramatically more money—in the case of this aircraft, from $114 million each to $354 million each, and it is still in a relatively embryonic stage.

The Air Force, I am sorry to say, has misrepresented several things, including the termination cost of the C–130J.

The Air Force—a September 28, 2005, Defense Contract Audit Agency report points out that Lockheed-Martin earned a profit of almost 27 percent—$643 million—on a $2.4 billion, 60-aircraft, multiprocurement for C–130 aircraft. The estimate on the actual multiyear procurement cost savings for the F–22—the Air Force acquisition officers misrepresented the F–22 program as a stably funded program. Last year, Congress authorized and appropriated enough money for 24 F–22 aircraft. The Air Force bought 22. We have been asking them: What happened to the other two airplanes? We still haven't gotten a response. How we buy the F–22 is not subject to unfettered discretion. If we choose to buy them under a multiyear contract, we must do so in compliance with the law. This amendment does not.

The Congressional Research Service points out the many ongoing technical problems with the F–22—avionics problems, airframe problems, engine problems. The F–119 engine fuel consumption has been unsatisfactory, and problems were experienced with the engine's core combustor, which did not demonstrate desired temperature levels. The F–22's cockpit canopy experienced ongoing challenges, including cracking and reliability. It goes on and on. Many of these things are associated with the development of a new weapons system.

By the way, I have never met a pilot who didn't like to fly a new weapons system, but the fact is that it is not ready for multiyear procurement. That was the subject of extensive hearings in the subcommittee and consideration in the full committee. I don't expect this body to rubberstamp everything the committee does, but I can tell you that extensive analysis and study was done on it.

I also point out that literally every outside group, including the IDA, had concerns about it, even though they alleged that there would be significant cost savings. But the fact is that even the IDA, which my friend from Georgia points out—this form of contracting bears significant risks. Multiyear procurement reduces Congressional budgetary flexibility, both for the instant program and across other programs within the Defense portfolio.

I urge my colleagues who consider supporting this amendment—and we know very well that there will be reductions in defense spending. It happens historically as wars wind down. Already on the House side, there has been a proposal for significant reductions in defense spending, which I do not support but apparently may be the final product for next year from the House Appropriations Committee.

We are going to lock in multiyear procurement for a weapons system that has experienced dramatic cost overruns. And I am not saying we shouldn't procure this aircraft. I am saying we should. I am not totally convinced that it would actually meet the challenges of the war on terrorism, but I strongly support it. But before we give them a blank check, I think we should regard what we are doing here—locking in, in a multiyear fashion, the procurement of a weapons system that has gone from $100-and-some million per copy to over $300 million per copy which still has very significant technical problems associated with it. I would caution and urge my colleagues to understand this in the larger context.

Finally, we have a responsibility of oversight in the committee and as a body. If we allow multiyear procurement, we basically give up those oversight responsibilities. And when we talk about a couple hundred million dollars, which is big money, and cost savings, look at the overruns, the billions in cost overruns they have already experienced, and we still haven't got a fully tested, completed, and operational product.

I understand the desire of my friend from Georgia to make sure this program is basically locked in, which is what this amendment will do. I don't think we are ready for it. Every outfit outside of the U.S. Air Force—and even the IDA, with a qualified endorsement—the Congressional Research Service, OMB, GAO, and all the others concur in that conclusion.

I hope we will reject this amendment, but I certainly understand and respect the position of my friend from Georgia.

Mr. WARNER. Mr. President, I find myself, as chairman, having to live up to my responsibilities. Not only do I have the highest regard for our colleague from Georgia, I have a high regard for this airplane. These airplanes are stationed in Virginia. I am supporting the position taken by Senator MCCAIN against the constituent interests in my own State because I feel ever so importantly the statements made by Senator MCCAIN—namely, that the oversight which our committee tries to provide should be respected in this Chamber. It is our collective judgment. The majority of the

Senators, having voted on this in various ways in our committee, believe that we should not go to this multiyear procurement at this time for reasons eloquently stated by the Senator from Arizona.

I regret deeply to be in opposition to one of our most valued Members, the Senator from Georgia, but let me point this out: You have to sometimes stand apart from constituent interests, State interests, and do what you believe is in the best interests of this country.

I say this with a sense of humility. I walked into the Pentagon in February of 1969 as then-Under Secretary of the Navy. The halls of the building were filled with the wreckage of a plane called TFX in which this country had invested billions of dollars to build and it was finally concluded that, for a number of reasons, the contract shouldn't go forward. Thereafter, in the positions as Under Secretary and Secretary of the Navy, I worked with the S-3, a new AFW airplane, bringing that along. I worked with the F-14. As a matter of fact, this distinguished aide of the Armed Services Committee was an F-14 pilot and has reminisced with me many times—thank you for putting two engines on that plane—because many a time he landed on a carrier with one engine.

The planes are complicated situations, and they are becoming more and more complicated each year, and it is the collective judgment of the members of the Senate Armed Services Committee that we should not abdicate our oversight and jump into this multiyear procurement.

I support the airplane. I am hopefully getting additional aircraft at my base in Virginia. I am proud of that. But I am going to support what I think is a proper management decision. To support the Chambliss amendment would be, frankly, a violation of statute on the books, the law of the land. Subsection A(1) through subsection 6 of section 2306(b) of title 10, United States Code, establishes the conditions for entering into a multiyear procurement contract. The statute requires the use of such a contract resulting in a substantial savings. This multiyear procurement proposal under this amendment would not provide substantial savings—some savings but not substantial. The statute also requires that the estimates of both the cost of the contract and the anticipated cost avoidance through the use of a multiyear contract are realistic.

Just listen to what Senator MCCAIN said. The estimates are not realistic. The Air Force had budgeted for 24 F-22A aircraft in fiscal year 2006 but will only be able to buy 22 or 23 aircraft with the available funds.

Mr. President, the statute also requires that there is a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation. There is no reasonable expectation that the level of funding required to avoid contract cancellation will be met. The multiyear justification package sent to Congress on May 16, 2006 presented a program that was underfunded by $674 million.

By statute, I say to colleagues, this amendment cannot be supported. By statute, by the majority of the members of the Committee of the Armed Services having examined it carefully, through subcommittee and full committee review, it cannot be supported. I say most respectfully to the Senator from Georgia, we are facing here a rather interesting chapter of a very significant and important defense contractor trying to get through this body a decision which is in violation of statute and overrides the judgment of the majority of the members of the Armed Services Committee. I urge Senators not to support this amendment.

The PRESIDING OFFICER (Mr. VITTER). The Senator from Georgia is recognized.

Mr. CHAMBLISS. Mr. President, I yield 3 minutes to my colleague from Georgia, Senator ISAKSON.

The PRESIDING OFFICER. The Senator from Georgia is recognized.

Mr. ISAKSON. Mr. President, I thank my distinguished colleague, the senior Senator from Georgia, SAXBY CHAMBLISS, for offering this amendment. I have the greatest regard for the committee and subcommittee chairmen. Senators WARNER and MCCAIN are outstanding Members of this body. I beg to differ with them, and I want to focus my debate on two critical areas.

One is Senator CHAMBLISS presents as a selling point of this amendment that $235 million in savings that a multiyear contract brings would not happen if you were doing annual contracts. The distinguished Senator from Arizona acknowledged, did not argue that that number was not correct. The distinguished Senator from Virginia also did not argue that number wasn't correct but made the following statement, that that is not a substantial savings. That is at best a subjective judgment, but I would call $235 million substantial any time.

Secondly, I would like to quote from a letter—and I ask unanimous consent to have this letter printed in the RECORD—dated June 8 from James Finley, Deputy Under Secretary of Defense, to the GAO.

Over the past several procurement lots, the Air Force has been very successfully working with the prime contractor to drive down cost. Unit flyaway costs have come down 35 percent between Lot 1 and Lot 5. If stopped, production re-start would be very costly and difficult to resume, breaking this positive trend.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

DEPUTY UNDER SECRETARY OF DEFENSE,
Washington, DC, June 8, 2006.

MR. DAVID M. WALKER,
Comptroller General of the United States, U.S. Government Accountability Office, Washington, DC.

DEAR MR. WALKER: This is the Department of Defense (DoD) response to the GAO draft report, "Tactical Aircraft: DOD Should Present a New F-22 Business Case Before Making Further Investments," dated May 8, 2006 (GAO Code 120474/GAO-06-455R).

The Department does not agree with draft GAO report's recommendation to delay further investment in the F-22. While the Department agrees with the GAO's emphasis on the importance of supporting our procurement decisions with appropriate "Business Case" analysis, we have performed such analysis to support F-22 and tactical aircraft force structure decisions, and will continue to do so. Additional information and rationale for the Department's position is summarized below.

Implementing the GAO's recommendation to delay investment in the F-22 would disrupt production and create program instability. This instability would be detrimental to our nation's defense capabilities and our tactical aircraft industrial base. Over the past several procurement lots, the Air Force has been very successfully working with the prime contractor to drive down costs. Unit flyaway costs have come down 35% between Lot 1 and Lot 5. If stopped, production restart would be very costly and difficult to resume, breaking this positive trend. Likewise, there is considerable modernization work ongoing. To stop this work would result in large termination costs and would be very costly to resume. Multiple GAO reports have noted the negative impact that program instability has on program cost, schedule, and performance.

The assumptions on which the GAO's recommendations are based were not understood. The quantity and mix of tactical aircraft to be procured by the Department has been and remains an area of significant "Business Case" analysis. As the geopolitical and fiscal environment changes, we continually reassess national security requirements and adjust our force structure as needed. Keeping the F-22 production line active, preserves the Department's options and sustains the industrial base for efficient transition to Joint Strike fighter production.

To support the Quadrennial Defense Review and preparation of the President's Fiscal Year 2007 Budget (PB07), the Department performed a Joint Air Dominance (JAD) Study. The JAD Study examined options for varying levels within the strike fighter mix. The Department looked at the war scenarios and cost implications of buying fewer variants of Joint Strike Fighters, increasing and decreasing the number of F-22s, and buying more legacy aircraft at the expense of fewer fifth generation platforms. The results of these analyses are reflected in PB07, which sets forth a balanced portfolio of tactical aircraft assets, including Joint Strike Fighter, F-22 and F/A-18E/F. The draft GAO report makes note of, "the large disparity between what the Air Force wants for the F-22A program and what OSD has committed to fund, there is a significant break in the business case to justify buying more F-22As." The 381 aircraft the Air Force analysis indicates are required is a fiscally unconstrained projection of Service needs. The QDR analysis reflects fiscal realities and the need to address competing defense priorities. The JAD analysis showed that a balanced force structure mix of fifth generation fighters, with legacy F/A-18E/Fs, F-15Es and conventionally armed bombers, best met our requirements. Buying fifth generation tactical

aircraft assets (F-22 and JSF), for both the Air Force and the Department of the Navy, optimized capability, affordability, and mitigated risk better than other options.

A detailed response is attached.

Thank you for the opportunity to respond to this draft report.

JAMES I. FINLEY.

Mr. ISAKSON. Mr. President, I was in business—didn't build airplanes but built houses—and I know a little bit about R&D development costs, but I know what the Raptor does.

Many of the things that were referred to as difficulties were predictable experiences in the development of a weapons system. The Raptor is the finest airplane ever built by any government anywhere any time, and the pilots who fly it attest this meets and exceeds every specification.

For me as a Senator, the other specification I want to meet is saving the taxpayers of the United States of America money; $235 million is a substantial savings. The Senator from Georgia, Mr. CHAMBLISS, is right. This amendment establishes a 3-year multiyear contract for the F-22 is right, and I urge my colleagues to support it in the Chamber.

I yield back the time.

The PRESIDING OFFICER. The Senator from Georgia is recognized.

Mr. CHAMBLISS. I yield 3 minutes to the Senator from South Dakota, Mr. THUNE.

The PRESIDING OFFICER. The Senator from South Dakota is recognized.

Mr. THUNE. Mr. President, the Chambliss amendment will remove the prohibition on multiyear contract authority for the purchase of the F-22A aircraft and in so doing give the DOD the flexibility it needs to purchase 60 F-22A aircraft over a 3-year period in installments of 20.

The multiyear contract will save the Government, as has been noted by Senator ISAKSON, over $200 million over the 3-year period and allow for a rational and steady flow of F-22s.

Mr. President, I also want to note one thing about the GAO study that has been referenced here today and the funding for the F-22A. The statement is made in the GAO study that the funding for the F-22 could be better spent on fighting the war on terror. The problem with that is it assumes that America faces threats from only irregular forces or subnational groups.

North Korea's threat to launch a multistage missile that can hit Hawaii, Iranian nuclear ambitions, and the expansion and modernization of the Chinese military are patent examples of substantial threats from independent nation states.

The air superiority gap America once enjoyed has dramatically closed. The F-15, F-16, or F-18 are no longer without competition on the world stage. Since the late 1970s, for example, the Russian Air Force has been continually improving its air fleet. Planes like the MiG-29, Su-27, Su-35, and the addition of the Su-37 super-flanker have evened the playing field. The Chinese are now making their own version of the Su-27 under the designation J-11. Both Russia and China are eyeing foreign buyers for these formidable aircraft.

Further technology and modern air defenses have grown significantly, and Legacy aircraft are vulnerable to increased anti-aircraft threats and technology.

Congressional inaction on this matter is creating a situation where American pilots will be flying aging Legacy aircraft against comparable enemy aircraft.

DOD states that the F-22As as fifth-generation fighters is needed to neutralize advanced air defenses, thus opening the door for follow-on joint forces to include nonstealthy Legacy aircraft and long-range strike capabilities.

We need the F-22. The QDR supports this notion. The QDR focuses on the ability to quickly and effectively penetrate enemy airspace and exploit stealth and electronic warfare capabilities. The F-22A excels at all these missions and helps America take a step ahead against emerging technologies and threats we face.

Mr. President, I urge my colleagues to support the Chambliss amendment and allow the Air Force to move forward in a way that will enable us to save the taxpayers money and to meet the needs that we face for this country as we go forward.

I yield back the remainder of my time.

Mr. CHAMBLISS. Mr. President, how much time is remaining?

The PRESIDING OFFICER. The Senator has 9 minutes remaining.

Mr. CHAMBLISS. I yield such time as he may consume to the Senator from Oklahoma.

The PRESIDING OFFICER. The Senator from Oklahoma is recognized.

Mr. INHOFE. I thank the Senator from Georgia. I think this is a very serious thing we are getting into. I have five very important points I plan to make to respond to statements that have been made in the Chamber here. One is I think the Chairman is right when he talks about the information wasn't there, wasn't adequately discussed during the markup. One of the reasons for that is the IDA study didn't even come out until May 15, and because of that, that was not a part of the conversation.

Let me say one thing about the GAO study. I agree with the Senator from South Dakota. I am always leery of a new study that comes out the same day that an amendment is discussed and brought up in the Chamber, and that happened to be 3 days ago. I think it is quite a coincidence it came out at the same time. Having looked at the IDA study, we are on solid ground for pursuing this multiyear effort.

Let me respond to our good friend, the Senator from Arizona, on the cost overruns and the delays. I cannot remember—I have been on this Armed Services Committee for 12 years and in the House for 8 years—one system that did not go through this same thing. In the Navy alone, they had many cost overruns. The joint strike fighter, now recognized as something we desperately need and are using, probably had more cost overruns. We had the Black Hawk upgrades, the same thing there.

But the thing I remember the most is the C-17s because I was in the House at that time. It was delay after delay after delay, and stop and think, if we had at that point junked that, where would we be? Where would we have gone in Bosnia, Kosovo? Things were anticipated where we would desperately need it.

Right now we need to increase the number of planes. That I think we all know. And then we know what is happening to the C-130-R program. This is something that has been happening for a long period of time.

The third thing I want to mention is the savings. I know one of the six criteria is called substantial savings. I don't know if there is anyone who is going to be looking at this budget and accepting the fact that a quarter of a billion dollars is not substantial. But there seems to be some doubt by Senators as to whether or not these savings would actually be achieved. And if you really ask questions about it, if we really had to do this, I say to my friend from Georgia, we could write that in and say at any point when it looks like we cannot anticipate these savings, we would go back to the other type of procurement. That could be done.

Quite frankly, I think the Air Force would be willing to do that. And the figure of $225 million they and others believe and I believe is a conservative figure. So I think that would be one way to offset it.

When you look at title 10 criteria, substantial savings, we have talked about that; stability, we have talked about that, stability of funding, stability of design, we all know these things and where we are with the program.

And so I have come to the conclusion after looking at this that it does qualify for all of these criteria, but there is one thing that has not been said, quite frankly, in the right wing over here, and that is, during the 1990s I can remember standing on this floor and saying we are going to have to do something about what is happening to the modernization program because it is not just the aircraft and artillery pieces, the most modern thing we have for the artillery is the Palladin, which is World War II technology, where you have to get out and swab the breach after each shot. There are five countries, including South Africa, making a better artillery piece than we are sending out with our kids.

Then we look at the F-15 and F-16, great vehicles. We understand that. But one of the proudest moments I have had was in 1998 when we were cutting a lot of the Defense budget at that

time. We had two-star general John Jumper, who stood up and said publicly: Now we are sending our kids out with equipment that is not as good as the Russians are making. At that time, they had the Su-27; the Su-30 was not actually deployed yet, now the Su-35. And we know in one purchase—I say to my friend from South Dakota because he mentioned other countries that are buying these things—in one purchase, the Chinese purchased 230 of these vehicles. We think they are Su-30s, but we don't know.

Consequently, if you assess the judgment as someone I think we will have to accept, and that is General John Jumpers, their Su series in many ways is better than our best strike vehicles, the F-15 and F-16. That has to concern Americans.

So I think if that were the only reason to keep this on schedule, and go to a multiyear program where we enjoy the savings, that would be reason enough. As long as I am here, I am going to try to put America in a position where we have the very best of equipment with which we send our kids to battle. That is not the case today. So I strongly support the amendment and believe we should get on with it.

Mr. President, I yield back.

The PRESIDING OFFICER. The Senator from Arizona.

Mr. MCCAIN. Mr. President, I yield myself such time as I may use.

I think we ought to try to go back to what this amendment is about. This amendment is not to cure any delay. The fact is, we have in this authorization 20 F-22s, with $1.4 billion over what was in the budget—20 of them. And then, next year, I would imagine we will authorize another 20; and the year after that, another 20. This is not about any delay. This is about congressional oversight. This is whether we should go to multiyear funding and lock us into a weapons system which has not been proven yet.

I say to my friend from Georgia, no matter how this amendment comes out because of the differences of opinion we have within the committee, in July I would like to schedule a hearing, and we will get all the players over again. Whether this amendment goes up or down, in July we will schedule a hearing in the subcommittee and have another look at the pluses and minuses. The Senator from Oklahoma mentioned that several studies have come in. The IDAs came in on the 20th. The GAO one came in yesterday or the day before.

So I will be glad—no matter how the vote ends up—to have another hearing on this issue because we are talking about, obviously, really large sums of money. So this Senator does not want to delay the procurement of the F-22. But I certainly want to maintain our ability to oversight the program rather than locking us in. So it is not about whether we delay or not.

Finally, on the issue of saving $225 million: from what? Because the Air Force, on May 16, 2006, stated that an additional $674 million is needed to fully fund the multiyear program being proposed. So is that savings of $225 million out of the $674 million of additional costs or does it mean there really isn't an additional $674 million, that they sent over, that they need? So that has to be sorted out as well.

So again, I restate to my colleagues that literally every outside organization—CRS, CBO, GAO—all of them believe not that this weapons system needs to be canceled, not that it needs to be delayed, but we do not need to embark on a multiyear lock-in acquisition of this weapons system, which no doubt has very great value.

I hope my colleagues will agree with the distinguished chairman and me that this amendment should be rejected at this time.

Mr. President, does the Senator from Michigan wish to speak on this?

The PRESIDING OFFICER. The Senator from Michigan is recognized.

Mr. LEVIN. Mr. President, I will be opposing the Chambliss amendment, although I am both a supporter of the F-22 and a supporter, generally, of multiyear contracts. Where they meet the criteria for multiyear contracts, I am very supportive of them because of, mainly, the money that can be saved.

I oppose this amendment with some reluctance. Again, I very much support, and have supported, the airplane. And I, in general, like the multiyear approach, where it meets the criteria. But some of the criteria have not been adequately met; for instance, whether the multiyear contract would result in substantial savings compared to using annual contracts. The studies are that the savings would be, I would say, very modest and not substantial. There are some savings, but I could not say they are substantial savings.

Another criteria is whether the contract is for a number which is expected to remain substantially unchanged during the contemplated contract period in terms of both numbers, production rate, procurement rate, and, again, total quantities. The F-22 total program quantities are likely to increase before the end of production.

There is also a requirement that there be a stable design for the property to be acquired and that the technical risks associated with the purchase are not excessive. There are some unresolved operational test deficiencies, and there are what I think can fairly be called major modifications that are planned for providing more robust air-to-ground capability.

There is also a question as to whether the estimates of both the cost of the contract and the anticipated cost avoidance through the use of a multiyear contract are realistic. Cost estimates are still problematic. The 2006 contract itself, we understand, has still not been signed. So it does not meet that criteria either.

I would hope that, perhaps next year, a multiyear would indeed meet the criteria so we could utilize a multiyear approach next year. But I do not believe this year it does meet the criteria for a multiyear contract. I, therefore, will be opposing the Chambliss amendment.

I yield the floor.

The PRESIDING OFFICER. The Senator from Georgia.

Mr. CHAMBLISS. Mr. President, I respond to the distinguished Senator from Michigan that all of this which he raised has been addressed in the IDA report and has been answered. The criteria set forth in the statute has been validated and verified. I don't know of any technical problems with the airplane today because, as I said earlier, we have 32 at Langley currently. We have other airplanes stationed at a couple of other bases around. They are flying over us as we speak, protecting our Nation's Capitol. They are in rotation to go to Iraq. If there were any deficiencies, obviously, we would not have those airplanes put in that rotation, engaging in what may be combat.

I will close by finally saying there has been a lot of conversation about the way the cost of this airplane has increased. I think the mission of the airplane actually has changed over the 19 years since this airplane was first authorized. It was initially an air-to-air airplane. Air-to-ground was added to it, which caused delays. What the Senator from Arizona alluded to, relative to issues of the airplane is exactly correct. But all of those have been addressed. And the cost, the flyaway costs of this airplane for the last three lots have decreased by 16 percent, 11 percent, and 14 percent respectively.

So it is an expensive airplane. There is no question about that. But the capability of the airplane is also not questioned. It is a good deal for the taxpayers. It is a good deal for the folks who are going to be called on to fly this airplane in defense of this country. I encourage my colleagues to support the amendment.

Mr. HATCH. Mr. President, today I rise as an ardent supporter of the F-22A Raptor. I am very pleased that the Armed Services Committee has modified the Department of Defense's budget request and authorized the procurement of 20 F-22s during the next fiscal year.

That being said, I must express my disappointment that the committee did not include in this legislation language authorizing the Secretary of the Air Force to enter into a multiyear procurement contract to purchase 20 Raptors a year for the next 3 years. Under such a contract, the Institute for Defense Analyses estimates that we will save the taxpayer at least $225 million. Therefore, I am proud to join Senator CHAMBLISS and cosponsor this important amendment along with Senators INHOFE, LIEBERMAN, BINGAMAN, CORNYN, THUNE, BENNETT, ISAKSON, DOMENICI, BAUCUS, DODD, HUTCHISON, COLLINS, BEN NELSON, FEINSTEIN and

STEVENS. Our amendment only strengthens the procurement plan for this vital aircraft.

I am also troubled that this bill does not increase above the 183 currently planned the number of F-22s that the Air Force is authorized to procure. My trepidation that our Nation will not build a sufficient number of aircraft is based on careful study of our Nation's needs and on the advice and counsel of senior Air Force officers who have been unanimous in their expert opinion that if the Air Force is to meet its responsibilities under the National Military Strategy, the Nation requires 381 Raptors.

I have seen first-hand the capabilities of this extraordinary aircraft, first at Tyndall Air Force Base, FL, where our pilots are learning to fly the Raptor, and second at Langley Air Force, VA, where the first operational F-22s are based. As a result of these meetings with pilots and ground personnel and several other briefings on our future preparations, I have come to the conclusion that purchasing sufficient numbers of Raptors is absolutely vital to our national security.

