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COMBAT VEHICLE ACTIVE PROTECTION SYSTEMS

HEARING

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

SECOND SESSION

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COMBAT VEHICLE ACTIVE PROTECTION SYSTEMS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,
Washington, DC, Thursday, September 21, 2006.

The subcommittee met, pursuant to call, at 10:02 a.m. in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. WELDON. The subcommittee will come to order. Today continuing our high priority placed on providing force protection for our men and women in combat, the subcommittee is holding its sixth hearing on force protection issues. We will receive testimony from Department of Defense (DOD) witnesses on combat vehicle active protection systems (APS), systems designed to protect ground combat vehicles from threats like rocket propelled grenades (RPGs) and anti-tank guided missiles (ATGM). This capability has been described to me as a mini missile defense systems. Only instead of a system with 20-to–30 minute timelines, a system with 2-second to 3-second timelines and once armed is without the man-in-the-loop.

Also, because of the proximity of engagements to the defending vehicle, there are associated potential collateral damage considerations. So achieving this capability is not without significant conceptual, technical, and tactical challenges.

In April 2005, Central Command (CENTCOM) validated a Joint Urgent Operational Needs Statement request from our forces in Iraq for a capability that included a requirement for a fully automated, active protection system against rocket propelled grenades and anti-tank missiles. Initially, the tasking for the Central Command request was assigned by the Joint Rapid Acquisition Cell (JRAC) in the Office of the Secretary of Defense (OSD) to the Office of Force Transformation (OFT) in the Office of the Secretary of Defense.

After conducting a market survey of active protective systems that offered the promise of providing near-term capability, the Office of Force Transformation and other agencies to include the Army, determined that a system called TROPHY developed by an Israeli company offered the most promise of providing the required capability. After preliminary testing, the Office of Force Transformation estimated that the TROPHY system could be fielded onto one demonstrator vehicle in the first half of 2007.

However, the Army and OSD's Joint Rapid Acquisition Cell recommended against continuing testing of TROPHY because of technical and collateral damage issues, and that the Central Command urgent requirement could not be met until at the earliest, the 2011 fielding of the active protection system being developed for the Army's Future Combat Systems (FCS) program.

So we have a situation where Central Command has validated an urgent requirement for an active protection system. The Office of Force Transformation indicates that a system could be fielded in the first half of next year, 2007. Yet the Office of the Secretary of Defense has decided to not field a capability until 2011 at the earliest. We would like to understand what factors went into this decision.

Further complicated a public understanding of the facts in the effort to develop and field a system that could protect our personnel was a recent evening news segment. This segment implied to the mothers and fathers of America that U.S. officials are not doing everything they can to give their sons and daughters the best possible equipment for the war on terrorism. I don't know about our witnesses, but I know that it doesn't apply to me, and I am confident they believe it doesn't apply to them.

The news segment in question further implied and quoted an unnamed official as saying that an active protection system is "ready today." that can be put on U.S. combat vehicles in Iraq. Well, if that is the case, I want to know where that system is. The segment also interviewed a distraught mother who had lost her son and implied that if only the Army had not blocked the TROPHY active protection system, her son would be alive today.

It further went on to infer that if the Army had not blocked this system, 132 lives that were lost might not have been lost. When in actuality, the reported facts are that even if this system had been deployed in Iraq on all the vehicles for which it was designed, 122 of the 132 would still have been killed. Now, a loss of one service member is unacceptable and one too many. But implying that 132 would have been saved is just factually incorrect and outrageous.

This segment goes on to say that the Israeli military, based on its recent experience in Lebanon, is "rushing to deploy TROPHY." yet the best available information we have been able to get indicates that the Israelis had originally planned to do an operational assessment of the TROPHY system in 2007, but are now in discussions to attempt to accelerate this plan. We are all entitled to our own views, but I don't call this type of reporting responsible journalism. This is journalism that plays on people's deep emotions, strings unrelated facts together which leads to false conclusions and with an unknown intent.

Now we invited their news media, including their anchor, to come to this hearing because if they have a story to tell, let them tell it where we can ask questions as opposed to 30 or 60 second sound bites, and of course, the media which proclaims to want to have all the open information and all the facts would not send their person, even the producer, to come before this committee, which I find highly offensive.

If you are going to make a claim to the American people, then have the intestinal fortitude to defend your position in front of the Members of Congress who are responsible for implementing these systems. And if you don't, in my opinion, you have no integrity as a media source.

Now I will tell you what I really think when you get here in person. In addition, the Army has not always been clear in responding to the public and Congress and has provided contradictory information on its active protection systems program. So I am not going to be a rubber stamp for any service. In an information paper dated June 13 responding to a query from our committee, the Army stated in one place that the TROPHY system could be deployed as early as the end of 2006 on Israeli vehicles, but further on in the response, indicated it was on a similar developmental timeline as the only other U.S. active protection system in development scheduled for fielding in 2011.

Similarly, explanations regarding the selection of the contractor for the Future Combat Systems active protection program are unclear as to what the contractor was selected to do. This has led to media accusations that the Army cooked their books in the selection of the contractor. We intend to ask the Government Accountability Office (GAO) to determine the facts in the source selection. Contrary to information provided in witness statements, we are not aware of any funded program for an active protection system for current systems like the M 1 tanks, Bradley fighting vehicles or Stryker vehicles in the Army or Marine Corps budgets.

We look forward to hearing the specifics of these purported programs. Some of the major issues we need to address are number one, does the current threat to our combat vehicles require an active protection system for these vehicles? Number two, does an effective acceptable active protection exist to equip those vehicles? And when can it be fielded?

Number three, is the investment required to equip those vehicles with an active protection system warranted relative to all of our other requirements? I have additional questions about tests that the Army may or may not have attended about what the process was to determine which eventual course of action we take, and if we do have a short-term capability, why in the world aren't we implementing it while we pursue a longer term capability?

Those are questions that this committee wants to get to the bottom of. Again, given the urgent action request from Central Command for our forces in Iraq, the subcommittee hopes to understand why the Office of the Secretary of Defense has declined to pursue an interim active system capability. With the earliest possible projected fueling of an active system being 2011.