Over the past 30 years, the United States has been able to maintain air superiority in every conflict largely due to the F-15C. However, with the great advancements in technology over the past several years, the F-15 has struggled to keep pace. For example, the F-15 is not a stealth aircraft and its computer systems are based on obsolete technology. My colleagues should remember that the F-15 first flew in the early 1970s. During the ensuing years, nations have been consistently developing new aircraft and missile systems to defeat this fighter.

Realizing that the F-15 would need a replacement, the Air Force developed the F-22. The F-22's combination of stealth, supersonic cruise, advanced maneuverability, and sensor-fused avionics makes this aircraft a powerful deterrent to countries contemplating a challenge to U.S. interests, and defines the essence of a true fifth generation fighter.

So far during the current exercise Northern Edge in Alaska, the F-22A has achieved a kill ratio of 144:0. Not one F-22 has been simulated "shot down" while 14 legacy F-15s and F-18s in the exercise have been simulated "shot down." One-hundred-and-forty-four to zero, that is the way American forces should go to war.

The F-22 has the greatest stealth capabilities of any aircraft currently flying or under design. This is a powerful attribute when one remembers that it was the F-117 Nighthawk's stealth characteristics that enabled that aircraft to penetrate the integrated air defenses of Baghdad during the first night of the 1991 gulf war. The F-22 brings stealth capability out of the night, enabling operations in high threat areas at the place and time chosen by combatant commanders, 24 hours a day seven days a week.

The Raptor is also equipped with supercruise engines. These engines do not need to go to after-burner in order to achieve supersonic flight. This provides the F-22 with a strategic advantage by enabling supersonic speeds to be maintained for a far greater length of time. By comparison, all other fighters require their engines to go to afterburner to achieve supersonic speeds. This consumes a tremendous amount of fuel and greatly limits an aircraft's range.

The F-22 is also the most maneuverable fighter flying today. This is of particular importance when encountering newer Russian-made aircraft and surface-to-air missile systems, both of which boast advanced, highly impressive capabilities against our legacy F-15, F-18, and F-16 aircraft.

Yet, a further advantage resides in the F-22's radar and avionics. When entering hostile airspace, the sensor-fused avionics of the F-22 can detect and engage enemy aircraft and surface threats far before an enemy can hope to engage the F-22. At the same time its advanced sensors enable the F-22 to be a forward surveillance platform gathering crucial intelligence on the enemy.

However, one of the most important capabilities of the Raptor is often the most misunderstood. Many critics of the program state that, since much of the design work for this aircraft was performed during the Cold War, it does not meet the requirements of the future.

I believe this criticism is misplaced. The F-22 is more than just a fighter—it is also a bomber. In its existing configuration it is able to carry two 1,000 pound GPS-guided JDAM bombs and will undergo an upgrade to carry eight small diameter bombs in the near future. In 2008, the F-22's radar system will be enhanced with advanced air-to-ground modes, enabling the Raptor to hunt independently and destroy targets on the ground.

All of these capabilities are necessary to fight what is quickly emerging as the threat of the future—the anti-access integrated air defense system. Integrated air defenses include both surface-to-air missiles and fighters deployed in such a fashion as to leverage the strengths of both systems. Such a system could pose a very real possibility of denying U.S. aircraft access to strategically important regions during future conflicts.

It should also be noted that—for a comparably cheap price—an adversary can purchase the Russian SA-20, surface-to-air missile. This system has an effective range of approximately 120 nautical miles and can engage targets at greater then 100,000 feet, much higher than the service ceiling of any existing American fighter or bomber. Surface-to-air missiles, with similar capabilities, have been sold to Iran. The Russians have also developed a family of highly maneuverable fighters, the SU-30 and 35s, which have been sold to such nations as China. Of further import, 59 other nations have fourth generation fighters.

It has also been widely reported in the aviation media that the F-15C, our current air superiority fighter, is not as maneuverable as newer Russian aircraft, especially the SU-35. However, the F-22 is designed to defeat an integrated air defense system. By utilizing its stealth capability, the F-22 can penetrate an enemy's airspace undetected and, when modified, independently hunt for mobile surface to air missile systems. Once detected, the F-22 would then be able to drop bombs on those targets. Some correctly state that the B-2 bomber and the F-117 could handle these assignments during night only operations. However, the F-22 offers the additional capability of being able to engage an enemy's air superiority fighters, such as the widely proficient SU-35. Therefore, the Raptor will be able to defeat, almost simultaneously, two very different threats, 24 hours a day, that until now have been handled by two different types of aircraft.

I should like to point out that these potential threats are not just future concerns, but they are here today. For example, over the last 2 years, the Air Force has conducted exercises with the Indian Air Force as part of our effort to strengthen relations with that nation. The Indian Air Force has a number of SU-30 MKKs, an aircraft which is very similar to a version of aircraft sold in large quantities to the People's Republic of China. During these exercises, it has been widely reported in the aviation and defense media that the Indian Air Force's SU-30s won a number of engagements when training against our Air Force's F-15s.

So let me be clear on this point: a developing nation's air force was able to defeat the F-15. This was a stunning event and one that requires our immediate attention.

Now that this fact has been established, the question that we must ask ourselves is: How do we remedy this national security concern? The F-22 provides the answer.

Though the F-22 may be the solution to these problems, if the Nation does not purchase a sufficient number of these aircraft our service members could face unnecessary dangers and risks. Many others and I have come to this conclusion after closely listening to our service members when they have outlined their equipment requirements based upon the national security goals our Government has outlined. What is their professional opinion? That if the Air Force is to succeed in the tasks outlined in our National Defense Strategy, our airmen and women require 381 F-22s, far more then the 184 aircraft currently planned.

However, another important consideration is cost. In a period of runaway procurement costs, we are not only concerned about the effort to procure the correct number of F-22s but to procure them at a reasonable price. That

is exactly what this amendment achieves. It authorizes a multiyear procurement plan for the Raptor, in which 20 aircraft a year over 3 years will be purchased. This will result in the taxpayer saving approximately $225 million under the existing plan to purchase 184 aircraft.

Introducing innovative plans to save funds is nothing new to the F-22 program. In fact, since production first began on this aircraft, the "fly-away" cost has been reduced by 35 percent. However, we must take advantage of any opportunity that will result in additional savings while increasing our military capabilities. A multiyear F-22 procurement plan achieves that goal.

If this amendment is adopted, the Air Force will be permitted to enter into a multiyear procurement contract. However, some of our colleagues argue that the F-22 does not meet the six-point requirements for multiyear procurement under existing law. I, on the other hand, believe these criteria have been met and the amendment before us should be seen as reinforcing that fact.

Specifically, the first requirement to authorize a multiyear contract under the existing statute is the determination that substantial savings will result from the contract. The Institute for Defense Analysis estimates that a multiyear contract will result in at least $225 million in savings.

The second criterion states there must be a "minimum need" for the aircraft. I believe that my address today has shown the urgent need to deploy the Raptor in order to counter the deployment of fourth generation fighters and new antiaccess systems.

As far as a minimum need is concerned, as a result of the Joint Air Dominance Study the Secretary of Defense stated that a minimum requirement for 183 Raptors existed. Under the administration's proposal, which this amendment is based upon, the production rate, procurement rate and the total quantities of the Raptor purchased will be substantially unchanged during the contract period. Remember, the contract calls for the purchase of 20 Raptors a year over the next 3 years.

The third requirement insists that the Raptor be a program with stable funding. The Armed Services Committee has added additional funds for this year and the Department of Defense's future budgets will also contain funding requests since the purchase of F-22s under a multiyear procurement contract was called for in the Quadrennial Defense Review.

Fourth, the aircraft's design must be stable. This is probably the most controversial requirement. Yes, the F-22 has had its problems during the development and production process, but I challenge anyone to identify another strike aircraft that hasn't. Remember, the F-22 is now operational. That means the Raptor will deploy in support of our service members and it has satisfactorily completed the engineering and manufacturing development phase as well as its follow-on operational test and evaluation.

It is important to note that any upgrades to the Raptor will not result in significant structural changes. Some might argue, correctly, that a potential problem with the forward boom frame heat-treating has been identified on up to 91 aircraft. It is important to note that this was not an aircraft design problem, but an issue of a manufacturer not following the prescribed manufacturing process. In reality, testing has so far shown that 92 percent of the suspect frames tested did in fact undergo an adequate manufacturing process. I have been advised that neither a redesign nor a refit are planned or expected. Regardless, the manufacturer has been replaced and all aircraft procured under a multiyear agreement will not have this problem.

Fifth, a program must show that its cost estimates are realistic. The Air Force has gone above and beyond the call of duty in providing the Congress with independent cost analysis. The Institute for Defense Analysis provided an Independent Cost Estimate in 2005 and with a multiyear procurement business case analysis in May of this year.

Finally, the last requirement of a multiyear procurement plan is the determination that the program is important to the national security of the United States. I believe that we have already established conclusively that the Raptor is the answer to the present and future threats posed by antiaccess systems.

Therefore, I believe that the Raptor qualifies for a multiyear procurement contract under the existing statute. However, to ensure there is no doubt on this subject, I strongly recommend this amendment to my colleagues.

Our Nation stands at a crossroads.

In a wide variety of policy arenas, the Senate is being asked to make investments that will reap rewards for our children and our grandchildren.

The F-22 is one of these investments. It will guarantee America's dominance of the skies for the next half century. All that is required is that we make a commitment now to ensure that future. By purchasing adequate numbers of F-22 Raptors we are meeting the threats of today and tomorrow and we are doing so in such a way as to maximize the savings of the American taxpayer.

I thank Senator CHAMBLISS for offering this important amendment, and I urge my colleagues to join my fellow cosponsors, Senators INHOFE, LIEBERMAN, BINGAMAN, CORNYN, THUNE, BENNETT, ISAKSON, DOMENICI, BAUCUS, DODD, HUTCHISON, COLLINS, BEN NELSON, FEINSTEIN and STEVENS in supporting this amendment.

Mr. LIEBERMAN. Mr. President, I rise today to speak in support of the amendment to authorize a multiyear procurement for the F-22 fighter—amendment No. 4261 I am proud to cosponsor. I thank my friend and colleague, the Senator from Georgia, Mr. CHAMBLISS, for his leadership in offering this amendment. I believe he has very ably and comprehensively argued the case for this multiyear and has persuasively rebutted the personal arguments against taking this action. But I want to add some thoughts about why I think this is a prudent act by this body.

The F-22 has had developmental problems and it has had cost increases. But all this is old news. There are few, if any, programs that have had more oversight by the Senate Armed Services Committee than this program. We have examined it in great detail in hearings each year from concept to procurement. We have examined the technology, the acquisition plan, the development process, and the production issue. And we have examined the costs in substantial detail. In some years we have put on cost caps to force spending discipline, and in other years we have slowed down production to align the request with the reality of the backlog. But despite the challenges of building the world's most capable fighter, we have decided, and the full Senate has decided, that this is a critical program that should and must continue. And the U.S. Air Force has argued it needs the F-22 to continue.

There is a very compelling reason for this decision. Air dominance is absolutely essential to American military dominance and American security in the 21st century. Our military has had that dominance since World War II. If we were ever to lose it, or even allow it to be seriously challenged, the global strategic environment would fundamentally change for the United States. The F-22 is the way we prevent that from happening for the next generation maybe more. Much has been said about the cutting-edge technologies that are included in this airplane that will ensure we maintain that air dominance. I need not repeat that now. But it is the reason that we have voted to continue procuring the F-22 and it is reason that we will continue to do so.

I believe the problems with the F-22 that some of my colleagues have reminded us about have been substantially solved. The F-22 business case was validated by DOD during the QDR and the Air Dominance Study. The long debate over the number we will procure is about over. I am convinced that it will not be lower than the 183 validated by the QDR. In fact if there are now to be changes in that number, it will be increased, not decreased. So I believe that we will build the additional 60 contemplated in this amendment. The decision to procure these 60 over 3 years instead of 2 years is sound. We should not have a break in the production line before we begin building the F-35 the JSF. Those 60 aircraft can be built for about $250 million less with the multiyear buy provided for by this amendment.

The Senate Armed Services Committee, and the Airland Subcommittee,

has spent much time focusing on our acquisition system because we are concerned that the weapons we are buying are taking too long to field and are costing too much. We believe the American people should not pay more than they have to. But we also believe our Armed Forces should get the weapons they need to defend our security. SACS have concluded we need this fighter. We recommended full funding this year for 20. I believe we will do that next year and the year after that until we have procured 183 F–22 fighters. Authorizing a multiyear will cost the American people $250 million less than if we authorize these fighters year by year. That is good acquisition policy. Our Armed Force needs this fighter, and we should not pay $250 million more to get it than we have to. That is why I urge my colleagues to support this amendment.

Mr. MCCAIN. Mr. President, I yield back the remainder of my time.

Mr. CHAMBLISS. Mr. President, I yield back the remainder of my time.

Mr. LEVIN. Mr. President, if the Senator from Arizona will yield 1 minute?

The PRESIDING OFFICER. The Senator from Michigan is recognized for 1 minute.

Mr. LEVIN. Mr. President, I want to put in the RECORD a chart from the Institute for Defense Analysis. It compares savings on various programs, showing savings with the F/A–18, multiyear, from 7 to 11 percent; the C–17 airplane, of 10 percent; the C–130J, multiyear, of 10 percent; and the comparison to the F–22, which they estimate at 2.6 percent. I ask unanimous consent that this chart be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

TABLE 4.—CHARACTERISTICS OF OTHER RELEVANT MYP PROGRAMS

Program	Savings (%)	Savings (FY$M)	Prior lots/units	Period of performance (years)	Procurement timeframe	Quantity procured	Amount of CRI funding ($M)	Amount of EOQ funding ($M)	FAR	TINA waiver
F/A–18E/F Air Vehicle (MYP–1)	7.4	$850	3/62	5	FY00–04	222	$200	$85	15	No
F414 Engine (MYP–1)	2.8	51	5/682	5	FY02–06	454	0	0	15	No
F/A–18E/F/G Air Vehicle (MYP–2)	10.95	1,052	8/284	5	FY05–09	210	100	0	15	Yes
C–17A Airframe (MYP–1)	5.0	760	8/40	7	FY97–03	80	350	300	15	No
C–17A Engine (F117–PW–100)	6.0	122	4/160	7	FY97–03	320	0	0	12	No
C–17A Airframe (MYP–1)	10.8	1,211	14/112	5	FY03–07	60	0	645	12	Yes
C–17A Engine (F117–PW–100)	5.7	92	14/448	5	FY03–07	267	0	0	12	No
C–130J/KC–130J	10.9	513	9/37	6	FY03–08	52	0	140	12	No
C–130J (Air Force)	10.9	340	....	6	FY03–08	42	0	unknown	12	No
KC–130J (Marine Corps)	13.1	173	....	6	FY03–08	20	0	unknown	12	No
F–16A/B/C/D Air Vehicle (MYP–1)	7.7	246	4/605	4	FY82–85	850	unknown	unknown	15	No
F–16C/D Air Vehicle (MYP–2)	10.1	467	8/1139	4	FY86–89	720	unknown	unknown	15	No
F–16C/D Air Vehicle (MYP–3)	5.7	262	12/1859	4	FY90–93	630	unknown	unknown	15	No
Average	8.00	469	....	5.25	N/A	292	N/A	N/A		
F–122A Air Vehicle	2.6	203	8+122	3	FY07–09	60	0	255	15	No
F–122A Engine (F119–PW–100)	2.7	32	8+244	3	FY07–09	120	0	45	15	No

[a] Include Production Representative Test Vehicle (PRTV) lot and units.
[b] Include PRTV lot and units and Replacement Test Aircraft (RTA); installed engines only.

Mr. LEVIN. I yield back my time.

The PRESIDING OFFICER. All time has been yielded back.

Mr. CHAMBLISS. Mr. President, I ask for the yeas and nays on my amendment.

The PRESIDING OFFICER. Is there a sufficient second? There is a sufficient second.

The yeas and nays were ordered.

The PRESIDING OFFICER. Under the previous order, the Senator from Minnesota is recognized.

Mr. DAYTON. Thank you, Mr. President.

AMENDMENT NO. 4241

Mr. President, I am a proud cosponsor of Senator MCCAIN's proposal to name this legislation after the great chairman of the Senate Armed Services Committee, Senator WARNER.

I have had the privilege during my term in the Senate to serve on the Armed Services Committee under two tremendous chairmen, outstanding Senators, and terrific human beings—JOHN WARNER and CARL LEVIN.

Our Senate, our military, and our country have been fortunate to have their extraordinary leadership during these critical years.

Chairman WARNER, for whom this legislation would be named, is more than deserving of that honor. He is greatly respected by our committee members on both sides of the aisle and, indeed, by the entire Senate. He has been unfailingly fair to all points of view, while leading us with a firm hand and resolute gaze, that he learned during his own military service and as Secretary of the Navy.

When he picks up his committee gavel, all of us—members, staff, military officers, and other interested parties—all know we have a leader well prepared in all respects for that enormous responsibility.

Our Senate and our Nation are indebted to Senator WARNER and to Senator LEVIN for their superb public service.

Mr. President, I have listened to many of my colleagues express their views on Iraq during the past week and have waited for this opportunity to express my own.

My colleagues reflect sincere differences and I believe sincere desires to uphold the best interests of our great country in a very difficult and complicated situation. We are all patriotic Americans first and foremost and partisan politicians later.

I voted against the Iraq war resolution in October 2002, despite being presented with incorrect and misleading information by very high officials in the Bush administration, which purported to prove that Saddam Hussein was developing nuclear weapons. I questioned the veracity of that information. And I had grave concerns that an unwarranted invasion of Iraq, if no weapons of mass destruction were found, would ultimately weaken, not strengthen, the national security of the United States by seriously damaging our standing and our alliances throughout the world.

I also voted against the Iraq war resolution because I believed that such a decision by the Congress at that time was premature. President Bush was not asking Congress for a declaration of war, as the U.S. Constitution requires. He was asking for a congressional resolution authorizing him to declare war, if he determined it necessary at some later date. I do not fault the President for asking for that blank check. I fault the Congress for giving it to him. In fact, it was over 6 months later that the President made his final decision to commence military action against Iraq.

In a similar vein, I believe that both the Levin-Reed amendment and the Kerry-Feingold amendment were premature. One called for the redeployment of U.S. troops from Iraq to begin within 6 months. The other required the almost complete withdrawal of those troops within a year.

I believe it is impossible to foresee at this time whether either of those actions would be in the best national security and foreign policy interests of the United States 6 months or 1 year from now. The situation in Iraq is too uncertain and too unpredictable to do so. That uncertainty and unpredictability evidence the failures of the Bush administration's conduct of this war effort.

It is now over 3 years since the U.S. military swept from the Iraqi border to Baghdad in only 3 weeks, overthrew Saddam Hussein and his evil regime, and liberated the Iraqi people. Yet after that swift and decisive military victory was won, the Bush administration has failed to secure it.

Administration officials ignored the advice of their own top military commanders—and this is an important lesson for us—and failed to commit

Appendix G

Selected documents from
Christopher Bolkcom,
Specialist in National Defense,
Congressional Research Service

1. March 28, 2006 Testimony to the Senate Armed Services Committee AirLand Subcommittee.

2.June 19, 2006 Memorandum, F-22 Technical Challenges.

3. June 19, 2006 Memorandum, F-22 Program Cost Estimates.

NOT FOR PUBLICATION
UNTIL RELEASED BY
SENATE ARMED SERVICES COMMITTEE

STATEMENT OF

CHRISTOPHER BOLKCOM
SPECIALIST IN NATIONAL DEFENSE
CONGRESSIONAL RESEARCH SERVICE

BEFORE THE

SENATE ARMED SERVICES COMMITTEE
AIRLAND SUBCOMMITTEE

HEARING ON AIR FORCE AND NAVY
TACTICAL AVIATION PROGRAMS IN THE
FY2007 DEFENSE AUTHORIZATION REQUEST
AND THE FUTURE YEARS DEFENSE PLAN

MARCH 28, 2006

NOT FOR PUBLICATION
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PANEL 1 STATEMENT

Proposed F-22A *Raptor* Funding Strategy

Mr. Chairman, distinguished members of the subcommittee, thank you for inviting me to speak to you today about the F-22A. As you requested, my testimony will address the Air Force's proposed new funding strategy for the F-22A, and its plan to proceed with a multi-year procurement of 60 F-22A aircraft.

Introduction

As part of its FY2007 budget request, the Department of Defense (DoD) has proposed a change in how it plans to fund its remaining production of the F-22A *Raptor*, which in its parlance is "non-traditional, but executable."[1] The new strategy is complex, but can be described in a simplified way. DoD proposes to add an additional production lot, and to stretch the funding of its final 60 *Raptors* over an additional two year period (from FY08 to FY10). This incremental funding will reduce the average annual rate of procurement, and split the funding of annual production over a two year period (sub-assembly activities are funded in the first year, those sub-assemblies then transition to final assembly to create a complete aircraft in the second year). The Air Force also desires authority to enter into a multiyear procurement (MYP) contract, and a reprogramming of FY06 funds to execute an economic order quantity (EOQ) purchase prior to MYP authority. This revised strategy is expected to increase program costs at least $930 million more than the program's cost estimate under the FY2006 plan.[2]

The Defense Department expects this plan would enable it to purchase four additional aircraft (for a total of 183), and extend the F-22A production line approximately one year, to reduce the gap between F-22A and F-35 production. Secretary of the Air Force Michael Wynne has testified to the full committee that "it is not in our nation's interest to terminate this fifth generation fighter [the F-22A] until we got access to another fifth generation fighter [the JSF]." Mr. Wynne's principal concern was that the United States might get into an "hot engagement" without either the F-22A or the JSF in production.[3]

The Defense Department cannot pursue this new funding strategy without congressional approval. Specifically, for this plan to move forward, DoD needs Congress to 1) grant it approval to negotiate an MYP contract with Lockheed Martin for the final three production lots, 2) grant it the authority to reprogram funds to make an economic order of quantity (EOQ) purchase in FY2006, and 3) approve the plan to incrementally fund the last 60 aircraft.

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[1]USAF Briefing on F-22A New Funding Strategy and Multiyear Procurement. Provided to CRS on March 2, 2006 by SAF LLW.

[2] FY 2006 and FY2007 Budget Estimates. AIRCRAFT PROCUREMENT AIR FORCE OPR: SAF/FMB. VOLUME I. U.S. Air Force.

[3]Hearing of the Senate Armed Services Committee on the Defense Authorization Request for Fiscal Year 2007 and the Future Years Defense Program. March 2, 2006.

Complications

A number of factors may complicate DoD's ability to secure congressional approval of its "unorthodox plan" for the F-22A. For example, the F-22A program has experienced noteworthy turbulence between the FY05 and FY07 budget requests. Total program budget, annual budget requests, total inventory, annual procurement rate, and program duration have all changed. These changes may engender closer scrutiny than is customary of the underlying criteria for MYP authority.

Considering the changes to the F-22A program that have occurred, and changes which are being proposed, some may question the Air Force's ability to comply with some provisions of 10 USC 2306b(a), including provision (2) "That the minimum need for the property to be purchased is expected to remain substantially unchanged during the contemplated contract period in terms of production rate, procurement rate, and total quantities." and (3) "That there is a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation."

A further complication may be a problem with sections of the F-22A's titanium "forward boom frame" (a series of load-bearing structures within the aircraft's fuselage, located between the engine and the wing) which was discovered by the manufacturer in December 2005. 10 USC 2306b(a) (4) requires that "There is a stable design for the property to be acquired and that the technical risks associated with such property are not excessive." Air Force officials say that the cause of the problem has been identified, and is not expected to affect any aircraft built after Lot 5. Air Force officials say that "Neither a redesign nor a retrofit are expected at this time."[4] However, Air Force officials also note this issue is still being evaluated, so making conclusive statements on potential ramifications may be premature.[5] Further, 91 aircraft were potentially affected by this problem. Inspecting these aircraft and taking corrective action, if any, may require substantial time and effort that was previously unforeseen.

Even if this potential flaw is easily resolved, some may raise questions about how this problem was made public. The Air Force briefed committee and other congressional staff on the F-22A's proposed funding strategy on February 22, 2006 and March 13, 2006, but did not mention the potential flaw in either briefing. Yet the potential flaw was discovered in December 2005. Were Air Force leaders unaware of this potential problem in February and March? Or, on the other hand, were Air Force leaders aware of this problem when they briefed congressional staff, and chose not to mention it? If so, this may suggest a lack of disclosure and transparency on the Air Force's part. Questions may remain on whether other problems associated with F-22A manufacture may emerge.

Another complication for the Air Force is the proposed incremental funding of F-22A procurement. Section 8008 of the FY2006 Defense Appropriations Act (PL 109-148) states that multiyear procurement must be based on "full funding of units to be procured through the contract." Supporting legislation, such as H.R. 4613 (H.Rept.108-553 of June 18, 2004) make clear that some appropriators find incremental funding to be incompatible with MYP contracts: "the Committee directs these requirements be met before future multiyear production contracts can be entered into: (1) Multiyear contracts must follow full funding policies and not be used as vehicles for incrementally funding procurement..." Some Members of Congress have already expressed concern

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[4]"Bullet Background Paper on F-22A Forward Boom Heat Treatment Issue." March 16, 2006. U.S. Air Force.

[5]Tony Capaccio. "Lockheed F-22A May Have Flaw Forcing Redesign, Rep. Young Says." *Bloomberg News Service.* March 15, 2006.

over the proposed F-22A funding strategy, and specifically singled out the incremental funding as objectionable.[6]

Air Force leaders are candid about the unorthodoxy of this proposal, and that it may have a difficult time gaining consensus among all parties involved in this decision. Air Force leaders describe this strategy as a "one time opportunity" to save money and to reduce risk.

Issues

The issues associated with this proposed funding strategy lend themselves to a simple cost benefit calculation: what are the potential risks, who is taking the risks, who benefits, and how great are the potential benefits? This proposal may present a number of risks regarding the full funding principle and the question of "tying the hands of future Congresses:" For example, incremental funding appears to obligate the government to spend money that has not been appropriated. If the Congress were to cancel the F-22A program under annual funding it would have a "useable end item." If it were to terminate the F-22A program at the end of a year when the sub-assembly of an F-22A production lot were completed, then the U.S. government would take possession of half-completed aircraft. To get any benefit from these incomplete aircraft, the government would have to spend more money to complete manufacture.

Air Force officials maintain that the chances of the F-22A encountering production problems at this stage are remote. Over 100 aircraft have been manufactured, and the aircraft's design is mature and stable. Further, they argue that "half-finished" aircraft are not useless. They could be broken into piece parts and used to re-supply the F-22A fleet. This may be true, but it is likely that a cost penalty would be incurred by acquiring piece parts in this way. The prime contractor is being paid to build an airplane, not supply parts. Presumably, some of the cost of building these "half-finished" aircraft would be to cover assembly line overhead, and workers' salaries, for example. These costs would be absent from parts purchased directly from a supplier.

Another potential risk is that the potential cost savings from the EOQ purchases and MYP contract (if approved) would not suffice to offset "upward cost pressure" caused by the reduced annual rate of F-22A production. Building 20 aircraft per year is appreciably fewer than the most efficient rate of production, which is estimated to be 32 aircraft per year.[7] The Air Force has not yet calculated how great the "upward cost pressure" will be. Again, it may be that the Air Force will require additional funds in the future to execute this proposed funding plan.

Some would see a more general risk in setting this precedent. The Air Force says that this proposed strategy is a "one time opportunity," to reduce risk and to save money. The F-22A production line is drawing to a close, they say, and the Air Force won't ask for such exceptions again. The F-35 JSF program, however, could potentially be delayed further. In that case, and based on the arguments made by DoD in support of this funding strategy, DoD could plausibly return to Congress in years hence and request more money to extend F-22A production to close the widening gap between it and JSF production. If the Air Force were successful in securing its requested waivers from Congress, the other Services may be motivated to seek similar concessions from

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[6]Rep. Duncan Hunter. *Opening Statement.* Hearing of the Senate Armed Services Committee on the Defense Authorization Request for Fiscal Year 2007 and the Future Years Defense Program. March 2, 2006.

[7]Under the previous funding strategy, the Air Force would have funded procurement of 29 aircraft in FY07 and 27 aircraft in FY08, closer to the more efficient rate of 32 per year.

Congress on their high priority procurement programs. If approved, this funding strategy may be cited by future DoD leaders as a precedent. Rep. Duncan Hunter, stated that the Air Force is "asking us to approve incremental funding for the F-22A, a precedent in and of itself," and that he wished to understand "how we've arrived at this very unusual, precedent setting funding strategy."[8]

The Air Force does not have a history of requesting incremental funding. This may be its first such request. At one point, requesting incremental funding in the Navy was also unusual. Today it has become common. For example after the Navy's LHD-6 program received incremental funding in FY1993 and FY1994, the instances of incremental funding in Navy ship building appeared to accelerate. Since the mid 1990s, the LHD-8, LHA-6, CVN-21 and DDX programs have either been incrementally funded, or incremental funding has been proposed. As a final example of how the Services cite precedent to justify unorthodox requests, in 2001, Navy officials requested the use of advance appropriations for Navy ship procurement, noting that this funding approach had been used by several federal agencies other than DOD.[9]

The primary benefit that Air Force leaders say will result from this unorthodox plan is that by adding a 9th production lot to the F-22A program, the assembly line will remain open for a longer period of time. The Air Force says that this will reduce the potential gap between the end of F-22A production and the beginning of F-35 production. DoD believes that, as Air Force Secretary Wynne testified, it is in the nation's interests to maintain a continuous production of advanced fighter aircraft in case we encounter a "hot engagement."

This rationale may sound reasonable, but questions persist about how beneficial such continuous production may be, and whether these potential benefits merit the potential risks involved. The need for extending the F-22A production line has already been the subject of congressional scrutiny. At a March 1, 2006 hearing of the House Armed Services Committee, Chairman Duncan Hunter asked:

> If there was a need to have a fifth generation fighter production line open, why the decision was made last year to cut the F-22 production line and then this year reverse that decision and extend the production, in both cases producing about the same number of aircraft, only now for a billion dollars more in program cost?[10]

It is unclear what immediate value keeping the F-22A production line open would have in a crisis. If, for example, the United States found itself unexpectedly drawn into major conflict and a larger inventory of *Raptors* were desired, it does not appear likely that the manufacturer could rapidly produce additional aircraft in large numbers. Due to the need to appropriate "long-lead" items, such as titanium, and to procure in advance other aircraft components, it takes between three to four years to build a production lot of F-22As from start to finish.[11] Even if large numbers of aircraft were rapidly produced, pilots for these aircraft, and maintenance personnel would need to be trained and organized. Tools, supplies, and spare parts would likely need to be acquired. How long does DoD envision such an "hot engagement" to last? The most intense and demanding air combat in recent operations has been measured in days and weeks, not in months or years.

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[8]Rep. Duncan Hunter. *Opening Statement*. OpCit.

[9]CRS Report RL32776. *Navy Ship Procurement: Alternative Funding Approaches*. Ronald O'Rourke.

[10]Rep. Duncan Hunter. *Opening Statement*. OpCit.

[11] Conversation with SAF/LLW. March 14, 2006.

If the F-22A production line were to replace lost capability rather than add to fielded capability, it is unclear what scenario DoD envisions that would result in such heavy attrition of the *Raptor*. The F-22A has been touted as the only aircraft that can operate in the most threatening wartime environments from "day one." Air Force leaders have stated that the F-22A will be the aircraft that will "kick down the door," by eliminating the most challenging threats and thus enable "persistence" forces like the F-35 JSF and "legacy" forces like the F/A-18E/F to operate safely and effectively. If the Air Force is concerned that the F-22A could suffer such extensive attrition in a near-term conflict (circa 2011), that keeping the production line open is a prudent measure, one might ask whether the Air Force has overestimated the *Raptor's* capabilities.

Air Force leaders assert that they require 381 *Raptors* not 183. Consequently, keeping the production line open longer does not reflect a lack of confidence on their part. Instead it simply preserves the option of purchasing more aircraft in the future if budgets and circumstances permit, which would reduce the gap between the number of F-22As the Air Force needs, and the number it can currently afford. Although the Air Force has been consistent in recent years in stating its requirement for 381 F-22As, it could also be said that DoD must be satisfied with the currently planned *Raptor* inventory, or else it would not have cut $10.5 billion from the F-22A budget.

A final question addresses how effective the proposed F-22A funding strategy may be in facilitating the continuous production of DoD's 5th generation fighter aircraft. Under last year's plan, F-22A production would end in December 2010. According to the JSF Joint Program Office (JPO), 21 JSF aircraft are planned for delivery to DoD by that date.[12] These aircraft would enter production in 2008 to make a 2010 delivery[13]. Thus, it appears that under the old F-22A funding strategy, JSF and F-22A production overlapped by two years and that there is no break in the production of 5th generation fighter aircraft.

Under the new F-22A funding strategy, production would end in December 2011. It appears that the only material difference between the old and proposed plans, in terms of overlapping with JSF production, is that 71 F-35s are expected to be delivered by December 2011; 50 more than under the old plan. In terms of schedule, however, the proposed funding plan would bring F-22A production one year closer to the Marine Corps' planed JSF initial operational capability (IOC) in March 2012, and the Navy's and Air Force's planned IOC in 2013.

Conclusion

Mr. Chairman, this concludes my remarks on the F-22A. Thank you for the opportunity to appear before you and discuss this important issue. I look forward to addressing any questions you or the committee may have.

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[12] Email from Office of the Secretary of Defense, Legislative Affairs. March 13, 2006.

[13] Technically, production will begin once advance appropriations for long-lead items is obligated. This is expected to occur by the second quarter of 2006.

Memorandum June 19, 2006

TO: [redacted]

FROM: Christopher Bolkcom (7-2577)
Specialist in National Defense
Foreign Affairs, Defense, & Trade Division

SUBJECT: F-22 Technical Challenges

This memo responds to your recent request for a description of "current/on-going technical problems" in the F-22 program, "as well as the technical problems the program has had historically."

Please describe the current/on-going technical problems

The Air Force has reported five technical problems currently being experienced in the F-22 program:

- **Structures Retrofit Program.** SRP is a planned improvement effort required to manage weapon system service life and ensure the aircraft meets the design service life of 8,000 flight hours. As service life deficiencies were identified during Engineering, Manufacturing and Development (EMD) structural testing, (mid fuselage, engine bay, aft boom, forward boom, wing leading edge) corrections were incorporated into the production line. The SRP retrofits those aircraft delivered prior to the incorporation of all corrective actions into the production process (aircraft 4010-4083). Work will begin as early as January 2007 and is scheduled to conclude in 2010.

- **Forward Boom Heat Treat Issue.** In December 2005, the Air Force was notified that some titanium forward boom frames were not properly heat-treated. This improper heat treatment created the potential for forward boom frames with anomalous material properties (e.g. extensive cracking) in aircraft 4017-4107. Immediate studies indicated this is not a safety of flight issue, but the cost of inspections and steps potentially required to address this anomaly are currently unknown.

- **Canopy Actuator.** On 10 Apr 06, an F-22A ground-aborted because the canopy would not open. This problem was caused by screws backing out of the internal locking mechanism in the canopy actuator. An inspection for potentially faulty actuators identified 42 potentially faulty actuators (35 installed on F-22As and 7 spares). A 30-

day repetitive mechanical inspection has been implemented to ensure proper operation of the actuators and potentially faulty actuators will be replaced through retrofit expected to be complete by February 2007.

- **Air Recharge System.** The Air Recharge System (ARS) experienced three problems: leakage, auto-ignition failures, and an ARS rupture during flight. The ARS replenishes the Stored Energy System after engine start. Fixes to these problems have been initiated.

- **Nose Landing Gear.** On 11 May 06, an F-22A (aircraft 4020) experienced an uncommanded nose landing gear retraction and the nose of the aircraft fell to the ground, landing on the main weapons bay doors. A similar incident occurred on 18 Mar 2003 to aircraft 4008. The technical solution preventing uncommanded nose gear retractions has been incorporated into the production process and is being fielded throughout the fleet. The findings of Safety Investigation Board are pending.

In addition to those problems reported, at least one production issue may also warrant concern. The F-22 aircraft exiting the Lockheed Martin final assembly plant have experienced an increase in gross takeoff weight of 800 lbs from the beginning of production to the present.[1] Increased weight reduces aircraft performance.

It may be useful to note that the technical problems identified above are those that are currently known, and reported. As mentioned in testimony before the Senate Armed Services Committee on March 28 2006, the titanium problem that the Air Force discovered in December 2005 was not reported to Congress until March 2006. Based on this experience, it may be that additional technical problems exist in the F-22A program of which Congress has not yet been informed. Further, the Government Accountability Office (GAO) and others have expressed concern that the Air Force's plan to integrate a new, multi-mode, air-toground- capable AESA (Agile, Electronically Steered Array) radar into the F-22 could present unforeseen and significant technical challenges. The Air Force does not share the GAO's concern, and argues that modernizing the F-22 radar is no more challenging than, for example, retrofitting existing F/A-18/E/F Super Hornets with new AESA radars.

Technical problems experienced historically

According to the GAO, increased labor rates coupled with technical problems associated with avionics, airframe, and engines have caused 70% of the F-22 cost growth.[2]

- **Avionics**: overcoming avionics software instability was a key challenge that led to an extension of the EMD phase (engineering, manufacturing and development)

- **Airframe**: Lockheed Martin experienced a number of technical challenges with the F-22 airframe, including buffeting of the vertical tail fin, a separation of materials in horizontal tail fin, and "bumps on external shape due to repackaging internal systems"

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[1] *F-22 Multiyear Procurement Business Case Analysis*. Institute for Defense Analyses. May 2006. P.7.

[2] GAO-03-645T p.18.

- **Engine**: F119 engine fuel consumption has been unsatisfactory, and problems were experienced with the engine's core combustor, which did not demonstrate desired temperature levels. Another disappointment was manufacturing problems with fuel-air heat exchangers which reduced effectiveness.

- **Cockpit Canopy**: The F-22 has experienced on-going challenges with the cockpit canopy, including cracking and reliability.

- **Maintenance and Support Requirements**: The F-22 does not does not meet the Air Force Airlift Key Performance Parameter (KPP) of 8 C-141 equivalents to move a F-22 squadron. 8.8 C-141 equivalents are required. Further, mean time between maintenance is 3 to 5 times the Air Force requirement of ~2 flight hours between maintenance.

Although it is difficult to draw a direct correlation between technical problems and aircraft accidents (also known as mishaps), the F-22 mishap rate may be noteworthy, and may reflect on the technical challenges experienced. The F-22 program experienced three Class A mishaps (>$1 million in damage) in 14 months.[3]

[3] Bruce Rolfson. "Raptors Return To Flight Following Dec. 20 Crash; Mishap Was 3rd Crash in 14 Months." *Defense News*. January 10, 2005.

Memorandum June 19, 2006

TO: [redacted]

FROM: Christopher Bolkcom, (7-2577)
Specialist in National Defense
Foreign Affairs, Defense, & Trade Division

SUBJECT: F-22 Program Cost Estimates

This memo responds to your recent request for information on F-22A program cost estimates. Your questions are listed below in **bold text**, with responses directly below.

Please describe the history of the F-22 to include when the program was initiated (i.e. when money was first allocated for it);

- F-22 Concept Development began in September 1983 based on $23 million provided by Congress for Advanced Tactical Fighter (ATF) (PE 0603230F)
- F-22 Demonstration/Validation began in October 1986 with award of $691million contracts to Lockheed and Northrop to build two prototypes (YF-22 and YF-23 respectively)

How many aircraft we planned to buy and for what total dollar amount;

- 648 aircraft were estimated in first Selected Acquisition Report (SAR) on December 31, 1991 for cost of $57.5 billion in base year dollars (FY90).
- Prior to this, Air Force leaders had expressed interest in purchasing 750 aircraft, but no funds were allocated.

The number of cost overruns the program has had and the total dollar amount associated with those overruns;

- DoD has reported 10 cost over-runs in the F-22 program. (DoD is required to report cost overruns in the SAR when the cost estimate is 15% higher than past SAR.)
- The first year in which the F-22 appeared in DoD's Selected Acquisition Reports

(December 31, 1991) the Air Force estimated it would cost $57.5 billion in FY90 dollars to purchase 648 aircraft. In the most recent SAR, DoD estimates the F-22 program's 185 aircraft to cost $65.4 billion in FY05 dollars. Adjusting for inflation, the program unit acquisition cost (PUAC) estimate in 1991 was $114 million per aircraft ($05) and in 2006 the estimate was $354 million per aircraft ($05). In real terms, this represents a per-aircraft price increase of over 200%.

Year	# Aircraft	$ Base Year	PUAC ($05)
1991	648	57.5 Billion (90)	114 million [1]
2006	185	65.4 Billion (05)	354 million

The number of program delays;

- The F-22 program has experienced >15 years of cycle-time in program delays. Some examples of delayed milestones include:
  - Initial Operational Capability (IOC) delayed 9 years and 9 months (March 96 to December 05)
  - Initial Operational Test and Evaluation (IOT&E) delayed 5 years, 3 months
  - Full Rate Production delayed 5 years, 3 months
  - Low Rate Initial Production (LRIP) delayed 4 years 9 months
  - 1st delivery of operational aircraft delayed 4 years, 7 months
  - 1st flight delayed 2 years
  - Completion of Critical Design Review delayed 1 year 4 months

The number of Nunn-McCurdy violations;

- Two (2). In the September 30, 2001 SAR, DoD reported that the F-22 program exceeded both the Nunn-McCurdy thresholds for cost growth for both Procurement Unit Acquisition Cost and Average Unit Acquisition Cost.
- Owing to flexibility in program cost rebaselining, the F-22 program has generally succeeded in avoiding Nunn-McCurdy violation despite noteworthy cost growth.
- GAO has noted the effect of rebaselining on cost reporting in *Defense Acquisitions: Information for Congress on Performance of Major Programs Can Be More Complete, Timely, and Accessible* (GAO-05-182), as an example:

> DOD reported in the 2003 Selected Acquisition Report (SAR), the most recent available, that the F/A-22 Raptor program's unit cost decreased by 0.33 percent in the previous 4 months— since the latest rebaselining. DOD did not report that the program's unit cost had cumulatively increased by 72 percent in the last 143 months.

The total cost of the program to date;

- The most recent DoD cost estimate for the F-22A program is $62,600.0 million ($TY). Of that total amount, $50,224.7 million ($TY) has been appropriated through FY06, leaving an estimated program balance of $12,375.3 million ($TY).

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[1] A DoD deflator of .78 was used to adjust for inflation between 1990 and 2005.

Based on the number of Nunn-McCurdy breaches, program delays, cost overruns, etc., are the estimates of both cost of the contract and anticipated cost avoidance through use of an Multiyear Procurement (MYP) realistic as described by the Air Force and IDA?

- There do not appear to be any obvious methodological flaws in IDA's analysis of F-22 MYP cost savings, which is roughly half of the Air Force estimate ($225 million in savings vs. $400 - $500 million.). However, there may be reasons for some to question the feasibility of achieving IDA's estimated $225 million MYP savings. For example,
  - There has been consistent and noteworthy disagreement between the Air Force and the Office of the Secretary of Defense (OSD) on F-22 cost estimating. Congress requested an independent cost estimate, which DoD hired IDA to execute.
  - IDA's estimate of F-22 costs is different from OSD's and the Air Force's estimates.
  - In the December 31, 2004 Selected Acquisition Report (SAR) DoD reported that a two-year MYP (for production lots seven and eight) the Air Force anticipated pursuing would have saved $458.9 million over annual procurement. This level of estimated savings for a two-year MYP is approximately twice the figure IDA estimates the Air Force may save through a three-year MYP. Such disparity in estimates may suggest to some observers poor assumptions, tools, or methodologies for MYP cost savings estimates.
  - The basis of some Air Force cost estimates is unclear. For example, the Air Force plans to acquire two additional F-22 aircraft with the anticipated $225 million in MYP savings. According to DoD's latest estimate, the F-22's Average Procurement Unit Cost is $185.4 million in FY2005 dollars. By this figure, two F-22s would cost $370.8 million.
  - GAO has consistently argued that the F-22 program should have conducted more thorough testing before entering production. For example, GAO has argued that "The F-22 entered production without ensuring production processes were in control."[2] If true, this less-than-mature production process could be responsible for the F-22's current technical problems, which add to program cost, and may reduce projected MYP savings.

The issue of termination liability (or lack there of) is a great concern to us and we would like you to address this as well.

- The Congressional Budget Office (CBO) may be the authoritative agency on this issue. On May 28, 2006, Donald Marron, Acting Director of the CBO testified before the Air Land Subcommittee of the Senate Armed Services Committee:

  > The Air Force would commit to the purchase of 20 aircraft per year for three years, with the right to cancel the remainder of the order at the end of each year. But it is not requesting appropriations sufficient to cover the potential cancellation liability. Under

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[2] As reported in "F/A-22 Raptor - GAO Assessment." *Aerospace Daily & Defense Report* May 2, 2005, page 21.

that proposal for multiyear procurement, the Air Force would have to seek additional appropriations in the future even if a decision was made to cancel the contract.

Appendix H

November 9, 2005
Selected Excerpts from:
"Gaining an Understanding of Estimating Systems and Controls"
by Larry Chanay, Defense Contract Audit Agency

Gaining an Understanding of Estimating Systems and Controls

November 9, 2005

Larry Chanay

Audit Issues: Flash Reports

Contractor did not use appropriate factor to decrement its subcontractor proposal (F/A-22)

- $96K
- Contractor agreed to inform its estimators to apply appropriate factors in accordance with its policy

Audit Issues: Flash Reports

Estimating Deficiencies on F/A-22, Lots 4 and 5

- Inadequate Labor Estimates
  - **proposed costs based on historical data did not reconcile to official accounting records**
  - **historical data was often inaccurate**
  - **$62.5 M and 1.8M labor hours unsupported**
  - **Contractor concurred**

Audit Issues: Flash Reports

Estimating Deficiencies on F/A-22, Lots 4 and 5 (continued)

- Inadequate BOM Development procedures
  - **the parts structure not updated during the proposal process;**
  - **parts omitted, duplicated, and incorrectly added,**
  - **low dollar parts are not repriced.**

Audit Issues: Flash Reports

Estimating Deficiencies on F/A-22, Lots 4 and 5 (continued)

- Inadequate accounting for non-recurring material costs
  - Some proposed non-recurring included recurring in the history
  - $800K impact

Audit Issues: Flash Reports

Estimating Deficiencies on F/A-22, Lots 4 and 5 (continued)

- **Inadequate documentation of proposal**
  - **Task sheets don't reconcile to supporting data**
  - **Supporting data not readily available for audit**
  - **Page numbers not referenced**
  - **$843K questioned because task sheets don't reconcile to supporting data**
  - **$33M unsupported because supporting data not readily available**
  - **Contractor concurs with recommendations**

Audit Issues
Pricing Proposal Audits

- Major questioned costs in material (F/A-22)
  - **Expired vendor quotations**
  - **No Cost Analysis Reports (CARs)**
  - **Current history not used**
  - **Duplicated subcontract costs in proposal**
  - **No priced BOM**
  - **$65.2M material questioned during FY 2005**

Audit Issues
Defective Pricing Audits

- Pending audit – F/A-22 Lot 1
  - Contractor had negotiated Purchase Orders on 36 parts prior to final price agreement (78 sampled)
  - Contractor had negotiated subcontract prices on 14 parts prior to final price agreement (68 sampled)
  - Data on the 50 parts not presented at negotiations
  - $4.1 million

Audit Issues
Defective Pricing Audits

- Pending audits – F/A-22 Lots 2 and 3
  - Current data not used when pricing BOM
  - Updated vendor proposals not used
  - Government relied on defective data
  - $3M (Lot 2) and $13M (Lot 3)

Conclusion

- Moderate to High Risk in the following Control Objectives:
  - Cost Estimate Development
  - Contract Certification

Appendix I

August 20, 2001
Letter to The Honorable Duncan Hunter, Chairman
Committee on Armed Services
from
The Honorable Christopher Shays, Chairman
Subcommittee on National Security,
Veterans Affairs and International Relations

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SUBCOMMITTEE ON NATIONAL SECURITY, VETERANS AFFAIRS,
AND INTERNATIONAL RELATIONS

Christopher Shays, Connecticut
Chairman
Room B-372 Rayburn Building
Washington, D.C. 20515
Tel: 202 225-2548
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E-mail: hr.groc@mail.house.gov

August 20, 2001

The Honorable Duncan Hunter, Chairman
Committee on Armed Services
Subcommittee on Military Research and Development
2340 Rayburn House Office Building
Washington, D.C. 20515-6041

Dear Chairman Hunter:

The Subcommittee on National Security, Veterans Affairs, and International Relations (NSVAIR) has been conducting an examination of production cost reduction plans (PCRP) for the F-22 program to determine extent of realized cost savings, the potential for additional savings and the value of improvements in manufacturing and procurement processes. In view of the recent Defense Acquisition Board Decision (DAB) decision to enter low-rate initial production (LRIP), and seek an increase in the production cost cap, this is to inform you of some preliminary findings regarding the integrity of the F-22 production cost estimating process.