Before we introduce the witnesses for their opening remarks, I would like to recognize my good friend from Hawaii, the ranking member, Mr. Abercrombie.

STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. ABERCROMBIE. Thank you, Mr. Chairman. Mr. Chairman, ordinarily, you are aware that I seldom make a formal statement at

this point and submit it for the record, but in this instance with your permission, I would like to speak more formally.

Mr. Chairman, I believe I am correct in making the claim that there may be other committees that have as good a record as this committee does of focussing on testing and proving systems, not just in the military sense, but in any process that the Congress approves of legislatively with regard to any issue that might come before us of a legitimate legislative nature, but there cannot be any committee in this Congress that pursues more assiduously the question of testing, the question of viability with regard to any activity that is legislatively mandated by us or any of those committees to advance the interests of the American people.

More particularly in this instance, where the Armed Services Committee is concerned, no committee or subcommittee pursues the issue of adequate testing in order to make certain that where the life and death of American servicemen and women is at stake, that any equipment that is provided to them has the best possible foundation. I think I can state that without reservation.

To my knowledge, Mr. Chairman, certainly as far as me being your ranking member is concerned, we were not contacted. The staff associated both with my office personally and the staff assigned by the committee certainly were never given the opportunity to inform me that such a proposal was underway by the media. Now, I don't know, Mr. Chairman, you said I see this camera over here, I don't know where it is from, but I don't see anybody named Brian Williams or Lisa Myers or any producers or anybody like that around here. I know Mr. Williams gets paid a good deal of money to pontificate daily on the air and presumably has some shred of integrity that would require him to have some kind of investigation as to what he is putting forward for public consumption, or has some basis, in fact.

Now the subject of this hearing is a critical one. How does our military select and develop weapon systems that help protect the lives of our troops in combat? Is that a fair assessment? I think so. Such a process should get the troops what they need, be open to new ideas and be willing to try unorthodox approaches. This committee has been a leader in that respect.

However, the process through which we give our troops equipment also has to be thorough. I need only cite our work on the Presidential helicopter as the most recent example. It would be tragic if an effort to protect our troops ended up instead actually putting them in greater risk, what this committee wants from the DOD and the military is a system that is both open to new ideas and timely, but also rigorous in vetting technologies before they go into battle.

That is a difficult balance to strike, but finding that balance is essential. The issues in question in today's hearing are very complicated, both from a technical and a military operational standpoint. active protection systems "for vehicles are a daunting technical challenge." I have an idea that that—that the witnesses today are going to verify what I am saying. The systems have to be completely automated due to the short reaction time available to shoot down an incoming missile or rocket-propelled grenade. I want to keep trying to read through this without getting upset about this.

Every committee in this Congress is important. Every subject matter of every committee is important, but this is the only committee that deals with life and death issues in virtually everything we do and every vote we take, the consequences can result in somebody losing their life or their limbs. It is not an abstraction, it is not an academic discussion, it is not a matter of political punditry so you could score points on somebody. This committee takes very, very seriously issues of life and death. I am going to repeat, the systems have to be completely automated due to the short reaction time available to shoot down an incoming missile or rocket-propelled grenade.

It isn't done with sound bites on television. They have to be safe enough to use in real combat environments, not just in a testing range. This committee does not make votes using the men and women in our Armed Services as lead goats or as fodder for tests in order to satisfy television. For example, a protective system that indeed protects the vehicle but kills all the American troops standing beside it may not exactly be the ideal choice. At a minimum, the complexity of the issues involved at today's hearing suggest serious testing and military judgment must be applied to this problem before the military moves forward.

The NBC story broadcast a few weeks ago that led to today's hearing raised many issues about how the Army decided to proceed with the development of an active protection system and what kind of threats our troops face in Iraq or may face in the future elsewhere. The NBC story alleged the following—this is—I realize, Mr. Chairman, you elucidated your view, but I would like to do mine.

That the Army chose to pursue its own active protecting systems from Raytheon rather than buying an Israeli system called TROPHY. That the Army overruled others in the Pentagon who wanted to test the Israeli system in Iraq on select U.S. vehicles, that the Army rejected the Israeli system due to its ties to Raytheon, a U.S. defense company, that the Army rejected the Israeli system because it could threaten funding for the Future Combat System, which includes the Raytheon Active Protection System project.

Parenthetically Mr. Chairman, the Army probably feels that the biggest threat to the Future Combat System is you and I and the members of this committee, because if anybody has taken the Future Combat System through its paces, it is this subcommittee.

Since the report came out, a number of additional facts have emerged. In my judgment the Israeli TROPHY protection system is not ready to deploy today. It is, at best, an advanced prototype and does not counter roadside bombs, which is the main threat to U.S. vehicles in Iraq. And the main thing—I see Mr. Simmons there at the end of the row, the main thing that we went to Iraq to investigate on a bipartisan basis having nothing to do with Raytheon or Democrats or Republicans or the Future Combat System. The TROPHY system essentially uses small shotgun shell-type projectiles to shoot down incoming threats. I am not sure that Lisa Myers has the first clue as to what that is all about, let alone Brian Williams. He is too busy being made up.

However, these shells can cause considerable injury to nearby dismounted troops and/or civilians. So the utility of the system in the war in Iraq that features lots of both friendly infantry near

U.S. vehicles and civilians is questionable. This is urban warfare. The Army contends that the project its working on for active protection will produce a more effective system that is more relevant to addressing the threats to U.S. vehicles in Iraq, and that I believe is what the goal and purpose of the Army investigation and testing—the weapons testing program is all about.

Finally, the Army contends that the process it went through and analyzed various active protection systems was open and followed all appropriate regulations and guidelines. That is what this subcommittee investigates regularly. So the goal of today's hearing is to lay all the facts on the table so this committee can decide what further steps are needed.

I will tell you this, that Ms. Myers and Mr. Williams should be ashamed of themselves. Now, that may be very hard for self-important media types in this country who never reflect on themselves except by way of self-congratulation, they should be ashamed of themselves, they should be ashamed they are not here today because they had played fast and loose with the emotions of people whose sons and daughters, whose wives and husbands have been put at risk, or worse, in Iraq and Afghanistan. It is about time that they show a little responsibility to go along with the glory. Thank you.

Mr. WELDON. As usual, it is great to have you as my ranking member, Mr. Abercrombie, because you display the kind of sentiment that I think best reflects what this Congress is all about. We just want the truth. That is all. We want to know what the truth is. We want to know what the facts are. And we are willing to take them on, either side. I will show them no favoritism in this hearing. I will be as aggressive with the Army as those who propose other alternatives. We want the best for our troops, and we will pay for it.

This committee has put dollar after dollar on the table above the amount requested by the White House and the Pentagon to buy equipment that is needed immediately, and we want to put the best capability in the field immediately. But to have a sensationalist news account come out that plays on the emotions of people that have been traumatized by the loss of their loved ones is just, to me, unacceptable. And I wish that NBC would have come in here today. I wish they would have taken the same approach to an open hearing of the Congress the same way they purport to want the facts in their news accounts.

They claim to confess to want to know what the real story is. Well, here we are, NBC. Where are you? Are you here? Are you hiding behind some wall or are you on the cool camera looking from the outside? Well, maybe it seems like Neil and I are being a little too aggressive, but we are sick of this. We went through this with The New York Times when they put on the front page of The New York Times a depiction of our soldiers showing the enemy where the most vulnerable spot is to kill one of our soldiers based on the equipment we provide for them. And in spite of our military generals saying, please don't use that, The New York Times ran the story on the front page. Well, you know the media has to be held accountable.

The media likes to hold us accountable and none of us back away from that. When is it time to hold the nameless faceless bureaucrats, the producers, the behind-the-scenes people who hold the bombs, when is it time to hold them accountable? I think it starts today. We have with us three expert witnesses that have been directly involved with active protection systems. Representing the Office of the Secretary of Defense is the director of the Joint Rapid Acquisition Cell, Dr. Robert Buhrkuhl. Is that correct?

Dr. BUHRKUHL. Buhrkuhl, sir.

Mr. WELDON. Buhrkuhl. Thank you. Representing the Army is Major General Jeff Sorenson, Deputy Assistant Secretary of the Army For Acquisition and Systems Management. And Assistant Director for the Office of Force Transformation, Mr. Lloyd Feldman. We thank you all for being here. NBC News, I will repeat, declined our invitation to be represented here today. I guess democracy just doesn't work both ways with the media.

Without objection, all of our witnesses' prepared testimony will be included in the hearing record. And Doctor, we would thank you for your service and ask you to start off, make whatever comments you would like to make, and then we will go to questions following the statements by all three of you.

STATEMENT OF DR. ROBERT L. BUHRKUHL, DIRECTOR, JOINT RAPID ACQUISITION CELL, OFFICE OF THE UNDER SECRETARY OF DEFENSE (ACQUISITION, TECHNOLOGY & LOGISTICS)

Dr. BUHRKUHL. Thank you, sir. Chairman Weldon, Congressman Abercrombie, other distinguished members of the subcommittee, thank you for the opportunity to appear today before the subcommittee to discuss the concerns expressed over delaying the integration of the Israeli active protection system named TROPHY onto the Full Spectrum Effects Platform called FSEP. As a director of the Department's Joint Rapid Acquisition Cell, also called the JRAC, I am responsible for facilitating the Department's response to the immediate warfighting needs that are submitted by the combatant commanders.

The Joint Rapid Acquisition Cell provides a single pointed of contact in the Department for facilitating solutions to address these urgent needs. We focus on near-term material solutions typically involving existing off-the-shelf capabilities that can satisfy to some degree the urgent needs of the combatant commanders. On April 19, 2005, the United States Central Command submitted a Joint Urgent Operational Needs Statement for a capability that included a suite of scalable nonlethal and lethal capabilities mounted onto a Stryker infantry carrier vehicle. The suite of weapons would conceptually provide the warfighter with a full spectrum of components to conduct force protection missions, route reconnaissance, crowd control, raids and point defense all in an effort to save lives and reduce collateral damage. The Central Command's concept included a component for a fully automated active protection system to counter rocket-propelled grenades and anti-tank missiles. This component subsystem was the TROPHY active protection system and was to be used on the Stryker vehicles in lieu of the slat armor. Slat armor forms a metal cage around the vehicle and deto-

nates rocket-propelled grenades before they can penetrate the vehicle itself. On April 28, 2005, after evaluating the Central Command's request, the joint staff supported the need but stated that the proposed FSEP solution with all of its subsystems was unachievable in the near term, which is a requirement for taking action to resolve an immediate warfighter need. Subsequently, the Office of Force Transformation working with Army officials and the Naval Surface Warfare Center planned a more thorough and accelerated schedule for integrating the subsystems onto the FSEP vehicle and presented their proposal to the JRAC on September 19, 2005.

Based on the JRAC's recommendation in January 2006, the Deputy Secretary of Defense approved the use of $31.3 million for the Army to proceed with Spiral 1 Development of FSEP. In May of this year, however, the Army——

Mr. ABERCROMBIE. Excuse me, Dr. Buhrkuhl. Would you just explain for the record what you mean by that kind of development?

Dr. BUHRKUHL. Sir, we in the JRAC do not focus on development. What we try to do is take off-the-shelf technologies that are available. The nearest we would get to development would be the integration of those components on a single platform.

In May of this year, however, the Army program manager identified potential delays in delivering Spiral 1 capabilities, specifically, the active protection subsystem TROPHY displayed technical development and performance risks, which ultimately led to the decision to delay the integration of this capability onto FSEP Spiral 1 Strykers. During my deliberations, I consulted with numerous stakeholders that included the joint staff, the commander Army Test and Evaluation Command, the Office of the Director for Operational Tests and Evaluation, the Director of Capabilities developments, U.S. Army capability's integration center and representatives from the Naval Surface Warfare Center and the Office of Force Transformation, all of whom expressed their opinions regarding the availability and the readiness of the TROPHY active protection subsystem.