As part of our examination, the Subcommittee requested the General Accounting Office (GAO) review the status of production cost reduction plans. GAO again reported a very sizeable difference between the Air Force Program Office and the OSD-Cost Analysis Improvement Group (CAIG) projections of total F-22 production costs. Comparison of the two estimates, adjusted for a 339 aircraft buy, indicated a difference of $7 billion as of December 2000. (GAO-01-782) The $7 billion variance represents fully 15% of the F-22 production budget, a large margin of error even in the imprecise field of weapon system cost estimation, and adds substantial risk to the F-22 program.

The Air Force and OSD remain unable, or unwilling, to reconcile the production cost estimates to bring them within a tolerable range of variance. In an attempt to analyze the difference, GAO and the Subcommittee requested access to cost estimate records prepared by the OSD-CAIG, including briefings about the estimates, the methodologies used, and supporting analyses. The request was denied by the Department. The recent assertion by DOD Under Secretary (Acquisition, Technology and Logistics) E. C. Aldridge, Jr. that the Pentagon has to become more diligent in representing the true cost of weapon system development rings somewhat hollow in the context of the Department's refusal to disclose estimating data and the continued failure to reconcile widely varying F-22 production cost projections.

DOD refusal to provide GAO and the Subcommittee access to production cost estimation data and detailed methodologies prevents a complete analysis of the factors contributing to the estimating differences between the two production cost figures. But it is clear one major area of disagreement is valuation of PCRPs. Therefore, as you proceed with your deliberations on the pace and scope of the F-22 program, please be advised we can have little confidence in the accuracy of production cost estimates and less confidence in the legitimacy of projected production cost savings based on those estimates.

Based on the testimony and documents from three hearings conducted over the past 18 months, it also appears the F-22 production cost control effort has not been fully embraced by DOD leadership. Despite DOD agreement with the General Accounting Office recommendation to report detailed cost reduction plan information in F-22 Quarterly Reviews (including the total number of PCRPs identified, the number implemented, the cost reductions realized to date, and any deletions or additions from the plans included in the prior quarterly reviews), only summary information on the total estimated cost reductions has been reported as of the June 2001 quarterly review.

The production cost reduction effort is critical to an affordable F-22 program. Until Air Force and OSD production estimates are validated and reconciled, the PCRP process should be considered a largely cosmetic accounting exercise to evade congressional spending caps, not a genuine acquisition reform.

Re: F-22 Production Cost Controls
August 20, 2001
Page 3

If you have any questions, please contact Lawrence Halloran, Staff Director and Counsel or Vincent Chase, Chief Investigator of NSVAIR Subcommittee at 202-225-2548.

Sincerely,

Christopher Shays
Chairman

cc:

Hon. Donald Rumsfeld, Secretary of Defense
Hon. C.E. Aldridge, Under Secretary of Defense
Hon. Dan Burton
Hon. Henry Waxman
Hon. Dennis J. Kucinich
Hon. Adam H. Putnam

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Senator MCCAIN. Thank you, Ms. Brian.

Dr. Nelson, given the issue that's been raised today, we'll keep the record open so that Admiral Blair, whose name I did not mention—and the issue I did not mention—but, since it has been brought up, we'll keep the record open for a letter from Admiral Blair to explain these issues that have been raised. In retrospect, I understand and appreciate your defense of him.

[The information referred to follows:]

IDA INSTITUTE FOR DEFENSE ANALYSES

Dennis C. Blair, Admiral, USN, Retired
President

July 26, 2006

Senator John Warner
Chairman, Committee on Armed Services
United States Senate
Washington, DC 20510

Dear Senator Warner:

Thank you for the opportunity to clarify my role in IDA Paper P-4116, entitled *F-22 Multiyear Procurement Business Case Analysis,* dated May 2006, and to give you my perspectives on the *Washington Post* article on the same subject dated July 25, 2006. This article suggested that my position as a Director of EDO Corporation raised questions about the objectivity of the IDA study. The article contained several inaccuracies and in this letter I would like to provide correct information. I ask that this letter appear in full in the Committee Record.

It is easy to describe my direct involvement in IDA's analysis of the business case for multiyear procurement (MYP) of the F-22. I had none. It was an important research project, and I received routine reports of its progress but did not play any active role in its conduct or review.

The study was carried out within IDA's Cost Analysis and Research Division (CARD), under the project leadership of Dr. J. Richard Nelson, who led a highly qualified team of research analysts. The Director of CARD, Dr. David McNicol, chaired a quality review panel for the study, which also included two senior IDA research staff members, both of whom have PhDs in economics and one of whom works in a separate IDA division.

I did not attend either of the two in-process review meetings held over the course of the F-22 MYP study, and I did not read the written report until after it was forwarded to our sponsor in the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics.

As President of IDA, I am responsible for the overall technical excellence and objectivity of IDA's research and quality review processes. However, IDA has hundreds of projects ongoing at any time, and I do not play an active role in all of them. I am familiar with the qualifications and previous work of the IDA research staff members who led and participated in the F-22 MYP study, and in the quality assurance process that we have in place at IDA to review, to question, to critique, and to improve the work of

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our study teams. I consider the study outstanding. It clearly presents the results of our cost analyses and appropriately makes no recommendation on a multiyear procurement decision.

I'd like to describe briefly an earlier IDA study on the F-22, which was the source of some confusion when I talked with Mr. Smith of the *Washington Post.* IDA Paper P-4029, entitled *F/A-22 Independent Cost Estimate*, was completed in August 2005. My role in that study was somewhat different from that in the F-22 MYP analysis.

Dr. Nelson also led the F/A-22 independent cost estimate (ICE) effort and had a similarly high-quality research team in support. The quality review panel for this study consisted of three current IDA division directors. In addition, we convened a senior review group chaired by IDA's former President, General Larry Welch. The senior review group and the quality review panel met together three times from October 2004 to May 2005. At these sessions, all participants expressed their views on study assumptions, analytic approach, findings and presentational issues. I attended and participated in the give and take of these project review meetings.

I was not involved, however, in the drafting or in the final quality review of the written report for the F/A-22 ICE. Again, I depended on the judgment and technical competence of the experts involved in this study, backed-up by a solid quality assurance process. As with the F-22 MYP, I read the final report after it was forwarded to the sponsor. Again, I felt the work was outstanding.

In thinking back on a hurried phone conversation with the Washington Post reporter, I regret that I evidently failed to differentiate adequately among my overall responsibilities as President of IDA and my different roles in two separate IDA studies.

Next, I'd like to address an issue that came up during Dr. Nelson's testimony before the Airland Subcommittee on July 25, 2006. In conducting the F/A-22 ICE, our sponsor in the Office of the Under Secretary for Acquisition, Technology and Logistics established a government Working Group to help gather the right information within the Department and among the contractor community, and to review study assumptions and data.

For IDA's studies to be complete and relevant to decision-makers, we need to have access to the best possible information about the technologies, programs, forces, operating concepts and support plans. Government Working Groups help us do that. They do not determine what IDA does with the inputs and information provided, and the Working Groups have no say about our findings.

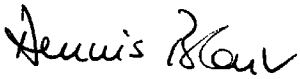
Finally, on the subject of conflicts of interest policies, contrary to the characterization in the *Washington Post* article, IDA has a clearly articulated set of policies approved by DoD, that apply to members of IDA's Board of Trustees and

employees, including corporate officers. Consistent with these policies, for example, I had earlier recused myself from participation in another current IDA study that involved a substantial potential EDO program.

IDA's reputation for objectivity and excellence in research is of the very highest importance to me personally and to the rest of IDA's management and staff. I do not want there to be any doubt in the minds of our sponsors or members of Congress concerning our commitment to providing high-quality, impartial analyses. To remove the basis for any doubt about IDA's future work, and to reinforce this commitment, I informed the EDO Corporation today that I am resigning from the Board as soon as possible.

Thank you again for the opportunity to present this clarification. I would be happy to address any further questions you may have on this matter at your convenience. Letters have also been sent to Ranking Member Levin, Subcommittee Chairman McCain, and Subcommittee Ranking Member Lieberman, and copies will be provided to other interested members of the Senate Armed Services Committee.

Sincerely,



Dennis C. Blair

3

Dr. NELSON. Thank you, Mr. Chairman. For the record, we will do that, and provide the chronology that I read previously.

[The information referred to follows:]

F/A -22 Independent Cost Estimate (ICE) Chronology (Twelve (12) Months Elapsed Time)	
Congressional Language in FY 2005 Defense Appropriations Conference Report	
Late August 2004	IDA selected
September 2004	Planning for visits and data collection, ground rules and assumptions
October 2004	Task Kickoff
October 2004 – February 2005	Visits, data collection, and initial analyses
March 2005 – May 2005	Final analyses, Government-Industry Briefings, and IDA Internal Briefing
June 2005 – August 2005	Draft document and edit Internal IDA review and OSD Sponsor review Report for the Congress delivered to OSD Sponsor and to the Congress on 15 August 2005

F-22A Multiyear Procurement Business Case Analysis (MYP) BCA Chronology (Four (4) Months Elapsed Time)	
November 2005	QDR Language
27 January 2006	Task Kickoff at IDA
February – March 2006	Visits, data collection, and initial analyses
April 2006	Final results, Government-Industry Briefings, and Draft Report
Early May 2006	IDA internal review and edit, and OSD Sponsor review
	Report delivered to OSD Sponsor and to the Congress on 15 May 2006

Senator MCCAIN. Thank you very much.

Dr. Nelson, do you find it interesting that the Comptroller General of the United States and his staff, the CBO, the CRS, and literally every outside organization disagrees with your conclusions that a multiyear procurement is good for America and good for the budgetary process? Do you find it interesting that all of these organizations, which are truly independent, are in disagreement with your conclusions?

Dr. NELSON. Sir, we do not make recommendations, we do not endorse, we do not make decisions. In my statement, I have a final——

Senator MCCAIN. Excuse me, that they disagree with your analysis. Let me put it that way.

Dr. NELSON. Okay. Analysts can disagree. Certainly, again, if we're confining ourself to the findings with regard to the savings, we found $225 million in a constrained budget, $235 million in an unconstrained budget, and we stand by our numbers. We did the analysis. We provide information, analyses, and data to our sponsors. Our sponsors make the decisions and that's what our role was in this task.

I would like to say one thing about the point brought up concerning the appendices, the exhibits in our study. Everything in our study is ours. We developed the appendices in order to provide perspective to our sponsor with regard to what the exhibits would look like with our numbers embedded in them that might be submitted by the Air Force. That was it.

Senator MCCAIN. Thank you. Is it your opinion that it would have been more helpful if this analysis had included the impact on the JSF on this procurement? I know you were not asked to do that, but——

Dr. NELSON. Right.

Senator MCCAIN.—do you feel that that would be, in your experience, something that we should take into consideration?

Dr. NELSON. In terms of the impact on industrial base and understanding the full impact across programs, across plant sites, across common activities that are provided by suppliers and contractors to both the F–22 and the JSF, yes, that would be interesting. The Air Force Cost Analysis Agency did do work on that, and that is what is included in the Air Force exhibits.

Senator MCCAIN. Mr. Bolkcom and Mr. Newman, in your respective experience, have you ever seen a request sent to Congress in which authorization for a multiyear procurement proposal is being sought before a current budget request or a FYDP have been submitted?

Mr. Newman?

Mr. NEWMAN. Not in my experience, no, Senator.

Senator MCCAIN. Mr. Bolkcom?

Mr. BOLKCOM. Not in 6 years, Mr. Chairman.

Senator MCCAIN. Interesting.

Senator Dayton? We have a vote that's started.

Senator DAYTON. I recognize that, Mr. Chairman. For that reason, I won't pursue questions, except I will wait, as the chairman said, Dr. Nelson, for the response. I do want to just ask for a reconciliation of what your comments were with the statement in the Washington Post article, since it is now a public document, public record, that Admiral Blair, "said he was heavily involved in the preparation of the report endorsing the multiyear procurement." He's quoted as saying, "As the chairman of an annual review committee that approved its final form, I'm on the top of that process." If that's out of context or a misquote or a misstatement, I think it's important that he correct such for the public record.

Dr. NELSON. Absolutely.

Senator DAYTON. Ms. Brian, I'd just like to say I would like to work with you, and we need to proceed quickly if we're going to include it in one of the bills going through this year, but to get a re-

quirement that would put these contractors under the same requirements for conflict of interest and disclosure as Federal employees. So, if you could work with my office on that, I'd appreciate it.

Ms. BRIAN. I look forward to working with you Senator.

Senator DAYTON. Thank you.

Thank you, Mr. Chairman.

Senator MCCAIN. Could I just point out again, I think before this committee or anyone reaches any conclusions, we should hear directly from Admiral Blair, and that's why we're keeping the record open on this issue.

Senator Chambliss.

Senator CHAMBLISS. Are you intending to come back after the vote, Mr. Chairman? Because, if not—if you don't have any more questions, I will be quick.

Senator MCCAIN. Okay, sure. Yes, I wasn't going to come back. I think we have more than one vote.

Senator CHAMBLISS. Okay. Let me just ask a couple of questions of Mr. Newman. First of all, who is your customer, as an agent of CBO, Mr. Newman?

Mr. NEWMAN. Congress is, sir.

Senator CHAMBLISS. Okay. Well, let me just compliment CBO for making the effort to contact Congress relative to some questions that you had regarding this multiyear program. Unlike GAO, CBO submitted a list of questions to the Air Force, dated July 18, 2006. You got answers to those, and that's what you base your opinion on. You have budget issues, and I appreciate that.

To Mr. Bolkcom, who is the customer of CRS?

Mr. BOLKCOM. Congress, sir.

Senator CHAMBLISS. Again, let me compliment CRS, because, unlike GAO, whose customer is also Congress, CRS submitted questions on 11 July to the Air Force, and they were legitimate questions. They have been responded to by the Air Force, and they make up a part of your opinion here.

So, I just think it's important that everybody know and understand that even though Congress may be the customer, that our folks should make a thorough investigation. Obviously you two did and I appreciate that, even though I may disagree with some of your conclusions.

[On July 31, Mr. Walker provided the following information:]

Comptroller General
of the United States

United States Government Accountability Office
Washington, DC 20548

July 31, 2006

HAND DELIVERED

The Honorable Saxby Chambliss
Member
Subcommittee on Airland
Committee on Armed Services
United States Senate

Dear Senator Chambliss:

In hearings held on July 25, 2006, before the subcommittee on Airland, Committee on Armed Services, United States Senate, you made a point to criticize GAO for not advising the Department of Defense of our concerns regarding the proposed F-22A multi-year contract and related proposals. For the reasons noted below, I believe that your criticism was not supported by the facts.

My testimony was based on a GAO report of June 20, 2006 to the Honorable C.W. Bill Young, Chairman of the Defense Appropriations Subcommittee, Committee on Appropriations, House of Representatives, regarding the current status of the F-22A acquisition. In conducting the review to support that report, my staff held discussions with representatives of the Air Force's F-22A Program Office, the F-22A Program Executive Office, and the Air Force's Air Combat Command. In addition, they discussed issues with the DOD's office of the Undersecretary of Defense for Acquisition, Technology and Logistics and Office of Secretary of Defense for Program Analysis and Evaluation. They also obtained and reviewed official government documents relative to the F-22A acquisition program.

Consistent with our Congressional and Agency protocols, we then submitted a draft of that June 20, 2006 report to the Office of Secretary of Defense for official DOD comments. The Secretary had over 30 days to disseminate the report to appropriate cognizant reviewers and provide comments on that report. In its official comments, which we included in our published report, DOD did not take exception to any of our facts. In addition, prior to the hearings, I personally told Deputy Secretary Gordon England about our impending testimony on the F-22A.

Furthermore, our concern regarding the reliability of IDA's analysis of the potential cost savings of a multi-year contract was based on information in a Washington Post

article of July 25. We were not aware of this information prior to the publication of the article.

With regard to the F-22A multi-year contract issue, as I testified on July 25, entering into a multi-year contract was estimated by IDA to result in a savings of $225 million. However, we feel that the Congress also needs to consider the potential termination costs, reduced flexibility and other risks associated with a multi-year contract. Furthermore, in addition to a multi-year contracting approach, the DOD's overall F-22A proposal involves 1) buying 4 more F-22As than the previous plan and 2) lengthening the contract over two years. We continue to believe the Congress should consider the total incremental cost of this overall proposal. As I testified on July 25, the result is an increase of $1.7 billion as compared to DOD's prior year proposal.

As I stated in my testimony, our nation's large and growing long term fiscal gap requires that the federal government begin making hard decisions. Our work regarding F-22A acquisition issues is done with that in mind and in the spirit of providing the Congress with as much relevant information as possible to make those hard decisions. In this context, we continue to believe that the Congress needs to reevaluate a range of existing federal programs and policies, including the F-22A program, based on credible current and future threats, current and expected future national budget levels and priorities, and considering various reasonable and realistic ways to meet the warfighter's true needs.

If you or any of your staff have any questions concerning this important issue, please do not hesitate to call me, Katherine Schinasi, or Michael Sullivan on (202) 512-4841.

Sincerely,

David M. Walker
Comptroller General
of the United States

cc: Senator John Warner, Chairman, Armed Services Committee
Senator John McCain, Chairman, Airland Subcommittee

Senator CHAMBLISS. Lastly, Mr. Nelson, as a part of your submission relative to Admiral Blair—I don't want you to go into an explanation of the question of the folks from the Pentagon and the way they participated and the work—you said that you did the work—and would you just give us a written explanation of what you mean by that, as a part of submitting your answers to this committee?

Dr. NELSON. Yes, sir.

[The information referred to follows:]

The estimate of MYP savings is IDA's independent estimate. There were no direct influences on the results by the Department of Defense. IDA's basic model for conducting tasks is:

- The sponsor frames the question and helps to provide access to needed factual information.
- IDA provides the answer.
- The sponsor decides what use to make of IDA's analysis and recommendations.

That is how we proceeded in this instance. A cost analysis, including our study of the F–22A MYP, cannot be done in a factual vacuum. We needed to know the

specific facts of the task; for example, the number of units still to be purchased of various F–22A systems and subsystems, the inflation factors to be used, the annual quantities planned, and the funding available, along with many other items. These facts were largely in the hands of the sponsor, the Air Force and the F–22A primes and subcontractors. Accordingly, we had extensive conversations with, and received information from, all of these organizations.

Senator CHAMBLISS. Thank you, Mr. Chairman.

Senator MCCAIN. Thank you.

Senator Chambliss, I totally agree with you and other members, allegations have been made. Before we reach any conclusion about that, we should get full and complete information, including a response from Admiral Blair, who had a record of very honorable service to this country.

Senator CHAMBLISS. Let me make one other comment, Mr. Chairman.

Senator MCCAIN. Sure.

Senator CHAMBLISS. I spoke earlier, and I should not have said what I said. Based on the information I have, I apologize for any comment relative to suggesting that staff was the source of that newspaper article. I appreciate Ms. Brian's comments about where it came from.

Senator MCCAIN. Well, I've never trusted the staff either. [Laughter.]

Thank you very much.

We will adjourn the hearing. Thank you very much.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

CONTINUOUS FIFTH-GENERATION PRODUCTION

1. Senator MCCAIN. Secretary Wynne and Mr. Finley, will you please explain why the F–22A production line needs to be extended given Lockheed Martin is building F–22A and Joint Strike Fighter (JSF) in different locations and not on the same production line?

Secretary WYNNE. There are both operational and industrial base benefits of minimizing or eliminating the gap between F–22A Raptor and F–35 Lightning II production. From an operational perspective, extending F–22A production provides America with an active fifth-generation fighter production line producing roughly two combat-coded aircraft each month to meet national security requirements in a very uncertain global environment. From an industrial base perspective, the F–22A and F–35 share production facilities in several locations across the United States to include some major facilities like Fort Worth, Texas (Lockheed Martin); Hartford, Connecticut (Pratt & Whitney); and Baltimore, Maryland (Northrup Grumman). Since the two aircraft employ very similar technologies, they have many common suppliers at every tier that are affected by cuts to either program. The proposed multiyear contract for 60 F–22As spanning three lots provides necessary stability for this essential supplier base during a critical period prior to the start of F–35 low-rate initial production (LRIP).

Mr. FINLEY. The decision to extend F–22A production was made to maintain a viable fifth-generation production line, smooth the transition to JSF production, and preserve future investment options, components for the F–22 and JSF are built at locations throughout the country by a large and similar supplier base, enabling a smooth transition in each of the different final assembly locations.

REQUIREMENT STABILITY

2. Senator MCCAIN. Secretary Wynne and Mr. Finley, after 19 years and several reductions in quantity, from 750, to 648, to 442, to 440, to 342, to 341, to 278, to 279, to 181, to 185, to 183 aircraft, and changes in quantities in both of the last two budget submissions, how can the Office of the Secretary of Defense (OSD) and the Air Force assure us that there will be no more reductions?

Secretary WYNNE. I have learned there are no guarantees, but every indication is that 183 units of the F–22A narrowly support the 7 squadrons we believe is the minimum necessary to support the Air Expeditionary Force construct. On the other hand, the Department of Defense (DOD) analysis of the fifth-generation tactical fighter capability sees 183 units as sufficient to bridge from the F–22A to the F–35 production. We believe that this unit quantity will be unchanged, unless the F–35 production slips and opens a gap in the availability of a fifth-generation warm line. The F–35 program looks to be on track, and therefore the likelihood of a gap minimal.

Mr. FINLEY. The 183 F–22 aircraft reflected in the President's fiscal year 2007 budget are based on the Joint Air Dominance Study performed to support the Quadrennial Defense Review (QDR). It reflects a balance between military requirements and fiscal reality. If Congress approves the multiyear procurement (MYP), the Secretary of the Air Force has committed to fully funding procurement of these aircraft within the Air Force budget. If the balance between military requirements and fiscal reality changes, then the quantities may be adjusted upward or, if the MYP is not approved, downward.

DATE FOR END OF PRODUCTION

3. Senator MCCAIN. Secretary Wynne and Mr. Finley, the cited purpose for changing the strategy was to extend production to 2010. Yet, the appropriators have approved fully funding the first year of the MYP in 2007, thereby taking away the need for incremental funding in fiscal year 2007. If Congress fully funds each year of the proposed multiyear contract it would mean the primary purpose would not be met as production would be completed in 2009. Does this mean you would buy more F–22As after this point to extend the production out to 2010 or would you then truncate the program in 2009?

Secretary WYNNE. Under the original split-funded, MYP strategy presented in the fiscal year 2007 President's budget (PB), Lot 9 funding would have been split between fiscal year 2009 and fiscal year 2010. Since the DOD and the Air Force have abandoned the split funding approach in accordance with the defense committees' decisions, Lot 9 would now be fully funded in fiscal year 2009. Delivery of the last Lot 9 aircraft, however, is expected in December 2011 under either a split funding or a full funding approach, at which point the production line is planned to close, absent any additional orders beyond 183 aircraft. The Air Force requirement remains 381 aircraft, however the Air Force has not requested funds for more than 183 at this time. The actual production line activities were only extended 1 year by adding a Lot 9 regardless of funding strategy.