The majority of the stakeholders believes that the TROPHY, because of technological inventory and qualification testing requirements, would not meet the overall FSEP schedule and that it was desired by the combatant commander. I then presented the pertinent facts to CENTCOM and asked that they request that the request be revalidated. In doing so, I specifically raised the issues about the potential cost and schedule impacts of the active protection subsystem on the overall FSEP program. On May 16, 2006, Central Command responded that they are proceeding with Spiral 1 with the already available lethal and nonlethal capabilities and using slat armor for vehicle and crew protection instead of the TROPHY subsystem was the preferred option.

Slat armor is used today, has proven itself in combat conditions and according to the Army is very effective against rocket-propelled grenades. Based on these consultations, I validated the Army program's manager's decision to integrate the active protection subsystem capability in a later spiral of the FSEP program.

In closing, Mr. Chairman, the acquisition community is committed to the safety of our warfighters and in ensuring that they have

the best protection and weapons systems available. Thank you for the opportunity to testify today and I welcome your questions.

[The prepared statement of Dr. Buhrkuhl can be found in the Appendix on page 31.]

STATEMENT OF MAJ. GEN. JEFFREY SORENSON, DEPUTY ASSISTANT SECRETARY OF THE ARMY (ACQUISITION, LOGISTICS AND TECHNOLOGY) FOR ACQUISITION AND SYSTEMS MANAGEMENT

General SORENSON. Congressman Weldon—Chairman Weldon, excuse me, and Congressman Abercrombie, distinguished members of the House Armed Services Subcommittee, I would like to express my appreciation for this opportunity to appear before this committee to discuss the Army's continued effort to improve the force protection capabilities of our soldiers, specifically combat vehicle active protection systems, otherwise known as APS. Although I have already submitted testimony for the record, I would like to make some brief opening remarks. I want to be absolutely sure that you understand the Army is committed to making sure our soldiers have the best force protection capability and active protection systems available. However, the systems we provide our soldiers must meet the current threat and they must be proven, tested and validated. We will not give our soldiers a false sense of security by fielding systems that are not rigorously tested in an operational environment. Every soldier is important, and every loss of life is tragic. The Army has taken significant steps to counter the rocket-propelled grenade, otherwise known as RPG, threats for many years and will continue to modernize our force protection capabilities for future threats. The RPG threat to our combat systems is considerably less than what has recently been reported in the press. I have provided some, if you will, unclassified data which I will go through in questions later on to address that specific issue, but in fact, the main threat to our forces is Improvised Explosive Devices (IED), specifically to those in our wheeled vehicle fleet. To date, the Army has fielded 950 sets of Bradley Reactive Armor Tiles, 1,097 sets of M113 Slat Armor Kits and two brigades sets of Stryker Slat Armor Kits.

In addition, the first sets of Stryker Reactive Armor Tiles will be available for fielding this October and the first set of the Abrams Reactive Armor Tiles will be available for fielding to theater in June. The reactive armor and slat armor protection systems currently deployed contribute greatly to the effectiveness of our current forces, specifically our combat systems, the Stryker, the Abrams and the Bradley to defeat RPG threats without use of an active protection system. Currently the Army through the Future Combat System program is diligently proceeding on a path to obtain the best single short range APS for current force systems while they are developing a parallel path to ensure that the common full-spectrum capability hit avoidance subsystem for the future combat system man ground vehicles.

The full spectrum solution is to counter both short and long range threats and to provide a 360 degree hemispherical bubble of protection. Contrary to news media reports, the Lead System Integrator (LSI), that is Boeing and SAIC and the government con-

ducted the source selection for the subcontract award for the APS system. Raytheon did not participate in the source selection. The LSI, with complete government participation and concurrence, selected Raytheon.

The Army further maintains that no contract improprieties occurred during the source selection process. The reference to the Raytheon participation in the trade study process was reported incorrectly and was aired by the media. The terms of the APS subcontract award to Raytheon, they were to conduct a technical trade study as stipulated in their contract. Their participation in the trade study was proper and consistent within the context of the subcontract award requirements. And that the purpose of the engineering trade study was to determine the best short range APS integrate system architecture that would meet the integration requirements for both current force active protection requirements consistent with an established growth path to the Future Combat System manned ground vehicles. There are a number of U.S. and foreign-based active protection systems under development. However, none of these APS systems can be integrated today into our combat systems.

The Army considers TROPHY an engineering prototype and does not consider the system operationally validated for fielding to the current force. Challenges exist in developing, integrating and fielding APS systems, such as minimizing collateral damage to the soldiers and the noncombatants while ensuring the right for self-defense.

In conclusion, the Army is absolutely committed to providing our soldiers with the best force protection capability available. However, the Army will not procure and field any system that is not proven, not tested adequately, and not validated to be operationally ready and safe. The Army finds the recent news reports to our approach to procuring an APS capability biased, unfair and truly disheartening. Thank you, and I will look forward to your questions.

[The prepared statement of General Sorenson can be found in the Appendix on page 39.]

Mr. WELDON. Mr. Feldman, thank you for being here.

STATEMENT OF LLOYD FELDMAN, ASSISTANT DIRECTOR, OFFICE OF FORCE TRANSFORMATION, OFFICE OF THE SECRETARY OF DEFENSE

Mr. FELDMAN. Chairman Weldon, Congressman Abercrombie, members of the subcommittee, I am honored to address the subcommittee, and I am grateful for the opportunity to discuss the Office of Force Transformation's innovative work on Project Sheriff which became FSEP and its demonstration to the TROPHY active protection system. I have included, as part of my written testimony, four addendums that include the chronology of the relevant events related to the initiative to process analysis and rationale that led to the selection of the TROPHY system and how the TROPHY system was integrated into a Stryker vehicle provided by the U.S. Army for the Sheriff FSEP Program and relevant testing information and results.

The United States military finds itself today engaged in a long war against multiple types of terrorist cells and other malignant

nonstate actors whose organizations are amorphous and ever changing. Confronting this threat requires shedding long-held assumptions regarding our preferred methods of warfare and how our forces go about finding, tracking and targeting an elusive enemy who hides among civilian populations and exhibits no moral inhibitions to sacrificing innocents to achieve their aims.

Confronting this enemy requires waging a war against individuals. Successfully fighting the type of war requires a willingness to embrace new types of capabilities, vastly different tactics and new ways of developing capabilities relevant for this fight. That is, in part, what the Office of Force Transformation was established to do for the Department of Defense. The Office serves as an internal catalyst for change. It champions those types of concept technology pairings that are potential game changers in terms of how their future use will fundamentally alter battlefields of tomorrow.

OFT operates at the intersection of nonarticulated needs and nonconsensual change. In plain speak, we do things that perhaps a Title 10 agency might not be ready to do or want to do, and they are, in fact, are chartered to do to be against the flow. As a result, the Office has a wide field of maneuver, a sanctuary where new ideas and innovations can be experimented with outside the restricted confines of established requirements in the world of acquisition. We generate new knowledge and create unique experimental articles for use in the combatant commands, the warfighters, to enable an alternative path for the Department to address future needs. Requirements in the context of the Office of Force Transformation are, in some ways, a term of art, and we choose to address needs and opportunities which have not been established working in advance of requirements.

One method that OFT uses to speed the creation of new knowledge across the force is through the idea of concept technology pairing. The objective is to operate in advance of requirements. These initiatives should not be considered programs. They are far removed from the normal acquisition process and in some cases, the rigor the intent is the early exploration through experimentation, operational experimentation with surrogate technologies or early applications around the loosely-defined concept tied to recognized gaps and current capabilities.

In this case, complex urban operations in difficult to discriminate scenarios where people not wearing uniforms embedded oftentimes in human defilade need to be discriminated while providing survival to the forces so that we don't kill the Italian journalist and we don't have to die while attempting not to do it.

To date, the Office of Force Transformation has launched concept technology pairings in the areas of operationally responsive space, Project Sheriff, Redirected Energy, Stiletto/Wolfpac and Sense and Respond Logistics.

Concept-technology pairing is to provide the first rung in the ladder that gets us to the future that we want to achieve and develop operational dexterity, conceptual learning with the forces. These pairings are not expected to be 100 percent effective, and we should not be surprised if some of them fail. The product here is learning in conjunction with the real capabilities developed for the forces, addressing warfighter needs. New knowledge can best be advanced

through a process of trial and error, exploring the limits in ways acquisition programs are sometimes not able to do, but where the pairings approach differs from the departmental efforts like Advanced Concept Technology Demonstrations (ACTD) is one of intent.

ACTDs are expected to enter into production at the completion of their 3-year phase and as such, a premium is placed on finding and selecting the ACTDs only from those candidates that offer a near-term promise of being produced and procured. The result is a collection of relatively well appreciated and understood technologies and not those more on the cutting edge of innovation. The output from our concept technology pairing initiatives however, is new knowledge that, in turn, leads quickly into another more refined version of the concept, successive iterations of the concept, in essence, bring that concept forward and allow warfighters to use and shape new term opportunities for concepts like Sheriff FSEP that were previously relegated to an ill-defined future.

By getting these capabilities into the hands of warfighters early and allowing them to experiment and exploring with successive iterations of the capabilities allows for the rapid coevolution of tactics concepts and leads to a level of operational dexterity that promotes innovation among the forces. It is the information age way of getting to an understanding of how you would use things before they are, in fact, laid in concrete, like riding a bicycle. It is not about the bike. It is about what you are going to learn to do, and eventually the Tour de France winning bike will come to Lance Armstrong, the newspaper boy bike to somebody else, and we will be able to work that out.

Project Sheriff and the follow on Wolfpack Platoon Project are the Office of Force Transformation initiatives that pair leading edge operational concepts for complex irregular warfare with state-of-the-art enabling technology. The Project Sheriff initiative was started in 2004 and addressed urgent warfighter needs to integrate the sensors, lethal and nonlethal weapons and force protection.

It is designed to rapidly and iteratively experiment with pioneering tactics and technology through a close interaction between innovative warriors and a supporting community of industry, government laboratories and universities. These rapidly executed experiments are designed to create and test an integrated prototype no more than 18 months that fits into an overarching operational construct to create a low-cost experimental venue where warfighters and supporting science and technology community and a cell closely cooperate and complement and inform the more deliberate acquisition process by identifying warfighter needs and experimenting with potential technological solutions, tactics, procedures, policies, employment of nonlethal and autonomous systems.

The ultimate goal is to be a catalyst for meeting the emerging needs of ground battle in irregular warfare, counterinsurgency and security and stabilization operations. The project also specifically addressed U.S. Central Command's urgent needs in Iraq and Afghanistan. These needs were formally expressed in a time-critical Joint Operational Needs Statement developed by Multi-National Corps Iraq, and endorsed by Central Command in 2005 for capabilities to be provided by the Sheriff Project. Project Sheriff and the

new follow-on Wolfpack Platoon Project being proposed and defined in cooperation with the Marines are designed to specifically address the compressed strategic and operational and tactical levels of war and intelligence; the problem of identifying combatants intermixed with noncombatants; the need for in-depth situational awareness; the blurred distinction between combat and police actions; the requirement for multiple levels of graduated response and precise target discrimination; the opportunity for increased command, control, communications, computers, intelligence, surveillance and reconnaissance, C4ISR, to create tactical options against a distributed threat and to move it to the lowest level possible; the digital, organizational and intelligence divide found between tactical units at the edge of battle and the technology enabled higher headquarters which have a different set of tools, and drive it down lowest; and the increased threat of improvised explosive devices, rocket-propelled grenades, anti-tank guided munitions, snipers, and small arms ambushes.