Mr. FINLEY. The Secretary of the Air Force committed to fully funding the MYP of F–22 aircraft. This means the last planned lot of aircraft, Lot 9, would be procured in fiscal year 2009 resulting in production line shutdown in fiscal year 2012 (December 2011). Whether fully funded or split funded, the strategy added 1 year to F–22 production.

4. Senator MCCAIN. Secretary Wynne and Mr. Finley, will you please explain how proposing an MYP now at the end of the program with a decreasing rate of production makes good business sense?

Secretary WYNNE. Saving taxpayers dollars and providing program stability to reduce risk in an acquisition program makes good business sense at any stage of production. In the specific case of the F–22A Raptor, however, there is an added business-related benefit of providing the stability offered through multiyear contracting for all common suppliers of both the F–22A Raptor and the F–35 Lightning II at a critical period prior to the start of F–35 LRIP. The QDR specifically addresses this key benefit.

Mr. FINLEY. MYP is a good business strategy that saves the taxpayer's money. In this case, we believe we can save at least $225 million on procurement of the last 60 aircraft.

FUNDING STABILITY

5. Senator MCCAIN. Secretary Wynne and Mr. Finley, don't the considerable technical and modernization challenges represent a threat to funding stability?

Secretary WYNNE. The Air Force is committed to fully fund and procure all 60 F–22A aircraft through the proposed MYP. There are currently no technical issues that affect either design or MYP funding stability. The ongoing modernization program is separate from procurement and does not impact the stability of funding for

the proposed MYP. As with any modernization program, candidate capabilities must complete rigorous developmental and operational testing prior to incorporation into production. In the specific case of the F–22A, the risk associated with the ongoing modernization program is further mitigated by the fact that major hardware and wiring associated with the planned modernization program are incorporated by Lot 6, which will set the engineering baseline for all proposed MYP lots (Lots 7–9).

Mr. FINLEY. Funding stability as addressed in 10 U.S.C. 2306b(a)(3) requires a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation. Secretary Wynne, in his letter of May 16, 2006, addressed to the chairman of the Senate Committee on Armed Services, stated that the Air Force intends to fund and procure 60 aircraft through the proposed MYP. If MYP of the F–22 is approved by Congress, the Department expects that sufficient funding will be requested to avoid contract cancellation and fully fund the procurement. There are no known technical or modernization issues which will impact the cost of the production aircraft which will be procured from Lockheed Martin under a firm-fixed price contract.

DESIGN STABILITY

6. Senator MCCAIN. Secretary Wynne and Mr. Finley, why shouldn't the F–22's very challenging modernization program be considered as part of the MYP debate on design stability?

Secretary WYNNE. The development program for the F–22A is complete and the design is stable. The DOD approved full rate production in March 2005 after an extensive design stability review, and the initial operational capability (IOC) was declared on 15 December 2005. The F–22A has demonstrated over 14,000 developmental tests, training, and operational flight hours. The existence of a separate and ongoing modernization program is not unique to the F–22A, nor is it any more or less challenging than modernization efforts on other major systems. Additionally, the ongoing modernization program does not affect the F–22A's demonstrated design stability. Like all major weapon systems, the F–22A will continue to undergo a modernization program as long as it is in the Air Force inventory. MYP has been approved under similar circumstances for candidate programs with similar anticipated upgrades, including the F/A–18E/F and UH–60 programs. The F–22A has proven its air-to-air and air-to-ground capabilities, and as recently as June 2006, the F–22A demonstrated a 34 of 34 success rate while dropping precision munitions. The F–22A design is stable.

Mr. FINLEY. 10 U.S.C. 2306b(a)(4) requires that the design be stable and that the technical risks are not excessive. The F–22 successfully completed initial operational test and evaluation (IOT&E) and follow-on operational test and evaluation (FOT&E). FOT&E focused on verification of corrections to deficiencies identified in IOT&E and air-to-ground mission testing using the Joint Direct Attack Munition (JDAM). The successful completion of FOT&E, and the production readiness assessment performed to support the full rate production decision, indicated that the F–22 design is stable. Changes from lot to lot during the MYP are not expected to result in any significant structural changes to the aircraft or substantial changes to its F119 engines. F–22 modernization work is being carried out under separate research and development contracts. The systems coming from the modernization program will be retrofitted into production aircraft after they have gone through developmental and operational testing. Performing modernization while the MYP is ongoing is consistent with other MYPs. For example, the F/A–18E/F, which is in its second MYP, is concurrently developing and procuring a new radar, an advanced mission computer and displays, a new infrared detection system, and a new reconnaissance pod. The F–22 is in operational use and has demonstrated over 21,000 total flight hours. IOC was declared in December 2005, an operational squadron has been established at Langley Air Force Base (AFB), Virginia, and 12 aircraft recently deployed to Alaska, completing a joint exercise.

FUTURE YEARS DEFENSE PROGRAM

7. Senator MCCAIN. Secretary Wynne and Mr. Finley, why would Congress want to authorize an MYP that is not fully funded under a current Future Years Defense Program (FYDP)?

Secretary WYNNE. The fiscal year 2007 budget, as presented, represented a series of settlements and proposals to connect requirements with budget realities. This MYP plan was requested in the original February 2006 submission of the fiscal year

2007 PB with a commitment to provide the full MYP estimate by May 2006. While this could be considered an "out-of-cycle" request, the Air Force is committed to fully funding the multiyear and will resolve the shortfall identified in the May 2006 MYP estimate within the fiscal year 2008 PB cycle prior to contract award.

Mr. FINLEY. The President's fiscal year 2007 budget proposed a unique split funding strategy which has been rejected by Congress. Marks by the four defense committees indicate that full funding will be directed for procurement of 20 Lot 7 aircraft in fiscal year 2007. The Secretary of the Air Force in his May 16, 2006, letter addressed to the chairman of the Senate Committee on Armed Services, stated that the Air Force intends to fund and procure 60 aircraft through the proposed MYP. If an MYP of the F–22 is approved by Congress, the Department expects that sufficient funding will be requested to avoid contract cancellation as required by 10 U.S.C. 2306b(a)(3).

8. Senator MCCAIN. Secretary Wynne and Mr. Finley, why should Congress grant the Air Force special or preferential treatment in this regard?

Secretary WYNNE. The Air Force is not requesting special or preferential treatment. If the F–22A MYP is authorized by law, the Secretary of Defense will execute the proper certification prior to contract award that the FYDP fully funds the support costs associated with the F–22A multiyear program, once those costs are fully established through contract negotiations, as is required for any MYP by subparagraph (A) of paragraph (1) of subsection (i) of section 2306b of title 10.

Secretary WYNNE. The Department is not requesting special or preferential treatment. The President's fiscal year 2007 budget requested MYP authority for the F–22 because it makes good business sense. We have the opportunity to save the taxpayers $3.7 million or more on each of the 60 aircraft we plan to buy, for a savings of at least $225 million.

POTENTIAL START DATE

9. Senator MCCAIN. Secretary Wynne and Mr. Finley, isn't it correct that even if Congress authorizes the current MYP proposal now, the Air Force will not—indeed cannot—enter into the contract until sometime after February 2007, when a new budget request and FYDP come out? Please explain.

Secretary WYNNE. The Air Force will not award the proposed multiyear contract before February 2007. Assuming Congress authorizes the F–22A MYP, the Air Force plans to award the F–22A MYP contract in May 2007. This date takes into account contractor proposal submissions by November 2006 negotiations scheduled for April 2007, and all required notifications and certifications to include the requirement at 10 U.S.C. 2306b(i) for the Secretary of Defense to certify the MYP program is fully funded and meets the conditions established by law. The certification will occur after the February 2007 submission of a new PB and after the completion of MYP contract negotiations.

Mr. FINLEY. The Air Force will not award the proposed multiyear contract before February 2007. Assuming Congress authorizes the F–22 MYP, the Air Force plans to award the contract in May 2007. This date takes into account contractor proposal submissions by November 2006, completion of the negotiations in April 2007, and completion of all required notifications and certifications. This includes the 10 U.S.C. 2306b(i) requirement that the Secretary of Defense certify that the MYP is fully funded and meets the conditions established by law. The certification will occur after the February 2007 submission of the fiscal year 2008 PB.

10. Senator MCCAIN. Secretary Wynne and Mr. Finley, wouldn't it be reasonable to just sign a single year procurement contract now for the F–22 and then come back next year, when the multiyear contract is fully funded under a new budget request and FYDP? Please explain.

Secretary WYNNE. The proposed 3-year MYP strategy results in substantial savings of $225 million over Lots 7, 8, and 9. These savings, generated largely from the economic order quantity purchase in the first year, would not be achieved if the MYP were reduced to only 2 years.

Mr. FINLEY. No, the MYP would only be for 2 years, foregoing savings to the taxpayers which would result from the 3-year MYP proposed in the President's fiscal year 2007 budget. The opportunity to save at least $225 million makes this worthwhile.

ANALYSES CONDUCTED

11. Senator MCCAIN. Secretary Wynne and Mr. Finley, what independent analyses did the Air Force conduct that led to the conclusion that $225 million and 2.2 percent were "substantial" for purposes of the statute?

Secretary WYNNE. The OSD contracted with the Institute for Defense Analyses (IDA) to complete a Business Case Analysis (BCA) for the F–22A MYP. The Air Force agrees with the scope and source of the savings identified in the BCA. The analysis concludes that the MYP program will result in a cost avoidance of $225 million, or a minimum of $3.75 million per aircraft, compared to annual contracts for Lots 7, 8, and 9. These costs savings equate to the opportunity to fund nearly two additional aircraft and are comparable to previously approved fighter MYP contracts such as the F/A–18E/F program, which saved $3.8 million per aircraft.

Mr. FINLEY. The Air Force reviewed the independent BCA performed for the DOD by IDA of the F–22 MYP. The Air Force agreed with the scope and source of the savings identified by IDA. The analysis concluded that the MYP would result in a cost savings of $225 million, or a minimum of $3.75 million per aircraft, compared to annual contracts for Lots 7, 8, and 9. These cost savings are comparable to previously approved fighter MYP contracts, such as the F/A–18E/F program which saved $3.8 million per aircraft, and are considered substantial.

12. Senator MCCAIN. Secretary Wynne and Mr. Finley, what analysis did OSD conduct that led to the conclusion that $225 million and 2.2 percent were "substantial" for purposes of the statute?

Secretary WYNNE. The OSD contracted with the IDA to complete a BCA for the F–22A MYP. OSD concurs with the analysis and the Air Force determination that the savings satisfy the MYP criteria for "substantial savings" on both a total, $225 million, and per aircraft, $3.75 million, basis. The 2.2 percent figure is based upon the entire procurement budget for the F–22A program and is not representative of the savings attributable to the MYP contract. The correct percentages are 2.6 percent savings for the air vehicle and 2.7 percent savings for the engines.

Mr. FINLEY. The definition of substantial savings is a matter of judgment since 10 U.S.C. 2306b(a)(1) does not define "substantial savings." It is our judgment that the use of an MYP contract for the acquisition of 60 F–22s over 3 years will result in substantial savings when compared to a series of annual contracts. While the number of aircraft lots in the proposed F–22 MYP is small compared to previous MYPs, the estimated savings of $3.7 million per aircraft are comparable to previously approved fighter aircraft MYPs on a per aircraft basis.

13. Senator MCCAIN. Secretary Wynne and Mr. Finley, what was the basis for the Air Force's conclusion that these numbers constitute "substantial" savings for purposes of the statute?

Secretary WYNNE. While there is no legal definition of "substantial savings," the Air Force has determined that a total savings of $225 million over 60 aircraft and 3 years, or $3.75 million savings per aircraft, is substantial. These costs savings equate to the opportunity to fund nearly two additional aircraft and are comparable to previously approved fighter MYP contracts such as the F/A–18E/F program, which saved $3.8 million per aircraft.

Mr. FINLEY. The definition of substantial savings is a matter of judgment. We agree that the use of an MYP contract for the acquisition of 60 F–22s over 3 years will result in substantial savings when compared to a series of annual contracts. While the number of aircraft lots in the proposed F–22 MYP is small compared to previous MYPs, the estimated savings of $3.7 million per aircraft are comparable to previously approved fighter aircraft MYPs on a per aircraft basis.

LIMITS OF INSTITUTE FOR DEFENSE ANALYSES STUDY

14. Senator MCCAIN. Secretary Wynne and Mr. Finley, by how much does the IDA's failure to take into account the $1.7 billion needed to implement the Air Force's proposal diminish IDA's savings number?

Secretary WYNNE. The IDA did not fail to take into account any costs. The Air Force does not need an additional $1.7 billion to implement the proposed MYP strategy. The shortfall to procuring the entire 60 F–22As referenced by the Air Force and IDA will be included in the fiscal year 2008 PB request. IDA conducted a BCA, based on the fiscal year 2007 PB, to determine whether savings could be generated through an MYP contract as compared to annual contracts for Lots 7–9 as is required by 10 U.S.C. 2306b(a)(1). The BCA concluded that an MYP contract would

save $3.75 million per aircraft for a total savings of $225 million. Prior decisions made by the Air Force do not diminish these savings at all.

Mr. FINLEY. The IDA did not fail to take into account any costs in conducting the F–22 MYP BCA. The Air Force does not need an additional $1.7 billion to implement the MYP strategy. The shortfall associated with the entire 60 F–22s, referred to by the Air Force and IDA, is $674 million. The Secretary of the Air Force has committed to inclusion of these funds in the Air Force budget submission, and the funds will be included in the President's fiscal year 2008 budget request. IDA conducted the BCA, based on the President's fiscal year 2007 budget, to determine whether savings could be generated through an MYP contract as compared to annual contracts for Lots 7, 8, and 9, as is required by 10 U.S.C. 2306b(a)(1).

15. Senator MCCAIN. Secretary Wynne and Mr. Finley, isn't it true that the taxpayer would see greater savings without implementing the MYP by simply keeping production at 30 aircraft per year for 2 years? Please explain.

Secretary WYNNE. The fiscal year 2007 PB extended the F–22A production program 1 year with the addition of Lot 9 and the reduction in production rate, for a total of 183 aircraft. This decision was critical to maintain a fifth-generation fighter supplier base and to ease the transition from F–22A to F–35 production. This decision was made by the Department to optimize capability and affordability, and mitigate risk better than other options. The Air Force has not investigated the option to produce 30 aircraft per year for 2 years and cannot speak to the cost implications of such a strategy on the F–22A or the F–35. Although the F–22A production facilities can support higher rates of production, current tooling will support no more than the current rate of 24 aircraft per year. Additional investments in tooling would be required to increase the current production rate to 30 aircraft per year. It is also unknown whether the lead times to procure this required tooling would support 30 aircraft per year beginning as soon as Lot 7.

Mr. FINLEY. No, taxpayer savings need to have a basis for realism. Procurement of 30 aircraft in fiscal year 2007 and fiscal year 2008 would have required investment in new tooling and procurement of 30 aircraft each year would have been unaffordable in the overall context of the DOD budget. This strategy would have resulted in an F–22 procurement funding requirement of approximately $4.5 billion each year, followed by an abrupt production line shutdown with completion of Lot 8. The President's fiscal year 2007 budget reflects a decision to extend the fifth-generation fighter industrial base, smooth the transition to F–35 production, and preserve future investment options.

16. Senator MCCAIN. Secretary Wynne and Mr. Finley, why didn't IDA analyze this alternative?

Secretary WYNNE. The fiscal year 2007 PB extended the F–22A production program 1 year with the addition of Lot 9 and the reduction in production rate, for a total of 183 aircraft. This decision was critical to maintain a fifth-generation fighter supplier base and to ease the transition from F–22A to F–35 production. This decision was made by the Department to optimize capability and affordability, and mitigate risk better than other options. OSD contracted with IDA to conduct a BCA for the F–22A MYP strategy proposed in the fiscal year 2007 PB, which is to purchase 60 aircraft and a companion multiyear contract to procure engines for the Air Force for Lots 7, 8, and 9. The IDA BCA was an independent estimate that complies with the requirement of 10 U.S.C. 2306b(a)(1) to establish that the use of an MYP contract will result in substantial savings over the total anticipated costs of carrying out the same program through annual contracts. The OSD did not contract with IDA to develop alternative procurement strategies for the F–22A program.

Mr. FINLEY. The Department did not ask IDA to examine the alternative of buying 30 aircraft in Lots 7 and 8 or other alternatives than that reflected in the President's fiscal year 2007 budget. IDA was asked to utilize the aircraft cost model which they developed for the independent cost estimate for F/A–22. Consistent with 10 U.S.C. 2306b, they assessed the cost for sequential lots of 20 aircraft each and a multiyear buy for these same quantities of aircraft, as well as other work relevant to the Department's plans for MYP of the F–22.

17. Senator MCCAIN. Secretary Wynne and Mr. Finley, IDA only focused on comparing three single-year procurements versus the Air Force's MYP strategy. Why didn't OSD direct IDA to conduct a more comprehensive BCA, which specifically looks at other acquisition strategies?

Secretary WYNNE. The QDR and related studies already considered alternative approaches and established the need to extend F–22A production by 1 year and pursue an MYP. This decision was critical to maintain a fifth-generation fighter sup-

plier base and to ease the transition from F–22A to F–35 production. Once the decision to add a Lot 9 was made, the IDA BCA was intended only to provide an independent estimate that complies with the requirements of 10 U.S.C. 2306b(a) to include determining whether the use of an MYP contract will result in substantial savings over the total anticipated cost of carrying out the same program through annual contracts.

Mr. FINLEY. The Department and the Air Force considered the IDA BCA consistent with the acquisition strategy identified as part of the President's fiscal year 2007 budget. Additional analysis was considered unnecessary.

18. Senator MCCAIN. Secretary Wynne and Mr. Finley, who formulated the scope of what the Department wanted IDA to analyze, and when?

Secretary WYNNE. OSD, in concert with the Air Force, established the scope of the BCA to fulfill the requirements outlined in 10 U.S.C., section 2306b, regarding MYP contracts. The IDA task order for the MYP BCA was awarded in January 2006.

Mr. FINLEY. The DOD staff worked with the Air Force staff in December 2005 and January 2006 in defining the scope of the work to be performed by the IDA in the BCA.

19. Senator MCCAIN. Secretary Wynne and Mr. Finley, even if Congress authorizes the current MYP proposal now, the Air Force will not enter into the contract until sometime after February 2007, when a new budget request and FYDP come out. In his interview with staff, Mr. Finley observed that, in the ordinary course, it is reasonable to expect that various costs will accrue in the interim between now and then. Does IDA's analysis take into account those interim costs? As to a plan to obtain authorization now but enter into the contract sometime next year, is IDA's analysis accurate? Please explain.

Secretary WYNNE. I was not present during the interview with Mr. Finley, so I cannot speak to the various costs that were discussed. However, IDA's analysis does take into account all relevant costs associated with the proposed MYP, including fiscal year 2006 advance procurement and fiscal year 2007 aircraft procurement funds. The MYP contract award date currently planned for May 2007 does not impact the projected savings for the MYP as outlined in IDA's BCA.

Mr. FINLEY. The interim costs you referred to are the normal long-lead costs associated with aircraft procurement, whether multiyear or single year. These costs are covered within the fiscal year 2006 advanced procurement funding already placed on contract with Lockheed Martin and Pratt & Whitney for Lot 7. These costs were taken into account by IDA in performance of the MYP BCA, and the projected savings will not be affected if the MYP is awarded after February 2007, provided there is no interruption to production before contract award.

20. Senator MCCAIN. Secretary Wynne and Mr. Finley, by what amount will the savings estimated by IDA be reduced if the Air Force is not able to enter into the MYP contract until February 2007?

Secretary WYNNE. The MYP contract award date currently planned for May 2007 does not impact the projected savings for the MYP. The Air Force plans to award the fiscal year 2007 advance procurement-economic order quantity (AP–EOQ) contract in January 2007. In accordance with 10 U.S.C. 2306b(l)(1)(B)(ii), the Air Force will notify the congressional defense committees at least 30 days in advance of the award of that AP–EOQ contract. All other notifications and certifications required by 10 U.S.C. 2306b (g), (i), and (l) prior to the award of a multiyear contract will be submitted to the defense committees at least 30 days prior to the planned May 2007 multiyear contract award.

Mr. FINLEY. The date of MYP contract award does not affect the MYP cost savings projected by the IDA, provided the contract is awarded prior to interruption of the production cycle.

FUNDING STABILITY

21. Senator MCCAIN. Secretary Wynne and Mr. Finley, recently Secretary Wynne submitted to the Senate Armed Services Committee a reprogramming request seeking to buy a 23rd F–22 Raptor—bringing the total for Lot 6 from 22 to 23 for fiscal year 2006. Congress originally fully funded 24 in the fiscal year 2006 National Defense Authorization and Appropriations Acts. Shouldn't a request for additional funds describe the cost overruns that have led to a purchase amount less than estimated? Why have the costs overrun yet again?

Secretary WYNNE. The reduction from 24 to 22 aircraft in Lot 6 was not the result of a cost overrun. The difference was due to a delayed understanding of the full impacts of a DOD Program Budget Decision (PBD) issued in December 2005, just 2–3 weeks prior to submission of the fiscal year 2006 PB. This PBD deleted F–22A Lots 9–11 and removed $10.5 billion. A program cut of that magnitude not only affected the lots that were cancelled, but also impacted the unit price curves and quantities of Lots 6, 7, and 8 since these lots became the last three in the production program. Despite much effort, those impacts could not be accurately estimated in the short 2–3 week period between the PBD publication and the DOD database lock. By March 2005, the Air Force completed a new service cost position (SCP) that incorporated adjusted unit price curves for Lots 6–8. The Air Force presented this revised estimate to the Defense Acquisition Board (DAB) for full rate production. DOD subsequently submitted an out-of-cycle selected acquisition report (SAR) to Congress in September 2005. In both the Executive Summary and the Total Program Cost and Quantity sections of that submission, the Department accurately reported the Air Force SCP prediction that the fiscal year 2006 PB would not be sufficient to purchase the authorized quantities of F–22A.

Mr. FINLEY. The reduction from 24 to 22 aircraft in Lot 6 was not the result of a cost overrun. The difference was due to the impacts of the Department's decision issued in December 2005, to reduce the F–22 procurement budget by $10.5 billion, and reduce procurement to 179 aircraft. This decision was made only a few weeks prior to submission of the President's fiscal year 2006 budget. This decision deleted F–22 Lots 9–11. A program cut of that magnitude not only affected the procurement lots that were cancelled, but also impacted the unit price curves and quantities of Lots 6, 7, and 8 since these procurement lots became the last three in the production program. Those impacts could not be accurately estimated in the brief time available for submission of the budget database. The Air Force subsequently completed a new SCP that incorporated adjusted unit price curves for Lots 6–8 and presented their revised estimate to the DAB for consideration of full rate production approval. In September 2005, the Department subsequently submitted an out-of-cycle SAR to Congress which reported the Air Force SCP and predicted that the President's fiscal year 2006 budget would not be sufficient to purchase the authorized quantities of aircraft.

22. Senator MCCAIN. Secretary Wynne and Mr. Finley, in the face of this change in procurement objective, and previous others, how can you say that funding for this program is sufficiently stable for the Air Force to now enter into a multiyear contract for the procurement of more?

Secretary WYNNE. The proposed F–22A MYP meets the 10 U.S.C. 2306b multiyear criteria referred to as "stable funding." It requires a "reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation." Both the Air Force and the DOD have clearly and repeatedly expressed, in writing and in testimony presented before Congress, a commitment to request funding for the full 60 aircraft multiyear contract. This "reasonable expectation" is further supported by the recently completed QDR and related studies on future tactical aircraft requirements that clearly indicate a requirement for not less than 183 F–22s.

Mr. FINLEY. The statutory requirement for funding stability, 10 U.S.C. 2306b(a)(3), requires a reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation. The Secretary of the Air Force in his May 16, 2006, letter addressed to the chairman of the Senate Committee on Armed Services, stated that the Air Force intends to fund and procure 60 aircraft through the proposed MYP. If an MYP of the F–22 is approved by Congress, the Department expects that sufficient funding will be requested to avoid contract cancellation.