To meet this new highly dynamic and evolving threat to American forces, Project Sheriff's goals were experiment with innovative concepts of operation, tactics, technologies and procedures that would both inform and be informed by potential technology enablers; integrate commercial off the shelf from mature technologies into complementary combined arms solutions mounted on a light armored vehicle under compressed timelines; combine nonlethal directed energy, high power millimeter wave, high power white light, laser glare aversion for optical denial, long range acoustic device—with sensor enabled active protection, lethal response, and electronic warfare; develop the synergistic, combined arms employment of lethal kinetic energy and nonlethal directed energy weapons in compartmented urban terrain; and combine active protection, lethal gunfire and electronic warfare to meet the threat of RPGs, snipers, and IEDs; serve as an active denial technology proof-of-concept in anticipation of fielding longer-range, more capable directed energy technologies; and to test rapidly and rigorously but not exhaustively in an operationally realistic environment prior to deployment to get an initial level of assessment for safety, utility and advantage; and to complete required bio-effects research, legal, and policy reviews prior to deployment; and increase the learning and inform the acquisition programs and minimal expense, informing requirements with empirical data on what can be done, abated tests for military forces which is required in the information age.

The active protection system is one component of the FSEP sheriff vehicle that we put together at that point in time. It is an important one but it is one component of a suite that was designed to provide congruent ability to do advanced sensing with new sensors, to use countermeasures, to spoil shots visual acuity and dexterity to engage our forces and provide survival and then to do weapons systems with a congruent field of view, the idea of getting to a rear stack instead of a trigger for our forces that would minimize the engagement timeline and get to self-targeting so that adversaries who engaged our forces would not get a fast successful shot, and at the time they were doing that, we would, in fact, be

able to progress through our own timeline of engagement with these particular tools.

As I say, active protection system is one component to this combined arms approach that aims to fundamentally enhance capabilities for ground battle in complex urban environments. In addition to IEDs, RPGs and an increasingly sophisticated and prevalent threat in irregular warfare, and an active protection system enables light armored vehicles to survive a first shot from a hidden enemy while the TROPHY active protection system was selected as the most promising near-term capability for experimental assessment based on government laboratory evaluation. Initial U.S. defense laboratory testing of TROPHY began this year. The ongoing Wolfpack Platoon Project will continue a testing program that builds on these initial successful tests and that validates extensive Israeli testing in U.S. industry evaluations. The aim of this testing program is to evaluate near-term active protection technology to rapidly meet immediate warfighting needs; determine how APS fits into a combined arms approach to the RPG, IEG, sniper and small arms ambush threat; and conduct experiments led by warfighters to advance operating concepts and refine needs that will inform the development of any active protective system.

My testimony does not address the issue of the deliberations that led to the removal of the active protection system from FSEP, as the Office of Force Transformation is not a member of the Joint Rapid Acquisition Cell. Representatives from the Office of Force Transformation were invited to numerous meetings with Dr. Buhrkuhl and the JRAC, and we presented our views in the course of these discussions.

I thank the committee for its interest in Office of Force Transformation's Sheriff and follow-on efforts and the continued support for the department-wide transformation. I look forward to providing more detail to any questions you may have.

[The prepared statement of Mr. Feldman can be found in the Appendix on page 48.]

Mr. WELDON. Thank you for your statements, and thank you for your service to the country. And there will be no five-minute rule. So I will give the members all a chance to ask as much questions as they want, and we will eventually ask for unanimous consent to allow our good friend and colleague to join us in asking questions today. Dr. Buhrkuhl, I would want to focus on, first of all, a couple of questions to you. In your prepared statement, you indicate that Central Command's requirement was for a fully automated active protection system against rocket-propelled grenades and anti-tank missiles. Our reading of the requirement also dated April 19, 2005, that you reference indicates that the requirement was for "an improved active protection capability against rocket-propelled grenades." would you please clarify what Central Command's request was for?

Dr. BUHRKUHL. Yes, sir. Central command's request was, as you stated, for an improved active protection capability against RPGs. What was briefed to us was the Full Spectrum Effects Weapon System (F–SEWS). This program called FSEP now was in Sheriff in F–SEWs and FSEP. The name kept changing. And the F–SEWS,

inherent in that was the TROPHY's subsystem where we were briefed on the joint urgent operational need.

Mr. WELDON. When the decision was made to proceed with the Full Spectrum Effects Platform without the TROPHY system, what was the estimate of the Office of Force Transformation's fielding need based on continued required testing?

Dr. BUHRKUHL. I am not sure on the Office of Force Transformation. I don't recall their date. I can tell you, we had estimates from 6 to 14 fields to field it from the testing community, whether it was the Army Test and Evaluation Command or the OFT operational testing.

Mr. WELDON. Mr. Feldman, would you like to respond to that?

Mr. FELDMAN. My recollection at this time——

Mr. WELDON. Could you pull the mike closer?

Mr. FELDMAN. My recollection at this time was that we felt that we could have the testing completed and fielding by September 2007.

Mr. WELDON. September of 2007.

Mr. FELDMAN. Yes, sir.

Mr. WELDON. The Office of Force Transformation had indicated a readiness for fielding of the TROPHY system in 2007, the estimated fielding date for the this system associated with FCS is 2011. A decision was made to not proceed with the TROPHY system. What was the decision based on?

Dr. BUHRKUHL. The decision for us for FSEP—and remember we are looking—we were looking at a full package program was what the user required, was to meet a national training center date of the end of February to be able to deploy for an operational assessment the end of July.

So the time frame didn't fit, waiting on the TROPHY to fit into that timeline. We also consulted and looked at the slat armor as an alternative, and since it seems to be very effective against RPGs, we felt like that provided the effectiveness against that danger for warfighters.

Therefore, we, as we normally do or sometimes do in the JRAC provide the warfighter with a 95 percent solution now in the near term, now, we didn't disapprove, obviously, a Spiral update later, but for now, to meet the immediate needs, we felt like we had to move forward.

Mr. WELDON. Well, that is one I am sure my colleagues are going to want to explore further. It is hard for me to understand. I understand that you are saying that you had alternative proposals and technologies that, in fact, you felt would meet the threat, but I still want to further explore in the committee the reasons why we didn't aggressively pursue a short-term varient if, in fact, that was, in the opinion of the Army, possible.

In your statement, you indicate you made a statement in May of this year to validate the Army program manager's decision, integrate the active protection capability and subsequent development. Is there an ongoing testing to field this capability? If so, what is your estimated date of fielding of the capability?

Dr. BUHRKUHL. Sir, there is an ongoing effort between the Naval Warfare Center, the Army Program Manager (PM). The first priority though is to get the three Strykers prepared and ready to go

to theater in July. They are focused on that. I am not sure what they are doing as far as continual testing of the TROPHY.

Mr. WELDON. What is your experience with the status of CENTCOM? Urgent action needs statements, how many have come through your office and how many have been deferred?

Dr. BUHRKUHL. I can't remember an exact amount. We deferred for probably two or three, and we have addressed about $250 million worth of needs over the last two years.

Mr. WELDON. The point that we want to reinforce is this committee has been wanting to take the lead in providing whatever additional funding has been necessary. We did that back when the President was running for re-election and Secretary Wolfowitz didn't want us to talk about a supplemental.

This committee stood up as Democrats and Republicans and demanded that we put an additional $25 billion on the table because the Army's request for its budget for that year was actually a requested decrease while we had $6 billion of unfunded requirements not being met.

So there should not be a question of dollars. We want—what is the ultimate fact that this committee stands behind is, we do not want to have an additional soldier, marine, sailor, corps man killed if there is a way for us to avoid that, and cost should never be an issue. So there should never be an issue of the expense necessary to put an acceptable technology into the field. Now, granted, as Neil pointed out very precisely, we want the testing, we want to make sure there is not collateral damage. We want to make sure that we are testing it before we go into—but as soon as possible, we want deployment so that we can protect the soldiers.

Let me ask you a couple of specific questions just for the record; maybe, General, you would be the best to answer this, or I don't know who.

Last year, the Army planned a test competing RPG defense systems in a shoot-off rodeo, and this competition was cancelled, I understand, by the Army, supposedly in part due to cost. Now, my understanding is that contractors usually pay the costs of such tests. There was speculation that the Army cancelled the tests because the Raytheon system was not yet ready. So for the record, would you comment on that, please?

General SORENSON. Yes, Chairman. I would say from my understanding, certainly cost was not the overriding factor. I think the issue was in order to make an assessment of what we would be doing for active protection systems for not only the future force, but also the current force, that it was best to be done in a source selection process as opposed to somebody who might have a capability show up, and we not take a look at others that in many cases could be in development and available.

So the decision was made at that point, rather than just kind of doing the rodeo where maybe a few people show up, but really canvass industry, canvass foreign industry to find out potentially in a time frame what actually could we find——

Mr. WELDON. How long would that take?

General SORENSON. I am sorry?

Mr. WELDON. How long would that take to do that canvassing?

General SORENSON. The selection?

Mr. WELDON. For the systems.

General SORENSON. Again, as we walk through this, we basically put out a Request for Proposal (RFP) back out in 2005 with respect to having an APS developer. The contract was awarded to Raytheon here in March. A trace study was done subsequent to that and looked at 20 different systems. The systems were analyzed in terms of their capabilities based upon data that had already been evaluated by our Research, Development, and Engineering Command (RDECOM), as well as other commands within, if you will, the Tank Automotive Command, TARDEC, et cetera. And that particular study was basically done within a matter of about three or four days in terms of trying to assess what additional systems could potentially be put in to current force and future force activity.

Mr. ABERCROMBIE. Mr. Chairman, would you yield for just a moment?

Mr. WELDON. Certainly.

Mr. ABERCROMBIE. Just so we get clear, because a lot of the technical expressions that you have made in the course to the testimony here I think members of the committee understand pretty clear, but maybe not everybody in the public has a grip on it. Let me just see if I understand what you said so far—and I have this clear, particularly in the light of the document that we have had a chance to look at here.

Now isn't it a fact, isn't it a clear fact of the matter that very few deaths—rather, let me restate that—most deaths come from small-arms fire or roadside bombs, and that the RPG and missile fire account for the very few? And as a result, there is other protective equipment which you have cited in terms of armor, various types of armor that help protect against RPGs and missiles already, and effectively so; isn't that the case?

General SORENSON. Yes.

Mr. ABERCROMBIE. So when you are making the representation to the Chairman here, part of the time frames and everything else is based on what you conceive of as being the essential nature of the kind of protection that you either are providing now or have to provide.

General SORENSON. Correct.

Mr. ABERCROMBIE. This gives you your 95 versus 100 percent and so on; in other words, the RPG and missile fire. If you read the text of the NBC report and imagine it being said, you would think that the RPG and missile fire is the essential feature of the deaths and maiming that takes place, and that is not the case, is it?

General SORENSON. No, it is not. And again, the data that we have provided here is basically for official use (FOU), it has been sanitized, it is basically National Ground Intelligence Center (NGIC) data. It essentially says that 85 percent of attacks with respect to our combat vehicles are from IEDs. And you can see there we have identified, in terms of percentage, what the killed in action are from the IEDs.

Mr. ABERCROMBIE. So for purposes of public information, the context within which you are making the decisions has to be what is

the existing danger to the people we are trying to protect and the vehicles we are trying to equip; isn't that correct?

General SORENSON. Yes, sir. And if you look——

Mr. ABERCROMBIE. Thank you, Mr. Chairman.

General SORENSON. If you look at chart two, you can see that the total RPG attacks in our combat systems is a very small percentage. And even with that small percentage, most of the attacks have resulted in no damage to those vehicles because of what we put on those vehicles, whether it is Slat armor, reactive tiles, or whatever; and you can see right there there is zero killed in action, none.

Mr. ABERCROMBIE. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

What I am going to do, because we are scheduled to have votes at 11:30, I am going to go to the other Members. And I turn now to Mr. Abercrombie for further questions. Or we will come back; you and I will get more.

Let's go to—Mr. Gibbons is next. You are recognized.

Mr. GIBBONS. Thank you very much, Mr. Chairman.

And, gentlemen, thank you for being here today to help us better understand these very perplexing issues.