DEFINITION OF MINIMUM ECONOMIC RATE

23. Senator MCCAIN. Secretary Wynne and Mr. Finley, among the requirements that have to be satisfied before the Air Force can enter into this MYP contract is that "[t]he proposed multiyear contract provides for production at not less than minimum economic rates given the existing tooling and facilities." Isn't it true that only by calculating production rate on the basis of "a shift-and-a-half plus minimal overtime" (which is how Lockheed Martin defines economic rate of production) can Lockheed Martin assure the Government that it is procuring the F–22s at a "minimum economic rate"?

Secretary WYNNE. While the Air Force is unaware of any formal definition for "minimum economic rate," there are many variables that could affect an analysis to determine (within existing facilities and tooling across multiple production locations) a production rate below which efficiencies are lost at an increasing and unacceptable rate. The contractor's analysis of a "minimum economic rate" at 18–20 F–22As per year included an average labor utilization across all F–22A production locations of around one full-time shift. The mid-fuselage station at the Fort Worth production line, however, was predicted to operate at around one-and-a-half full-time shifts. Recent unit cost analyses completed by the Air Force also indicated that quantities below 18–20 aircraft per year would experience a steeper loss of efficiencies than quantities at or above 18–20 per year. The Air Force will ensure the contractor's proposed labor utilization at each production location is reasonable during contract negotiations and that the facts support the requirements of 10 U.S.C. 2306b regarding the "minimum economic rate."

Mr. FINLEY. It is correct that Lockheed defines "economic rate of production" based on a shift and a half plus minimal overtime. This is a different criterion than "minimum economic rate." There is no quantifiable, legal definition of "minimum economic rate" in 10 U.S.C. 2306b. However, 10 U.S.C. 2306b subsection i(1)(B), indicates a connection between minimum economic rate and existing tooling and facilities. Therefore, we define "minimum economic rate" as the production rate below which gaps in the production line will result, and existing tooling and facilities would be underutilized, resulting in production inefficiencies. Based on this criterion, and information provided by Lockheed Martin, the minimum economic production rate for the F–22 production line is 18–20 aircraft per year, as noted in the Under Secretary of Defense for Acquisition, Technology, and Logistics' (USD(AT&L)) letter of July 24, 2006.

24. Senator MCCAIN. Secretary Wynne and Mr. Finley, isn't the metric that is typically used "1–8–5," that is, one-shift on an 8-hour day, 5 days a week?

Secretary WYNNE. The Air Force is not aware of a "typical" metric to determine the "minimum economic rate," however, the contractor's analysis of a "minimum economic rate" for F–22A at the current facilities and tooling capacity did include an average labor utilization across all F–22A production locations of around one full-time shift.

Mr. FINLEY. Different industries manage their production work according to their specific requirements, metrics, workload, and other unique factors. We are not familiar with the typical use of the "1–8–5" metric.

25. Senator MCCAIN. Secretary Wynne and Mr. Finley, doesn't the Government's complete reliance on the contractor to not only provide the number but also the definition of "minimum economic rate" render this requirement facile? Please explain.

Secretary WYNNE. The Air Force is unaware of any formal definition for "minimum economic rate" and has not adopted a contractor's definition. Recent unit cost analyses completed by the Air Force indicated that quantities below 18–20 aircraft per year would experience a steeper loss of efficiencies than quantities at or above 18–20 per year. While the contractor did conduct its own analysis based at least in part upon labor utilization, the Air Force analysis used historical data and unit cost models.

Mr. FINLEY. No. To the contrary, the Government did not completely rely on the contractor. As I noted in my response to question 23, there is no firm, quantifiable legal definition of "minimum economic rate." We define "minimum economic rate" as the production rate below which gaps in the production line will result, and existing tooling and facilities would be underutilized, resulting in production inefficiencies.

26. Senator MCCAIN. Secretary Wynne and Mr. Finley, the Congressional Research Service (CRS) has pointed out that the IDA model assumed a 5-percent savings for the avionics portion of the MYP that is unlikely to be achieved. Doesn't this suggest that there could be other flaws in this estimate? Please explain.

Secretary WYNNE. The Air Force believes the IDA estimate of savings, while conservative, is thorough, objective, and complete. The CRS conducted a thorough and iterative review of IDA's cost estimating methodologies, assumptions, and analysis. The question raised by the CRS represents a difference of opinion over a judgment made by IDA to assume a 4.5-percent savings (not 5 percent as indicated in the question) instead of 4 percent for the electronic warfare portion of the avionics savings estimate based upon an assumption about when the contract for the economic order quantity procurement could be completed. Incidentally, the subcontractor in question predicted much higher savings than IDA's analysts accepted. This 0.5 per-

cent difference of opinion between IDA and the CRS on a portion of one subsystem is the only substantive allegation of a flaw in IDA's estimate that the Air Force is aware of despite intense scrutiny from well-qualified experts supporting congressional decisionmaking on the F–22A MYP. The Air Force believes this should give Congress more confidence, not less, in the independent estimate upon which the Air Force's F–22A MYP request is based.

Mr. FINLEY. There is no flaw in the IDA MYP cost estimate. The IDA estimate for avionics savings was 13.7 percent. This represents a build-up of savings estimates for each of the individual avionics subsystem suppliers. For one of the suppliers, IDA estimated that the savings would be 5 percent based on the expected initiation of MYP long lead purchases by early August 2006, but due to the risk associated with the schedule, IDA used savings of 4.5 percent for this supplier in their avionics savings estimate. The purchase of MYP long lead items did not occur, therefore the savings expected from that supplier were reduced to 4 percent. This resulted in an overall cost savings decrease for avionics from 3.7 percent to 3.6 percent, and a total cost savings decrease of $1.4 million. There are no other cost savings in IDA's analyses that were affected by the scheduled early August 2006 purchase of MYP long lead items.

AWARD FEES

27. Senator MCCAIN. Secretary Wynne and Mr. Finley, what award fees has the Air Force provided the Lockheed Martin Corporation for the F–22A engineering and manufacturing development (EMD) phase?

Secretary WYNNE. The Air Force provided Lockheed Martin $850 million in award fees over the 15-year EMD phase. However, the production contracts within the F–22A production program, to include the proposed MYP contract, are firm-fixed price contracts and, as such, the total profit will be settled prior to contract award during negotiations.

Mr. FINLEY. The Air Force provided Lockheed Martin $850 million in award fees over the 15-year EMD phase of the F–22 program.

28. Senator MCCAIN. Secretary Wynne and Mr. Finley, were these award fees too much considering all the problems associated with this phase of the program? Please explain.

Secretary WYNNE. The absolute dollar value of F–22 award fees ($850 million) is relatively small (5 percent) in terms of the total EMD effort. Award fee is typically used for cost reimbursable development contracts that are inherently complex and do not lend themselves to exclusively objective measurements required for incentive fee contracts. The contractor's performance was evaluated using defined objective and subjective criteria that were tied to specific program objectives. However, the production contracts within the F–22A production program, to include the proposed MYP contract, are firm-fixed price contracts and, as such, the total profit will be settled prior to contract award during negotiations.

Mr. FINLEY. No, the award fees approved by the Air Force do not appear to be excessive. The $850 million in award fees paid to the contractor represent 5 percent of the total EMD phase cost. However, I intend to review Air Force (as well as other Services) award fee determinations in light of the Department's emphasis on setting award fees against actual performance. As noted in my oral statement, I am fully committed to acquisition excellence and the restoration of confidence in our leadership for acquisition systems. If appropriate, I will take firm action to improve the process to assure the Government is getting the best value for our investments and that contractors are treated fairly, but firmly.

LEGAL REVIEW

29. Senator MCCAIN. Secretary Wynne and Mr. Finley, when did the DOD conduct, pursuant to DOD Directive 5000.1, a legal review of the F–22A MYP proposal to determine that it is consistent with all applicable domestic laws, including but not limited to the requirements of title 10 U.S.C. section 2306b?

Secretary WYNNE. The legal and regulatory review of the F–22A MYP was conducted pursuant to DOD Directive 5000.1, prior to my submission of the MYP justification package to Congress on May 16, 2006.

Mr. FINLEY. The Air Force General Counsel conducted a legal and regulatory review of the F–22 MYP proposal for the Secretary of the Air Force prior to Air Force submission of the MYP justification to Congress on May 16, 2006. I requested a legal review by the Department's Deputy General Counsel (Acquisition and Logis-

tics), after concerns were raised by Congress. As a result of the Deputy General Counsel's review, we concurred with the Secretary of the Air Force's determination that the F–22 MYP satisfies the statutory criteria.

30. Senator MCCAIN. Secretary Wynne and Mr. Finley, who was the individual, by name, title, and office, who conducted this review?

Secretary WYNNE. My legal staff conducted the review. Daniel Ramos, Principal Deputy General Counsel, provided the Air Force's legal coordination of the multiyear package submitted to Congress based on advice received from Ty Hughes, Deputy General Counsel (Acquisition) and his staff.

Mr. FINLEY. At my request, the Department's legal review of whether the F–22 MYP satisfied the 10 U.S.C. 2306b criteria was conducted by Douglas Larsen, Deputy General Counsel (Acquisition and Logistics) (DGC(A&L)).

31. Senator MCCAIN. Secretary Wynne and Mr. Finley, was this person(s) authorized to conduct this review? If so, when and by whom?

Secretary WYNNE. Yes, Mr. Ramos, Mr. Hughes, and the Office of the Air Force General Counsel staff are authorized to conduct this review under DODD 5000.1, paragraph E1.1.15, Legal Compliance, and as directed by SAFO 111.5.

Mr. FINLEY. Yes, I requested DGC(A&L) conduct the legal review. I discussed the results with Mr. Krieg, USD(AT&L), before submission of my July 14, 2006, letter to Senator McCain.

IDA STUDY

32. Senator MCCAIN. Dr. Nelson, IDA recently released a report comparing the costs associated with a 3-year MYP plan with three single-year procurement contracts for the F–22A. This report was the basis for Senator Chambliss' amendment which reinstated the MYP. Did you conclude that $225 million and 2.2 percent cost avoidance constituted "substantial savings" within the meaning of the Federal MYP statute?

Dr. NELSON. IDA did not make a judgment on whether the $225 million cost savings/avoidance (2.2 percent) met the statutory requirement of "substantial savings." Our task was to estimate the magnitude of the cost savings/cost avoidance provided by an F–22 MYP, not to judge whether savings of the estimated amount are sufficient to meet the statutory requirement for "substantial savings."

33. Senator MCCAIN. Dr. Nelson, did IDA find that cost avoidance under the current MYP is about half of what the Air Force originally estimated?

Dr. NELSON. The IDA estimate is about one-half of what the Air Force was seeking, based on congressional testimony by Lieutenant General Hoffman (SAF/AQ) on 28 March 2006.

34. Senator MCCAIN. Dr. Nelson, did IDA find that the F–22 MYP savings compared unfavorably to 13 other MYP contracts?

Dr. NELSON. The IDA report presented data on estimated MYP cost savings/avoidance for other relevant aircraft and engine contracts. In percentage terms, IDA's estimated cost savings/avoidance for the F–22A MYP is lower than all but one of the examples. In dollar terms, IDA's estimated cost savings/avoidance for the F–22A is $225 million.

STATUTORY REQUIREMENTS

35. Senator MCCAIN. Dr. Nelson, did IDA study the proposed MYP's ability to meet statutory requirements for design stability?

Dr. NELSON. IDA did not offer a judgment about whether any of the statutory requirements, including design stability, are met. That was not a part of our work. A clarification is needed with respect to Appendices B and C of our report. The DOD is required to provide exhibits supporting any request for an MYP. Our sponsor in the OSD asked IDA to provide draft exhibits that embedded IDA's cost savings/avoidance estimates with other budget material developed by the Air Force. We also included factual material we had collected bearing on the other criteria. The exhibits are in appendices and not in the main report because they were intended for the sponsor's use but did not constitute part of the main body of our work.

36. Senator MCCAIN. Dr. Nelson, did IDA study the proposed MYP's ability to meet statutory requirements for funding stability?

Dr. NELSON. IDA did not study the proposed MYP's ability to meet statutory requirements for funding stability. That was not a part of our tasking from the DOD.

37. Senator MCCAIN. Dr. Nelson, did IDA study the proposed MYP's ability to meet statutory requirements for requirements stability?

Dr. NELSON. IDA did not study the proposed MYP's ability to meet statutory requirements for requirements stability. That was not a part of our tasking from the DOD.

38. Senator MCCAIN. Dr. Nelson, did IDA study the proposed MYP's ability to meet statutory requirements for contributing to national security?

Dr. NELSON. IDA did not study the proposed MYP's ability to meet the statutory requirements for contributing to national security. That was not a part of our tasking from the DOD. We provided materials we had collected during our work and included those materials in the Appendices.

39. Senator MCCAIN. Dr. Nelson, did the IDA business case study, commissioned by DOD, conclude that the F–22 meets all six conditions for an MYP contained in 10 U.S.C. 2306b?

Dr. NELSON. IDA did not address whether the F–22A meets all six conditions for an MYP as contained in 10 U.S.C. 2306b. That was not a part of our tasking from the DOD.

40. Senator MCCAIN. Dr. Nelson, did the IDA report document that the F–22 meets all required MYP criteria to include substantial savings and design stability?

Dr. NELSON. IDA did not address whether the F–22A met the criteria. That was not a part of our tasking from the DOD. We estimated the cost savings/avoidance that an F–22A MYP would provide.

ENDORSEMENT

41. Senator MCCAIN. Dr. Nelson, is it fair to say that IDA's study is not a business case that endorses the proposed MYP, but is instead a cost savings estimate? Please explain.

Dr. NELSON. IDA did not endorse the F–22A MYP. We took "business case" to refer to cost savings/cost avoidance, which is what we addressed.

AVIONICS SAVINGS

42. Senator MCCAIN. Dr. Nelson, the IDA study notes that to get 5 percent savings on avionics, the MYP contract must be in place by August 2. But, as CRS points out, your estimate includes a 4.5-percent avionics savings even though you say that the savings will drop to 4 percent after August 2. Don't you agree that 4 percent savings is a more accurate estimate? Please explain. Does the IDA analysis include any other generous assumptions like this one?

Dr. NELSON. The point raised by the CRS concerns only one avionics supplier. The 4.5-percent estimate was not based on a generous assumption, but was a contingent estimate that reflected the information available at the time. The relevant sentence from IDA's report is: "The current estimate (AA06) is a savings of 5 percent if the MYP is in place by August 2, 2006. If that deadline is not met, the estimate falls to 4 percent." CRS misinterpreted "MYP in place" as meaning the awarding of the MYP contract, which would have been impossible by August 2 since congressional approval of the MYP would not be possible until enactment of the fiscal year 2007 Defense Authorization Bill. The 5-percent value assumed that the go-ahead to order MYP long lead items would be given by August 2. During March and April when the analysis was being done, it was not clear whether this assumption would prove to be valid. Therefore IDA split the difference between the 4-percent and 5-percent estimates. In response to the issue raised by CRS, we recalculated the cost savings with a 4-percent savings for the relevant supplier. The cost savings percentage for the total avionics system decreases from 3.7 percent to 3.6 percent and total cost savings decrease by $1.4 million. There are no other cost savings in IDA's analyses that are affected by an August deadline to order MYP long lead items.

QUESTIONS SUBMITTED BY SENATOR SAXBY CHAMBLISS

MINIMUM ECONOMIC PRODUCTION RATE

43. Senator CHAMBLISS. Secretary Wynne, there has been some confusion, which CRS elaborates on in their written statement, regarding what the minimum economic production rate is for the F–22. Would you please explain the concept of the "minimum economic production rate," the reason for the confusion, and what is the actual minimum economic production rate for the F–22 program?

Secretary WYNNE. The Air Force is unaware of any formal definition for "minimum economic rate". Confusion can arise from this absence of a formal definition as well as from the many variables that could affect any analysis to determine (within existing facilities and tooling across multiple production locations) a production rate below which efficiencies are lost at an increasing and unacceptable rate.

Recent unit cost analyses completed by the Air Force indicated that quantities below 18–20 aircraft per year would experience a steeper loss of efficiencies than quantities at or above 18–20 per year.

CANCELLATION LIABILITY

44. Senator CHAMBLISS. Secretary Wynne, would you please respond to claims by Congressional Budget Office (CBO) that the Air Force "is not requesting appropriations sufficient to cover the potential cancellation liability" and that, under the proposed multiyear, "the Air Force would have to seek additional appropriations in the future even if a decision was made to cancel the contract"?

Secretary WYNNE. Cancellation ceiling is a contingent liability that only becomes an actual liability if the contract is cancelled. The CBO opinion that cancellation ceiling should be considered a certain liability of the Government upon contract award depends upon an assumption that the contract will be cancelled. In fact, the opposite assumption is expressly made by the act of awarding a multiyear contract that obligates the Government to more than just the first program year. For that very reason, subsection (f) of 10 U.S.C. 2306b provides three separate options for funding cancellation costs; only one of which is to fund those costs as part of the funds available for contract performance. As a result, the DOD Financial Management Regulation permits unfunded cancellation ceilings subject to the approval of the Under Secretary of Defense (Comptroller). F–22A MYP cancellation ceiling amounts are highest early in the contract when cancellation is the least likely and cover only non-recurring costs. In the event the F–22A MYP is cancelled at the end of a program year, the Air Force will not seek a supplemental appropriation as suggested by CBO. The Air Force will source unobligated procurement funding within the F–22A program and, if necessary, request reprogramming approval to use currently available aircraft procurement funds to pay the actual cancellation charge, once known, consistent with paragraph (2) of subsection (f) of section 3206b of title 10.

45. Senator CHAMBLISS. Secretary Wynne, I understand that DOD has recently approved a waiver allowing the Air Force to have an "unfunded cancellation ceiling" for the F–22. Would you please explain what this means and whether or not this is uncommon or unprecedented for major weapon system programs like the F–22?

Secretary WYNNE. The Under Secretary of Defense (Comptroller) approved the F–22A unfunded cancellation ceiling on July 21, 2006 consistent with subsection (f) of 10 U.S.C. 2306b and the requirements of the DOD Financial Management Regulation. This means funds will not be tied up unnecessarily to cover the unlikely contingency of contract cancellation. Unfunded cancellation ceilings are not unprecedented for major weapon system programs. In the event of contract cancellation, the Air Force will request necessary reprogramming approval to use currently available aircraft procurement funds to pay the actual cancellation charge, once known, consistent with paragraph (2) of subsection (f) of section 3206b of title 10.

PRODUCTION SCHEDULES

46. Senator CHAMBLISS. Secretary Wynne, would you please elaborate on the rationale for extending F–22 production for 2 years—as the QDR recommended—in order to preserve the defense industrial base and provide a bridge to JSF production?

Secretary WYNNE. IOC of the F–35 JSF is currently scheduled to occur in 2013. Extending F–22A production maintains the Nation's defense industrial base and ensures viability of a fifth-generation fighter production line. Critical resources, experi-

enced workforces, supplier confidence, and learning curves would be maintained reducing risk and future production costs.

47. Senator CHAMBLISS. Secretary Wynne, would you please comment on the current schedule of the F–22 program and how actual deliveries compare to the contractual delivery schedule?

Secretary WYNNE. The Air Force's F–22A schedule recovery efforts, started in August 2004, were successful. During the recovery period, the Air Force met all three congressional commitments to bring deliveries back to the original contractual delivery schedule. Deliveries now conform to the contract schedule and, as of July 2006, 76 aircraft have been delivered. This accomplishment is indicative of the F–22A's production program maturity and design stability.

WEIGHT

48. Senator CHAMBLISS. Secretary Wynne, CRS raises concerns relative to increasing weight of the F–22 program. Are there any current issues relative to increased or increasing weight for the F–22?

Secretary WYNNE. There are no current issues related to weight on the F–22A. The F–22A does not have an explicit weight specification. All F–22A aircraft go through extensive acceptance test procedures against an aeronautical performance specification, and the F–22A continues to be the most maneuverable fighter aircraft flying today. While F–22A weight has increased slightly from lot to lot, depending on minor configuration differences, the Air Force manages the overall program to ensure the aircraft continues to meet and exceed both the performance specifications and warfighter needs.

NUNN-MCCURDY BREACHES

49. Senator CHAMBLISS. Secretary Wynne, I understand the F–22 has had two Nunn-McCurdy breaches over the course of the program. Would you please explain those breaches and why they are or are not relevant to the current MYP request?

Secretary WYNNE. The F–22A had two Nunn-McCurdy unit cost breaches during the now completed development phase of the program. The first breach occurred in 1993 after the OSD Bottom-Up Review on Tactical Aircraft, which resulted in a quantity decrease from 648 aircraft to 442. The second breach was in 2001 and resulted in a $5.4-billion increase to the program and a decrease in the quantity from 341 to 305 total aircraft during the LRIP DAB. Since initiation of production, the costs have decreased steadily resulting in a 35-percent reduction in unit flyaway costs per aircraft from Lot 1 to Lot 5. The F–22A entered full rate production in 2005 and continues to successfully deliver combat-ready Raptors on schedule.

NUMBER PROCURED IN FISCAL YEAR 2006

50. Senator CHAMBLISS. Secretary Wynne, would you please clarify why the Air Force is only able to procure 22 F–22s in fiscal year 2006 even though the fiscal year 2006 budget supposedly funded 24 F–22s?

Secretary WYNNE. Just prior to the February 2005 fiscal year 2006 PB submission to Congress, a PBD truncated the F–22A program at Lot 8 (fiscal year 2008) and cut $10.5 billion. The cut impacted F–22A unit price curves and Lots 6, 7, and 8 quantities. Full impacts could not be accurately estimated prior to the fiscal year 2006 PB submission, but a revised estimate was presented to the DAB in March 2005 for full rate production. The Air Force estimated that only 22 F–22As could be procured in Lot 6 as a result of the cut. The DOD subsequently submitted an out-of-cycle SAR to Congress in September 2005. In both the Executive Summary and the Total Program Cost and Quantity sections of that submission, the Department accurately reported the Air Force's estimate that the fiscal year 2006 PB would not be sufficient to purchase the authorized quantities of F–22A.

COST PREDICTIONS

51. Senator CHAMBLISS. Secretary Wynne, would you please comment on the supposed variance of $7 billion in the cost of the F–22 program between the Air Force and DOD Cost Analysis Improvement Groups, according to a 2001 Government Accountability Office (GAO) study?

Secretary WYNNE. Air Force and the OSD cost estimates are intentionally independent and can vary substantially based upon different assumptions and cost modeling parameters. Independent Air Force and OSD estimates are an important tool for Defense acquisition decisionmakers to consider all perspectives. Both the Air Force and OSD cost estimate positions are presented to the DAB for consideration in major acquisition decisions. The Department's decisionmaking processes at that time in the program's history started the F–22A production program on a path that resulted in a production unit cost reduction of 35 percent from Lot 1 to the current Lot 5.

BUDGET CYCLE

52. Senator CHAMBLISS. Secretary Wynne, what part of the multiyear request was proposed in the FYDP covered by the original fiscal year 2007 PB and what part of the multiyear request do you consider to be submitted out of cycle?

Secretary WYNNE. The fiscal year 2007 F–22A budget, presented in February 2006, represented the Air Force's MYP plan for the F–22A over the FYDP. A series of settlements and proposals to connect requirements with budget realities significantly compressed the F–22A MYP strategy timeline beginning in December 2005. The F–22A MYP plan, presented in the fiscal year 2007 PB, documented a Department commitment to provide to Congress the updated MYP funding estimate by May 2006. Delivery of the full F–22A MYP BCA after the submittal of the initial fiscal year 2007 PB can be considered out-of-cycle. While some confusion resulted from the out-of-cycle nature of this multiyear authorization request, the proposed MYP meets all requirements of title 10 and the Air Force remains committed to fully funding the multiyear.

53. Senator CHAMBLISS. Secretary Wynne, is funding for the F–22 MYP in the current FYDP?

Secretary WYNNE. As documented by both the IDA report and the Air Force's 16 May 2006 MYP exhibit submission, the current F–22A MYP is fully funded to buy 56 of the total 60 aircraft requested. The Department will address any potential funding shortfalls to ensure the acquisition of 60 aircraft in the fiscal year 2008 PB prior to contract award.

MULTIYEAR PROCUREMENT CRITERIA

54. Senator CHAMBLISS. Secretary Wynne, you stated that the Air Force meets five of the six criteria right now, and the last to be met is "funding stability" (e.g. the requirement for funding requests sufficient to avoid contract cancellation). However, you later stated that the Air Force is committed to meeting this same requirement. Would you please clarify whether the Air Force does or does not meet all six title 10 criteria required for entering into an MYP?

Secretary WYNNE. The F–22A MYP proposed by the Air Force meets all six criteria required by 10 U.S.C. 2306b(a). The title 10 MYP criteria referred to as "stable funding" requires a "reasonable expectation that throughout the contemplated contract period the head of the agency will request funding for the contract at the level required to avoid contract cancellation." Both the Air Force and the DOD have clearly and repeatedly expressed, in writing and in testimony presented before Congress, a commitment to request funding for the full 60-aircraft, multiyear contract.

CONTRACT TYPE

55. Senator CHAMBLISS. Secretary Wynne, would you please explain the relevance of the EMD contract award fees to the Air Force's MYP?

Secretary WYNNE. EMD contract award fees are not relevant to F–22A production or the proposed MYP. The EMD contract is complete, and production contracts are firm-fixed price and do not include an award fee.

56. Senator CHAMBLISS. Secretary Wynne, what type of contract will be used for the multiyear and what are the implications for the likelihood of a cost overrun?

Secretary WYNNE. The Air Force will enter into a firm-fixed price contract for the F–22A MYP. This eliminates cost growth risk to the Government by putting maximum responsibility on the contractor to control cost and schedule. Once the MYP contract is negotiated and awarded, the Air Force will not pay more than the terms and conditions of the contract permit for all 60 aircraft despite erroneous suggestions made by some that the MYP contract could experience cost overruns.

57. Senator CHAMBLISS. Secretary Wynne, how are cost overruns in the F–22 development program related to the proposed multiyear program and compliance with the 10 U.S.C. 2306b criteria?

Secretary WYNNE. The F–22A MYP proposal is fully compliant with the criteria of 10 U.S.C. 2306b. Past cost challenges in the completed cost-plus-award-fee development contract are not relevant to the F–22A production contracts or the proposed MYP for 60 production aircraft. F–22A production contracts, to include the proposed MYP contract are firm-fixed price. By definition, the Government does not bear the risk of cost overruns on firm-fixed price contracts. Just like the previous 8 production lot contracts prior to the start of the proposed MYP, once the MYP contract is negotiated and awarded, the Government will not pay more than the firm-fixed price negotiated for all 60 aircraft. F–22A unit flyaway costs have decreased by 35 percent from Lot 1 to the current Lot 5 and production deliveries are on schedule.

RELATION TO F–18

58. Senator CHAMBLISS. Secretary Wynne, compared to the amount of data used to compute the cost savings estimate for the first F–18 MYP, how much cost data went into estimating the cost savings for the F–22 MYP?

Secretary WYNNE. The F–22A cost savings estimate used historical data from nine EMD aircraft and six production lots (PRTV I, PRTV II, Lots 1 to 4). When the first F/A–18E/F MYP was presented to Congress, contracts had been signed for 3 production lots with deliveries accepted on fewer than 12 LRIP aircraft. In both cases, the cost savings were compared to other recent MYP programs and assessed to be realistic.

TITLE 10 U.S.C., 2306B CERTIFICATION

59. Senator CHAMBLISS. Mr. Finley, generally speaking, is there a statutory requirement for DOD or the head of an agency to formally certify that multiyear contracts meet the criteria outlined in title 10 U.S.C., 2306b, paragraph (a)? If so, when must that certification be provided?

Mr. FINLEY. Subsection (a) of 10 U.S.C. 2306b requires that the head of an agency find each of six elements relating to the multiyear contract. Although it is customary in DOD to make written findings, subsection (a) does not require a certification. In regard to the proposed F–22 multiyear contracts, the Secretary of the Air Force, as the head of the agency responsible for the contracts, set forth his findings regarding each of the six elements in his letter of May 16, 2006, to the chairman of the Senate Armed Services Committee.

60. Senator CHAMBLISS. Mr. Finley, regarding the statutory certification requirement outlined in title 10 U.S.C., 2306b, paragraph (i)(1)(A), when is this certification required?

Mr. FINLEY. After the multiyear contracts have been specifically authorized by law, subsection (i)(1)(A) requires that the Secretary of Defense certify to Congress that the current FYDP fully funds the support costs associated with the multiyear program.

61. Senator CHAMBLISS. Mr. Finley, when will the Secretary of Defense forward the certification required by this subsection?

Mr. FINLEY. The Department will make the appropriate certification to Congress after the F–22 MYP has been authorized by Congress, and before award of the multiyear contracts.

ADDITIONAL SAVINGS

62. Senator CHAMBLISS. Mr. Finley, the IDA study talked about the possibility for more savings than their minimum estimate of $225 million in savings. Would you please discuss the possible source and likelihood of these additional savings?

Mr. FINLEY. The potential for additional savings, beyond the $225 million estimated by IDA, will be resolved after contract negotiations with Lockheed Martin and Pratt & Whitney for the MYP contracts. We believe that there is real value to the contractors and their suppliers in having the assurance that the Government will be purchasing 20 aircraft per year for 3 years.

IDA'S ROLE

63. Senator CHAMBLISS. Mr. Finley, what role did IDA play in the DOD decision to request authority for a 3-year MYP of 60 F–22 aircraft in the President's fiscal year 2007 budget?

Mr. FINLEY. IDA did not have any role in the Department's decision to request MYP authority for the F–22.

CONCERNS DISCOVERED IN TESTING

64. Senator CHAMBLISS. Mr. Finley, do the suitability concerns discovered during operational testing of the F–22 impact the stable design condition referenced in subsection (a)(4) of 10 U.S.C. 2306b?

Mr. FINLEY. No.

PREVIOUS MULTIYEAR SAVINGS

65. Senator CHAMBLISS. Mr. Finley, how much has DOD saved using multiyear contracts over the last 7 years?

Mr. FINLEY. We have saved approximately $7 billion.

66. Senator CHAMBLISS. Mr. Finley, what are the programs that resulted in these savings?

Mr. FINLEY. The MYP programs which resulted in $7 billion savings are shown in the table below:

Multiyear Contract Programs

Apache Airframe MYP I & II
Apache Aircraft Block II
Black Hawk/Sea Hawk—Airframe MYP I & II Javelin
Longbow Hellfire
LW 155 Howitzer
Family of Medium Tactical Vehicles (FMTV)
A1 MYP I & II
M1 Tank MYP I & II
F/A–18E/F Airframe MYP I & II
F/A–18E/F Engine
E–2C Airframe/Engine MYP I & II
DDG–51 MYP I & II
Virginia Class Submarine
Tactical Tomahawk
Common Cockpit
C–17 Airframe MYP I & II
C–17 Engines MYP I & II
C 130J/KC 130J Airframe

DATED GAO REPORT

67. Senator CHAMBLISS. Mr. Walker, regarding your June 20 report, table 1 on page 4 of that report indicates in two separate places that "The Air Force has not completed its analysis of contract cost or cost avoidance at this time." The IDA MYP BCA was delivered to GAO on May 16. Would you please explain why your report—which was released 1 month later—indicates that the analysis of cost savings has not been completed?

Mr. WALKER. GAO did not receive a copy of the IDA BCA until June 7, 2006; however, on May 19, 2006 we did receive a copy of Air Force Secretary Michael Wynne's F–22A multiyear justification package that was sent to Congress on May 16, 2006. Although the GAO report does not make specific reference to the IDA BCA, it does reference the Air Force justification package that was based on the IDA BCA. GAO usually does not reference every piece of evidence it obtains during an engagement. Nevertheless, our June 20 report discussed the estimated 2.7-percent savings of $225 million reported to Congress by the Secretary and included in the IDA report. Therefore, we did consider the IDA analysis in preparing our report. Finally, table 1 in the report was marked as showing information as of April 2006 when we completed our field audit work.

CONTRADICTORY STATEMENTS

68. Senator CHAMBLISS. Mr. Walker, on page 2 of your July 6 letter to the chairmen and ranking members of the congressional defense committees, you state that your "recommendation was not to delay the F–22 program" but "that the Department and Congress not fund any more investment in the program." However, on page 7 of your June 20 report, in the subsection titled "Recommendations" you write, "we recommend that Secretary of Defense delay further investments in F–22A procurement and modernization *until it completes a comprehensive BCA*—"[emphasis added]. It would seem that delaying F–22 procurement funding would necessarily result in a delay to the F–22 program. Would you please explain these two apparently contradictory statements?

Mr. WALKER. The Air Force and OSD have been aware of GAO's concerns about the need for a new business case on the F–22 for some time. Over the past few years GAO has consistently recommended DOD needs to develop a new business case to justify future investments in the program. OSD and the Air Force had continued to have a significant difference in requirements for the F–22A (183 aircraft versus 381 aircraft) and our recommendation was not intended to further slow the F–22A program but to get a consistent and fact-based identification of the need for whether and to what extent DOD believed the Department as a whole versus the Air Force alone believed there was a need for additional F–22As beyond those for which appropriations had already been made. We were of the opinion that OSD and the Air Force could and should resolve their difference without significant expenditures of time. On August 17, 2006, subsequent to the issuance of our June 20 report, OSD told GAO that the Department (OSD) and the Air Force understand that 183 aircraft are operationally valid and the program of record. Nevertheless, OSD has stated it will continue to assess the joint air dominance scenario checking the sensitivity of its assumptions. OSD has a new study ongoing called Joint Air Dominance II.

Under the multiyear proposal, the Air Force has added 2 years to aircraft procurement beyond DOD's plan last year which terminated procurement in 2008. Now procurement ends in 2010. We believe this will increase the risk that quantities will change again before the final procurement in 2010.

JOINT AIR DOMINANCE STUDY BRIEFING

69. Senator CHAMBLISS. Mr. Walker, in your June 20 report, on page 2 you state, "We have asked OSD to provide us access to the Joint Air Dominance Study, but it has not yet done so." I understand that GAO received a briefing from DOD on the Joint Air Dominance Study on June 20, the day your report was released. According to DOD's point of contact for this GAO report, GAO never requested a briefing on the Joint Air Dominance Study during the course of writing the report. The Joint Air Dominance Study was conducted as part of the 2005 QDR and outlines DOD's BCA and current plan for tactical air modernization and investment. When did GAO request a briefing on the Joint Air Dominance Study through their designated DOD point of contact for this F–22 report?

Mr. WALKER. In conducting our review of the F–22A program, we held several discussions with Air Force and OSD officials; however, none of the officials we interviewed told us about the Joint Air Dominance Study. For example, in an August 2005 meeting with Department officials, the Joint Air Dominance Study was not mentioned in response to our questions about ongoing efforts to analyze the F–22 or other tactical aircraft programs. We did not learn of the study until June 8, 2006 when DOD cited it in its response to our draft F–22A report, If DOD wanted GAO to know of the study and its results, it should have come forward with it earlier.

Importantly, GAO has recommended that DOD conduct a new business case for the last few years so DOD was well aware of our concerns with the F–22A program. At our request for access to the Joint Air Dominance Study, OSD officials briefed eight powerpoint briefing charts that summarized the Joint Air Dominance Study to GAO on June 20. These charts were top level assumptions and outcomes lacking any of the information that showed detailed analysis and support. GAO was committed to deliver the final report to its congressional requester by a specific date and made a decision to undertake additional analysis of the Joint Air Dominance Study in future work in the tactical aircraft area once we obtain full access to the study and supporting analysis. We have requested the full study under our ongoing tactical aircraft work, but as of September 5, 2006, we had not been provided access. Program analysis and evaluation officials stated that assumptions used in the Joint Air Dominance Study would be further analyzed during 2006, which we understand is ongoing now, to determine their sensitivity to change. This implies that study outcomes could change if assumptions are found to be sensitive to change.

70. Senator CHAMBLISS. Mr. Walker, when was that briefing received?

Mr. WALKER. As stated in question 69, we received a summary level briefing on June 20, 2006. OSD showed us eight pages at a very high level summary without significant detail. A more comprehensive review of the full OSD study is necessary.

71. Senator CHAMBLISS. Mr. Walker, who at GAO received the briefing?

Mr. WALKER. The Acquisition Sourcing Management Assistant Director responsible for the F–22A engagement and reporting received the briefing.

REASON FOR REDUCTION IN QUANTITY OF F–22S

72. Senator CHAMBLISS. Mr. Walker, in your written statement you comment, "After taking 19 years to complete development in December 2005, development costs [for the F–22 program] were reported at $26.3 billion—109 percent more than expected. The end result of these inefficiencies in the acquisition program has been a loss of buying power as the reduced quantity of aircraft will require a significantly higher unit cost than expected."

DOD started out planning to buy 750 F–22 Raptors. In 1991, DOD led a Major Aircraft Review and reduced that number to 648. This number was then cut to 442 in the 1994 OSD Bottom-Up Review, then 339 in OSD's 1997 QDR. Is it correct that each one of these reductions in quantity was driven by a DOD decision to spend money on other priorities, rather than any technical, schedule, or production issues with the F–22?

Mr. WALKER. We have reported in several reviews of the F–22A development and procurement programs that program inefficiency in progressing to a predicted cost and schedule lead to numerous schedule delays and cost increases. For example, the Air Force stated in 1988 that it needed 750 aircraft and that it could replace the F–15 fighters with the F–22A at a unit procurement cost of about $69 million. It also estimated it could complete development and deliver an IOC with new F–22As by 1996. For many reasons, including the Air Force's failure to capture the appropriate technology, design, and manufacturing knowledge of the F–22A aircraft at the right times, the program encountered substantial development problems. The end result was about a 10-year extension in development that delayed delivery of the IOC to the warfighter to December 2005 and at an increased unit procurement cost today of about $183 million—165 percent higher than established at the start of the program. The Air Force's failure to capture critical knowledge leading to delays, rising costs, changing needs, and other factors have all contributed to the current situation and have resulted in F–22As costing much more than planned. Given the significantly greater demands on the budget today and the higher cost of an F–22A, DOD can no longer afford to buy as many aircraft to replace the F–15s and has lost substantial buying power. Unfortunately, the F–22A's significant cost increases and schedule delays with resulting adverse impacts on quantities and value are illustrative of many serious and longstanding systemic problems within DOD's overall acquisition system.

73. Senator CHAMBLISS. Mr. Walker, is it correct that DOD's decision in December 2004 to procure 179 F–22s instead of 277 F–22s was based on PBD 753 which likewise reflected DOD's decision to spend money on other programs rather than any technical, schedule, or production issues with the F–22 program?

Mr. WALKER. PBD 753, dated December 23, 2004, reduced F–22A procurement by $10.5 billion and ended procurement in fiscal year 2008. It also included actions to several other DOD programs but it did not provide detailed information as to why DOD made these changes to the F–22A or other programs. We were told that this PBD was the result of high level executive decisions within the Department and it would be best for those executives themselves to provide the precise basis for their actions.

CURRENT FUNDING

74. Senator CHAMBLISS. Mr. Walker, is it correct that each of the four congressional defense committees have added approximately $1.4 billion to the fiscal year 2007 PB request to fully fund procurement of 20 F–22s in fiscal year 2007?

Mr. WALKER. The congressional defense committees have fully funded 20 F–22As for fiscal year 2007. However, at the time of our June 20 report the Senate Appropriations Committee had not approved a bill to fully fund these aircraft and the Senate was still debating the proposed F–22A MYP proposal in the National Defense Authorization Act.

75. Senator CHAMBLISS. Mr. Walker, in the July 25 hearing, DOD and the Air Force committed to fully funding the F–22 MYP program. Given a funding profile to procure 20 F–22s per year in fiscal year 2007–2009, is it correct that, according to the IDA F–22 MYP BCA, the proposed MYP strategy will save an estimated $235 million over 3 separate 1-year contracts for 20 aircraft?

Mr. WALKER. As stated in my testimony on July 25, 2006, the Air Force estimated savings from a multiyear contract would be $225 million for 56 aircraft and $235 million for 60 aircraft. These savings estimates were based on a BCA conducted by IDA.

The additional $10 million in savings for 60 aircraft will, however, require an additional investment of $674 million to purchase such aircraft, which currently is not now included in the Air Force budget for F–22A.

IDA INDEPENDENCE

76. Senator CHAMBLISS. Dr. Nelson, in your opinion, is there any evidence that anyone at IDA, including Admiral Blair, was swayed in any way regarding their involvement in the F–22 MYP BCA due to outside interests?

Dr. NELSON. There is absolutely no evidence that anyone at IDA, including Admiral Blair, was swayed in any way or influenced the results in any way, due to outside interests.

77. Senator CHAMBLISS. Dr. Nelson, did any DOD personnel participate in developing the IDA F–22 MYP BCA?

Dr. NELSON. No. The estimate of MYP savings is IDA's independent estimate. There were no direct influences on the results by the DOD. IDA's basic model for conducting tasks is:

- The sponsor frames the question and helps provide access to needed factual information.
- IDA provides the answer.
- The sponsor decides what use to make of IDA's analysis and recommendations.

That is how we proceeded in this instance. A cost analysis, including our study of the F–22A MYP, cannot be done in a factual vacuum. We needed to know the specific facts of the task; for example, the number of units still to be purchased of various F–22A systems and subsystems, the inflation factors to be used, the annual quantities planned and the funding available, along with many other items. These facts were largely in the hands of the sponsor, the Air Force and the F–22A primes and subcontractors. Accordingly, we had extensive conversations with, and received information from, all of these organizations.

CANCELLATION LIABILITY

78. Senator CHAMBLISS. Mr. Newman, you comment in your written statement that "The Air Force does not intend to set aside funds to cover potential cancellation costs for the multiyear contract." The Secretary of the Air Force discussed this issue earlier and DOD has approved a cancellation ceiling waiver for the F–22 program. Also, in his prepared statement for the Senate Armed Services Committee Airland Subcommittee hearing on March 28, 2006, Dr. Donald Marron, Acting Director of CBO, stated "DOD sometimes chooses not to request budget authority specifically for the cancellation liability because it considers cancellation a contingent liability with only a remote probability of happening." Is it correct that DOD, on occasion, carries cancellation costs outside the program budget?

Mr. NEWMAN. DOD does not dedicate sufficient funding to cover cancellation liability associated with MYP contracts. Instead it plans to use funds that are appropriated for procuring the item that would be acquired through the multiyear contract, or for procuring similar items—other aircraft in the case of the F–22A MYP contract. In some instances, DOD might seek additional appropriations to pay cancellation costs if the contract were canceled before completion.

When DOD says that it intends to carry cancellation costs outside of the program budget, it means that it intends to use funds that Congress appropriated for procuring other assets to pay cancellation costs. However, treating such funds as if they were available both for procuring those items and for paying cancellation costs for a multiyear contract for another program effectively commits those funds for two purposes simultaneously.

Regardless of whether an MYP contract for the F–22A proceeds for the full term or is canceled early, the Government's initial obligation to the contractor will exceed

the amount required to pay for the items ordered in the first year. For example, after the first year of the 3-year contract proposed for the F–22A, the Air Force could either cancel the remaining 2 years of production and pay the costs for cancellation, or it could continue production for the second year and pay for the cost of those aircraft. Under the multiyear contract, the Air Force would not have the option of foregoing future production lots without paying the cancellation charge. Thus, in no case would the Government pay only the cost of the aircraft produced in the first year. An appropriation that covered only the cost for the first annual production lot would therefore be insufficient to finance the Government's minimum obligation under the multiyear contract at the time that contract is signed. Although funds have been appropriated to procure other items, the funding available to the Air Force will be less than its total obligations.

DOD's failure to request funding for cancellation liability associated with any MYP contract may distort the resource allocation process by understating the cost of decisions made for the budget year and may require future Congresses to find the resources to pay for decisions made today.

RANGE OF POSSIBLE SAVINGS

79. Senator CHAMBLISS. Mr. Newman, you state in your written statement that "The savings from procuring F–22As through a multiyear contract could differ from the amounts estimated because of the uncertainty inherent in such estimates." Is it true that the actual savings could be either higher or lower than the estimated savings?

Mr. NEWMAN. Yes. Because the Air Force will enter either an MYP contract or a series of annual contracts, but not both, it will not be possible to determine savings—if any—from a multiyear contract. However, post hoc estimates of savings will almost certainly differ from the amount that the IDA estimated in May. Savings could be either higher or lower than that estimate. IDA did not provide any information on the uncertainly in their estimate, so CBO does not know whether it is more, less, or equally likely that the estimated savings will be too high or too low.

POSITIVE VS. NEGATIVE CHANGE

80. Senator CHAMBLISS. Mr. Bolkcom, on page 11 of your written statement, you quote from page 4 of the IDA MYP BCA saying, "the F–22A program has undergone significant change since IDA completed its F/A–22 independent cost estimate in August 2005" and indicate that some may infer that these "significant changes" raise design stability concerns for the F–22 program. However, the "changes" IDA refers in this section of the report—validation by the QDR, a full rate production decision, a proposed MYP contract, and an IOC declaration in December 2005—are all completely positive. Given this fact, would you please explain your comment on page 11 of your written statement that "some may interpret the 'significant change' that IDA observes to be an antonym for the stability that 10 U.S.C. 2306b requires"?

Mr. BOLKCOM. The significant changes you reference are clearly positive, and I mention the F–22 IOC and the QDR elsewhere in my testimony. However, the IDA report follows these positive developments you mention with a discussion of the F–22 delivery schedule and aircraft weight-gain trends. IDA presents its findings in an entirely positive way. In the interest of balance, I point out on page 11 of my written statement that these schedule and weight gain trends do not appear to be entirely a "good news" story. Implicit in IDA's observations is that delivery of F–22s is still behind schedule, and that weight gain continues. As a point of clarification, let me also mention that I did not mean to say that design stability was questionable, but that program stability could be viewed as questionable. The noteworthy changes between fiscal year 2006 and fiscal year 2007 in the F–22 budget, production schedule, and total inventory are other examples of recent changes that appear to potentially impact the program's stability.

BUSINESS CASE ANALYSES

81. Senator CHAMBLISS. Secretary Wynne, Mr. Walker, Mr. Newman, and Mr. Bolkcom, is an independent (external to DOD) BCA required for multiyear contracts?

Secretary WYNNE. No, an independent (external to DOD) BCA is not required for multiyear contracts. Most MYP estimates of savings are conducted as internal Service estimates, but the F–22A MYP cost savings were independently verified. Addi-

tionally, the F–22A program's costs have been closely scrutinized by both the OSD Cost Analysis Improvement Group and the Air Force Cost Analysis Agency.

Mr. WALKER. No, there is no legal requirement in 10 U.S.C. 2306b or elsewhere for an independent BCA in order for DOD to enter into a multiyear contract. However, in some cases it would be prudent to do so.

Mr. NEWMAN. The statute that authorizes MYP contracts, 10 U.S.C. 2306b, does not require an independent BCA for multiyear contracts. In the conference report (House Report 109–359) accompanying the DOD, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act, 2006 (P.L. 109–148), Congress required the Secretary of Defense to provide an analysis of alternatives for procurement of the F–22A, to include an analysis of an MYP contract for those aircraft. However, Congress did not specify that the analyses be performed by an organization outside the DOD.

Mr. BOLKCOM. Sir, DOD must provide evidence that the proposed multiyear contract will meet the statutory requirements. I do not believe an external assessment is required by statute.

82. Senator CHAMBLISS. Secretary Wynne, Mr. Walker, Mr. Newman, and Mr. Bolkcom, at the March 28, 2006 Senate Armed Services Committee Airland Subcommittee hearing, what was the percentage savings estimate for the savings under a 3-year multiyear contract for the F–22, according to the Air Force witness Lieutenant General Hoffman?

Secretary WYNNE. At the March 28, 2006 hearing, Lieutenant General Hoffman testified that based on rough analysis, potential savings under a 3-year multiyear contract were about 5 percent, plus or minus 1 percent. This corresponds to savings of roughly $400–$500 million compared to contracting for three 1-year lots. As stated in testimony, these figures were an approximate calculation, and they were based upon the best information available at the time from the assumptions made in the initial fiscal year 2007 PB submission. Lieutenant General Hoffman further testified that the results of an independent BCA being performed by IDA would be delivered in May 2006. The IDA study results formed the basis of the full F–22A MYP justification package submitted to Congress in May 2006 as promised by the documentation provided with the initial fiscal year 2007 PB submission.

Mr. WALKER. The following represents General Hoffman's prior statements per the transcript of the hearing:

> General HOFFMAN. "We think, with the right negotiating strategies and the right permissions from Congress and from OSD, that we can save the taxpayer about $400 million to $500 million by doing multiyear versus three distinct lots."
>
> "Sir, we are using IDA to do an independent assessment of the BCA. They have promised their results in May. I think we'll have an earlier peek at those results in April to make that business case for what we think will be about 5 percent—plus or minus 1 percent—of savings."

Mr. NEWMAN. Lieutenant General Hoffman stated that the Air Force was awaiting the results of the BCA, but that he thought that a multiyear contract for the F–22A would cost approximately 5 percent less than a series of annual contracts for those aircraft.

Mr. BOLKCOM. Sir, according to the hearing transcript, Lieutenant General Hoffman testified that he believed the IDA study would show an MYP would save "about 5 percent—plus or minus 1 percent" over single year procurement.

83. Senator CHAMBLISS. Secretary Wynne, Mr. Walker, Mr. Newman, and Mr. Bolkcom, what is the percentage savings estimate according to the IDA MYP BCA?

Secretary WYNNE. The IDA study states the F–22A MYP savings is 2.6 percent for the air vehicle and 2.7 percent for the engines when compared to costs for annual production contracts. This corresponds to savings of at least $225 million. When the dollar savings are compared to the entire procurement budget for the F–22A program, the potential savings is 2.2 percent. These savings calculations were also provided to Congress by the Air Force on 16 May 2006 as soon as the IDA study was completed.

Mr. WALKER. It is 2.7 percent for both airframe and engine based on a 3-year multiyear contract with annual buys of 20, 20, and 16 airframes and 40, 40, and 32 engines respectively in fiscal years 2008, 2009, and 2010. See pages C–8 and C–10 in the IDA analysis.

Mr. NEWMAN. The IDA estimated that a multiyear contract for the F–22 could cost 2.6 percent less than a series of annual contracts for those aircraft.

Mr. BOLKCOM. The IDA study provides a number of different estimates. It estimates that MYP savings for the air vehicle contract are 2.6 percent. MYP savings for the F–22 engine contract are estimated at 2.7 percent. MYP savings of total procurement costs are estimated at 2.2 percent. This last, and most inclusive savings estimate, is smaller than the potential air vehicle and engine savings because substantial portions of the procurement budget would be part of the multiyear contract.

F/A–18E/F COMMENTS

84. Senator CHAMBLISS. Ms. Brian, your organization has said in relation to the F/A–18E/F Navy fighter-bomber that it was "a version of the F/A–18 with such limited extra capabilities compared to the C/D version of the same plane that it is having difficulty justifying the extra cost. The E/F version has suffered from unacceptable flight characteristics requiring makeshift fixes." Would you please comment on current performance and status, to include the existence of current and prior MYP contracts, of the F–18E/F program?

Ms. BRIAN. The statement of the Project on Government Oversight (POGO) quoted in this question was made in 1998. At the time we were referencing the GAO report number GAO/NSIAD–96–98 titled, "F/A–18 Will Provide Marginal Operational Improvement at High Cost." During that period, there were three additional GAO reports raising the same concerns: "Consider All Alternatives Before Proceeding With the F/A–18E/F" GAO/NSIAD–93–144, "F/A–18E/F Acquisition Strategy" GAO/NSIAD–94–194, and "F/A–18 Aircraft Does Not Meet All Criteria for Multiyear Procurement" GAO/NSIAD–00–158. Because of this constructive criticism, it appears these flaws have been corrected. The F/A–18 has received two MYP approvals. When compared to a normal annual procurement, the two multiyear contracts achieved a savings of 7.4 percent and 10.9 percent. As a result, POGO has not further investigated the F/A–18, nor have we commented on that aircraft in nearly a decade.

UNATTRIBUTED DOCUMENTS

85. Senator CHAMBLISS. Ms. Brian, you comment in your written statement, that "IDA attached two unattributed documents at the end of its report which assert the F–22A meets all six requirements." You go on to say that—although Lockheed claims they were IDA's conclusions—in fact these were Pentagon exhibits for the fiscal year 2007 PB and not independent analyses by IDA. According to the IDA witness at the hearing, who wrote the two "unattributed documents" in question?

Ms. BRIAN. We understand those documents to be Pentagon budget exhibits that accompanied its MYP budget. For information regarding the testimony of other witnesses, we refer you to their testimony.

DISSEMINATION OF PROTECTED DOCUMENT

86. Senator CHAMBLISS. Ms. Brian, you stated earlier that the POGO was the source of the information in the July 25, 2006 Washington Post article outlining Admiral Blair's alleged role in the IDA MYP study. That article also quoted from Secretary Wynne's written statement prepared for the July 25 hearing and embargoed by the committee until 9:30 a.m. on July 25, 2006. Did any employee or representative of POGO provide a copy of or convey any content from Mr. Wynne's written statement to the Washington Post, or to any other person? If so, who provided the employee or representative of the POGO with a copy of Mr. Wynne's written statement? To the best of your knowledge, how did that individual obtain a copy of Mr. Wynne's written statement?

Ms. BRIAN. On principle, POGO cannot confirm or deny dealings with any alleged source. Accordingly, we must respectfully decline to answer this question. POGO is an independent nonpartisan organization that has many sources of information, and whose investigations have, over its 25-year history, helped to save American taxpayers more than $80 billion. We have been able to do so by, among other things, keeping confidential the identity of sources of information inside and outside the Government. If we were not to do so, we would place good-government seekers at risk, and render nearly impossible our ability to satisfy our good government mission.

87. Senator CHAMBLISS. Ms. Brian, are you aware of anyone else providing a copy of or conveying content from Mr. Wynne's written statement to the Washington

Post? If so, who? To the best of your knowledge, how did that individual obtain a copy of Mr. Wynne's written statement?

Ms. BRIAN. POGO must again respectfully decline to answer this question. Questions regarding Washington Post sources should be directed to the Washington Post.

88. Senator CHAMBLISS. Ms. Brian, did anyone provide (by any means) an employee or representative of the POGO with any portion of Secretary Wynne's written statement? If so, who provided it?

Ms. BRIAN. POGO must again respectfully decline to answer this question in accordance with the reasons stated in the answer to question number 86.

WASHINGTON POST ARTICLE

89. Senator CHAMBLISS. Ms. Brian, relative to the July 25 Washington Post article titled "Leader Of Panel That Endorsed Jet Program Has Ties To Contractor": Did any person in or associated with any congressional office supply you with any facts or information which you then supplied to the Washington Post which were incorporated into this article? If so, which person associated with which office supplied the facts or information?

Ms. BRIAN. POGO must again respectfully decline to answer this question in accordance with the reasons stated in the answer to question number 86.

90. Senator CHAMBLISS. Ms. Brian, would you please describe, in detail, the extent of your interaction with any congressional office relative to supplying the Washington Post with information relative to this article?

Ms. BRIAN. POGO must again respectfully decline to answer this question in accordance with the reasons stated in the answer to question number 86.

91. Senator CHAMBLISS. Ms. Brian, did any person in or associated with any congressional office suggest, encourage, or otherwise facilitate your supplying of facts or information to the Washington Post with respect to this article? If so, please describe this in detail.

Ms. BRIAN. POGO must again respectfully decline to answer this question in accordance with the reasons stated in the answer to question number 86.

QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

COMBATANT COMMANDERS' VIEW

92. Senator LIEBERMAN. Secretary Wynne, the F–22 Raptor is now operational in two squadrons and has deployed for training several times. It is largely out of the test environment and deploying in contingent and operational environments. What are your combat commanders telling you about its capability and performance?

Secretary WYNNE. To date, the F–22A Raptor was used in support of one operational mission and one training exercise. In January 2006, F–22As supported Operation Noble Eagle flying presidential combat air patrol (CAP) missions. In June 2006, F–22As deployed to Alaska for the Alaskan Command (ALCOM) sponsored Exercise Northern Edge 2006 (NE 06). Initial feedback from ALCOM and U.S. Northern Command (USNORTHCOM) was positive. NE 06 operations review identified that the F–22A aircraft provided increased access to high threat environments, prevented adversary penetration of friendly CAPs, allowed engagement of adversary aircraft sooner and from greater distances, and provided enhanced battle space awareness to all air participants.

93. Senator LIEBERMAN. Secretary Wynne, would your combat commanders like to have more Raptors or are they happy with the performance of the legacy aircraft currently available?

Secretary WYNNE. My commanders have told me they need 381 Raptors. They also tell me that we need to sustain and in many cases enhance the remaining legacy fleet.

I'd say they are comfortable with the present performance of legacy aircraft, but airmen know full well if they stay still, other enterprising airmen will overtake them. The current investment plan for our legacy fleet and Raptor moves us forward and keeps the combat capability edge which is important to our continued success.

94. Senator LIEBERMAN. Secretary Wynne, what are the performance shortfalls with the legacy aircraft?

Secretary WYNNE. The term "performance shortfall" would indicate that there may be something wrong with our legacy aircraft. We look at legacy aircraft as simply not having the same capabilities as our fifth-generation fighters. Legacy platforms do not provide us the capability to engage an enemy anti-access environment effectively. Since the introduction of our legacy aircraft, the quantity and quality of adversary air defense systems have improved while the improvements to legacy aircraft have been unable to fully compensate. Legacy aircraft lack low observability to penetrate enemy air defenses with low risk of detection and high probability of detecting and destroying targets. Legacy aircraft depend upon suppression or destruction of enemy air defenses so they can maneuver in enemy territory to support our ground forces and destroy targets. From a homeland defense perspective, legacy platforms do not have the engagement range, speed, and adversary detection capabilities of the F–22A. Additionally, legacy aircraft present sustainment problems inherent with any aging aircraft approaching the end of its design service life: increased depot requirements, diminishing parts availability, and obsolescence. Lastly, legacy aircraft do not fill the capability gaps and shortfalls required to execute the National Military Strategy.

F–22A COMPARISON TO POSSIBLE ENEMIES

95. Senator LIEBERMAN. Secretary Wynne, if North Korea were to move against its neighbors with hostile intent, would it be fair to say that the only fighter in the U.S. inventory capable of effective combat operations in their airspace without significant operational support from other types of aircraft would be the F–22A Raptor? Would that also be true for Iran?

Secretary WYNNE. The F–22A's unique combination of stealth, speed, maneuverability, and integrated avionics makes it the only fighter that possesses the ability to penetrate an anti-access adversary, like North Korea or Iran, without significant operational support from other types of aircraft. The F–22A takes advantage of emerging technologies and is a lethal, survivable, and flexible military platform capable of air-to-air and air-to-ground combat operations while negating airborne and ground based air defense systems.

CURRENT VS. DATED DATA

96. Senator LIEBERMAN. Mr. Walker, isn't it true that the recent GAO analysis compares the per plane cost in the fiscal year 2006 budget to the per plane cost under the multiyear in the recently released GAO report on the aircraft program?

Mr. WALKER. Yes, specifically the reports states:

> "Savings—The Air Force stated in its May 16, 2006, multiyear justification package that cost avoidance would approximate $225 million or about 2.7 percent. This is based on comparing 3 annual contracts to a single multiyear contract to buy 56 aircraft. The document also identifies a need for an additional $674 million to fully fund a 60 aircraft multiyear contract as was proposed in the fiscal year 2007 PB. While building an estimate for three separate annual contracts provides a basis to compare to a multiyear approach, it is not how the Air Force had previously planned to buy the aircraft remaining in the F–22A program. The fiscal year 2006 PB included procurement costs to buy the remaining 56 F–22As in two lots—29 F–22As in 2007 and 27 F–22As in 2008. If the unit procurement costs of this previous plan are compared to the planned MYP unit costs for 60 aircraft as proposed in the fiscal year 2007 PB, the unit costs increase by 10 percent. In other words, the unit procurement costs increase from $166 million per aircraft to $183 million per aircraft for the proposed multiyear contract."

97. Senator LIEBERMAN. Mr. Walker, what logic would be used to assess the program based on old budget data?

Mr. WALKER. The fiscal year 2006 budget was based on decisions made by the department's leadership. Comparing trends over time and changes from year to year are common methods used to show how programs change—cost, schedule, performance, budget, and other factors can all be analyzed using this methodology. Such an approach provides insight into how a program is progressing and identifies changes and key factors that cause change from year to year. These are important facts to know and understand when evaluating a program, especially one that has been in development for 20 years. We also believe this is important information that can aid decisionmakers in DOD and Congress. However, in the final analysis DOD and Congress can choose to use this information or ignore it.

98. Senator LIEBERMAN. Mr. Walker, it is my belief that any analysis should use relevant benchmarks for comparison. What would your assessment say if the debate were framed, as it should be, comparing the fiscal year 2007 cost per plane with and without multiyear savings?

Mr. WALKER. The Air Force, based on an assessment by IDA, estimated savings for an F–22A multiyear contract standing alone would be between $225 million and $235 million depending upon whether they buy 56 or 60 aircraft, respectively. However, purchasing four additional aircraft would cost the taxpayers $674 million and impose further funding risk to the Department. We would also point out that the savings estimates from multiyear contracts, while substantial in total dollar amount, are a relatively low percentage of savings when compared to many other multiyear programs, as was reported in the IDA MYP BCA for F–22A as well as in the IDA F/A–22 independent cost estimate. We would note that historically estimated savings are not always achieved in multiyear contracts. We would then have to place this in the broader perspective of overall affordability and risk. DOD faces extreme pressure on its budget, which we believe will likely worsen in the future. While DOD states a need to stretch the F–22A program as a part of the multiyear proposal in order to protect the industrial base, an analysis that compares this new strategy to the previous one in the fiscal year 2006 PB shows this increased cost to the taxpayers anywhere from $1.05 billion to $1.7 billion depending upon the quantity of aircraft purchased. An additional factor to be considered in making the decision is that multiyear can reduce the flexibility of Congress and DOD to move the funds to various other programs in the future.

DETERMINING REAL NEEDS

99. Senator LIEBERMAN. Mr. Walker, in your testimony you stated that the DOD must begin to make "hard choices between its many wants and real needs." Who is the determiner of "real needs" for our Nation's military?

Mr. WALKER. "Real needs" should be determined based on a comprehensive analysis of current and credible future threats involving all key players within the executive, both military and civilian, and legislative branches. The executive branch ultimately makes specific proposals and Congress has to decide whether or not to fund their proposals with input from knowledgeable parties. The process is framed and guided by law and policy. There are many different players in this process and, as we have seen in the past, disagreements arise from time to time among the participants as to specific programs. Disagreements occur between and among Congress, OSD, and the military sendees. These get resolved in different ways. However, what I am concerned with is the ability of DOD to meet its needs in the environment of the 21st century where many competing demands will be placed upon the limited financial resources of the U.S. Government. DOD already faces extreme budget pressures to buy the systems it wants at the same time it tries to fund a global war on terrorism. Other national priorities such as homeland security and disaster recovery costs also compete for available resources. Further, DOD continues to experience 30- to 40-percent cost growth in many of its weapon system development efforts and within the last 5 years its planned investments have gone from $700 billion to nearly $1.4 trillion for new systems. For these reasons I believe DOD needs to make hard decisions now that separate it's many wants from "real needs" based on realistic approved resource levels for today and tomorrow. DOD also needs to improve its basic business practices to more efficiently and cost effectively develop and buy needed equipment.

100. Senator LIEBERMAN. Mr. Walker, if the warfighting organizations are not the determiners, then who should we trust to decide what our military truly needs?

Mr. WALKER. See response to question 99.

MYP CRITERIA

101. Senator LIEBERMAN. Dr. Nelson, it is my understanding that IDA came to the conclusion during its analysis of the F–22A MYP that it meets the six criteria necessary: substantial savings, stability of requirement, stability of funding, stable design, realistic cost estimates, and national security to support continued MYP. Would you please take a few moments to further discuss these criteria and the conclusions that you reached during your analysis?

Dr. NELSON. IDA did not make a judgment on whether the F–22A MYP met the six statutory criteria. That was not a part of our tasking from DOD. Our conclusion was that $225 million is a reasonable estimate of the cost savings/avoidance that

would be expected by an MYP for the F–22A. As stated in my responses to previous questions for the record, we provided factual material regarding the other criteria, but they were not the focus of our task and we did not conclude in our report that the criteria had been met.

DEFINITION OF "SUBSTANTIAL SAVINGS"

102. Senator LIEBERMAN. Ms. Brian, you state in your testimony that the 2.5 percent savings of the multiyear F–22 contract, which amounts to at least $225 million, "does not impress you as substantial." What is a "substantial" savings, by definition in the statute?

Ms. BRIAN. IDA's suggested potential savings of $225 million from the proposed F–22A MYP contract is dwarfed by the $1.05 billion cost created by the contract and the additional $674 identified by the Air Force to fully fund this plan. This brings the total program cost to a staggering $1.724 billion according to a letter sent to Chairman Bill Young from the GAO on June 20, 2006. These savings are also considerably low in comparison to other DOD procurement programs. Past DOD aircraft procurement programs have achieved much more substantial savings in comparison to the F/A–22's 2.5-percent savings predictions. In the fiscal year 1996 supplemental, the House of Representatives pressured DOD to restructure the MYP contract for 80 C–17s to come closer to the historical savings of 10 percent. DOD was able to negotiate with the prime contractor and thus the MYP of the C–17 resulted in a savings of 7 percent. More recently, the MYP of the C–130J resulted in a savings of 10.9 percent and the second MYP for 60 C–17s resulted in a savings of 8.7 percent. In the past, substantial savings has been statutorily defined as 10 percent. Recently, the GAO has stated "According to the CBO, substantial savings was defined in the past as at least 10 percent; however, the current law does not define substantial."

103. Senator LIEBERMAN. Ms. Brian, as an organization that claims to represent taxpayers, how can you justify your conclusion that a savings of $225 million is not substantial?

Ms. BRIAN. The above answer explains why the proposed F–22A MYP is an anti-taxpayer measure. Even if IDA's promised $225 million in savings is realized, it is offset four-fold by the ballooning costs associated with the inefficiencies created by stretching out the production line. In addition, given the history of cost overruns that the F/A–22 program has faced since its inception in 1986, we believe that the promised savings will be swallowed up by cost growth during the life of the contract. The F/A–22 has faced a program cost increase of $10.2 billion so far—an increase of approximately 47.3 percent. With this history, it is hard to believe that there will be no additional cost overruns over the next 3 years.

F–22 RELEVANCE

104. Senator LIEBERMAN. Ms. Brian, you also state in your testimony that the F–22 is a "Cold War-era weapon" that has questionable national security value today. What fighters should the United States use if we are faced with the task of entering an armed conflict with North Korea or Iran?

Ms. BRIAN. POGO's fundamental position on the F/A–22 is that it has become so exorbitantly expensive that it is forcing us into unilateral disarmament. Originally, the F–22 fleet was projected at approximately 650 aircraft. Because of the cost inflation, that number has shrunk to 183 F/A–22s. Historically, air battles have been won by overpowering the enemy with a combination of technical and numerical superiority. Currently, North Korea is in possession of approximately 525 Attack/Fighters and Iran possesses 283. A majority of the Iranian fleet sits in disrepair and many of their aircraft are inoperable. The United States currently maintains and utilizes thousands of more advanced Attack/Fighter aircraft both in a ready status and currently deployed and in worldwide operations. In fact, the current push by Lockheed-Martin to sell F/A–22s abroad would, in fact, undermine the United States' ability to maintain air superiority, as we have seen that today's allies become tomorrow's enemies.

RELEVANT COMPARISONS

105. Senator LIEBERMAN. Mr. Bolkcom, you have included some MYP saving estimates of historical programs in your testimony, however, I might argue that the comparison should look at similar weapons systems and/or other tactical aircraft to

more accurately assess MYP savings/cost avoidance. It is my understanding that the F–18E/F MYP, for example, saved approximately $3.15 million per aircraft ($700 million divided by 222 aircraft) and, the F–22 MYP proposal would save $3.8 million—$5.5 million per aircraft ($231 million—$330 million divided by 60 aircraft). This tells me that there are other tactical aircraft programs that have been approved for MYP and that these procurements—the F–18E/F specifically—were determined to provide significant savings for the Government. Have you looked at the F–18E/F MYP or other tactical aircraft programs? If not, why not? If so, what did you find?

Mr. BOLKCOM. Sir, I did look at other tactical aircraft programs. My research found cost savings estimates for two different F/A–18E/F multiyear contracts. The F/A–18E/F MYP I contract, for 222 aircraft, is estimated to have saved 7.4 percent. MYP II, for 210 aircraft—including EF–18G models—is estimated to have saved 10.95 percent. Both of these cost savings estimates are considerably higher than the estimated 2.2 percent savings from MYP in the case of the F–22. As you correctly point out, the estimated savings per aircraft for the F/A–18E/F MYP I is closer to the estimated savings per aircraft for F–22 MYP. However, I believe that F/A–18E/F MYP I is estimated to have saved $850 million, which, divided by 222 aircraft is approximately $3.8 million per aircraft, not $3.15 million per aircraft. Further, as I also testified, the IDA study also appears to overstate some portion of the potential MYP savings for F–22 avionics, which would reduce the overall estimated savings. So, the per-aircraft comparison of MYP savings estimates for the F/A–18E/F MYP may not be as close as some believe. If the F/A–18E/F MYP is to be viewed as the standard of comparison for the F–22 MYP, it may be worth noting that the second F/A–18E/F MYP is estimated to have saved $5 million per aircraft.

Because the statute governing MYP no longer provides a quantitative requirement for savings, everyone involved is struggling to determine what dollar figure or percent constitutes "substantial" savings. Other witnesses and I have compared the estimated savings of the proposed F–22 MYP to other MYPs in an attempt to provide context. However, this context may not be complete. As I mentioned earlier, the decision whether or not to award MYP authority is the result of an implicit or at least not explicit risk-benefit analysis. The estimated savings is the benefit side of a risk-benefit analysis. If one were to estimate that the risks of a particular MYP were low—for example, adequate cancellation liability funding, adequate design stability, adequate funding stability—then the benefit required, the savings required, to offset this risk would be lower than the benefit required to offset the risk for MYPs that were more risky. So, for example, if the F/A–18E/F MYP you mention appeared to be in the same approximate risk-class as the proposed F–22 MYP, then the comparison may be apt.

CURRENT VS. DATED DATA

106. Senator LIEBERMAN. Mr. Walker, you have stated that procuring the remaining 60 F–22s under a 3-year multiyear contract would cost the taxpayer $1.7 billion more than that called for to procure the last 2 annual lots previously provided in the fiscal year 2006 budget. It seems irrelevant to me to use the fiscal year 2006 budget as the basis for this debate. The debate should focus, as CRS has testified, on comparing the cost to procure the same number of weapons systems under a series of single year procurement contracts to the costs of an MYP over that same period of time. Does history not show that using multiyear contracts/authority does provide savings to the Government?

Mr. WALKER. I stated that purchasing another four F–22As, further lengthening the procurement timeframe and entering into a multiyear contract as a package, which is what is being proposed by the DOD, would cost the taxpayers about $1.7 billion more than the DOD's baseline fiscal year 2006 proposal for the F–22A. I also stated that the multiyear contract standing alone would save an estimated $225 to $235 million depending on how many units are purchased. The additional $10 million in savings for 60 aircraft will, however, require an additional investment of $674 million to purchase such aircraft, which currently is not now included in the Air Force budget for F–22A.

History shows that multiyear contracts provide savings most of the time. However, in some cases it is difficult to prove savings were accrued and other times savings are not achieved. Savings are dependent on the unique factors of each multiyear case and can include the timing of the contract, the number of units being acquired, etc. So each case must be evaluated based on its own unique and specific details. For the F–22A, the proposed use of a multiyear contract is occurring at the end of the program for the final production quantities at a time when the production

line is winding down—a strategy not conducive to saving money. Additionally, it is only planned for 60 units over 3 years while an average multiyear buy quantity is over 300 units over a longer period according to data in the IDA BCA for F–22A. Finally, because this buy is at the end of the F–22A program there is little to no opportunity to gain savings from improved production efficiencies.

[Whereupon, at 11:58 a.m., the subcommittee adjourned.]

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