You know, oftentimes in government we tend to let the perfect get in the way of the good. And many times we have a tendency to resist fielding technology until we have created the Library of Congress information on that technology to avoid any risk. And oftentimes we here get a little frustrated with the process, think it is a little too bureaucratic. Sometimes we would like to see things happen more quickly than we do.

You know, we need to be risk takers. And I know that is not a popular idea when we are in a war, but when I look back over the course of history of things that have been developed during the trying times of war, some systems have proven to be much better that were instantly created and thrown out there. And I will just give you the P–51 Mustang during World War II, created in a very short time frame, became a remarkable aircraft interceptor for the United States Army Air Corps at the time.

When I look at IED and jamming devices, many times we have a tendency to want to believe that we can do this technology, but in order to cover every spectrum of jamming technology, we have got to have a system as big as this room before we can get something out there to protect the soldiers in some form or some fashion. And I would presume it is in the same tendency that we are looking at this system here.

Let me ask just a basic question for those of you that are knowledgeable about the Trophy system or the Raytheon APS system. When you compare the two, how long has the Trophy system been under development, under the same kind of process as compared to the Raytheon system? And which one can go into production today?

General SORENSON. Sir, if I may address that particular piece of it. I think our understanding, in our working with the Israeli Defense Forces, (IDF) basically the Trophy system has been certainly under development, I would say, probably for about the last decade. With respect to the Raytheon system, it has not been under development that long, but in terms of our analysis, in terms of system

engineering, we have done some looking at the particular system here and found out that if you put the Trophy system on our combat systems, it is about 1–1/2 times heavier, it takes up 1–1/2 times more volume, 10 times the power, and 3 times the integration problems. So it is not just a simple solution.

And as you alluded to earlier, while the particular system itself might be something of avoiding a kill, there is a whole envelope of an onion here. We try to avoid the encounter to begin with by improving our situational awareness. We began to avoid, if you will, the detection of our systems through signature management and tactics, we began to avoid the acquisition or our targets, another envelope here of the onion, and then to avoid the hits, and to avoid the penetration and to avoid the kill.

And we have put improvements with respect to situation awareness, we have put improvements with respect to our current suite of Slat armor and reactive armor tiles. We put countermeasure systems in terms of other ballistics protection. And that all is being used right now, as well as our tactics changes, to increase the force protection capabilities. It is just not a simple, you have got this, you have got the Klingon cloak, everything is going to be fine; it is a very complicated capability in terms of force protection.

Mr. GIBBONS. What do we sacrifice if we had put the Trophy system, say, for example, on a few vehicles today, sent them over there? What are we sacrificing if we did that?

General SORENSON. Sir, it is not that we are sacrificing. Just from a systems engineering standpoint, if you put it on Stryker today, which essentially is what it was put on, first of all, the radars are exposed. Those radars can be taken out very easily in a complex attack by someone shooting a rifle at it and beginning to destroy the radar; therefore the system becomes ineffective.

If you talk about what this particular system was looked at, it is going to be in a crowd; it is going to be the tactics, techniques and procedures (TTP) that you want to make sure it is not basically killing everybody in its—anywhere around there. Can we put a Trophy system on there that would be effective in doing that? The answer to that is no. Even the Israelis at this point in time are struggling to put it onto their Merkava tank; not a Stryker, not a Humvee, but their tank system.

And so the final integration of this capability is something that has to be looked at. How does it affect power, how does it affect weight, how does it affect volume? It is not just something you hang on and it makes work.

Mr. GIBBONS. So you are saying today we could not adapt the Trophy system to——

General SORENSON. Absolutely not. In fact, the test report that we got in from our tester said at best, even with Trophy system, at best, today if we had the system to get it integrated and get tested and then ultimately get fielded, we are looking at 2008, at best. And even today, we don't have the produceable item yet that we could basically do that with.

Mr. GIBBONS. So the contract with the Raytheon system would be to address all of these issues, to reduce the amount of power consumption, to reduce the profile of the radar on the vehicle, to eliminate the idea that the radar is going to be susceptible to a

multiple complex attack, to distinguish that system—to have a system that distinguishes between true and false attacks that are going to be on that system.

General SORENSON. Yes, indeed. And, in fact, we will have the capability from the Raytheon system at this point in time in terms of what we would basically hang on a vehicle in about 2008. After that, it is the integration into a Stryker—which, oh, by the way, we thank the committee for having given us money to begin to do that not only this year in fiscal year 2006, but we have additional funds in fiscal year 2007 that we are beginning to do the integration work on how we would basically begin to do that into a Stryker platform, which, quite frankly, would be more vulnerable than our Abrams and Bradley platforms.

Mr. GIBBONS. Well, without having to reinvent the wheel, General, would it be possible to modify the Trophy system to accommodate your concerns and to make those changes in that system that would more clearly reflect your concerns about power, about exposure, about distinguishing targeting and capability there, and have that system on line faster than completely doing a Raytheon system from the ground up?

General SORENSON. Sir, at this point in time, in terms of we have done that analysis, we have done that through our trace studies and so forth, we have looked at the possibility of doing that, and at the very best we potentially could save maybe six or seven months, but that is a potential. And quite frankly, with the other issues that I talked to with respect to the Trophy system, not the least of which from the standpoint of providing 360-degree coverage, we have issues. From the standpoint of an autoloader that is not yet developed, we have issues. From the standpoint of the fact that it would basically be vulnerable to our one shot, now that particular side is completely vulnerable to another attack. In other words, I'm the enemy, I shoot, I basically deploy that system. Now it has got nothing; I shoot, I kill.

So there are some issues right now with the Trophy system that would take additional development and integration before we could even be capable of putting it on our platforms. It is still long-term.

Mr. GIBBONS. General, I want to thank you for your explanations here today. And I can understand the difficulty. I know that it occurs in every system we produce for our men and women in the military. And I know there are evolutions of improvements that start—whether it is body armor, armor for a vehicle, jamming capability for IEDs, and now active protective systems for RPGs or other missiles coming in our tanks. And I know the difficulties there. I know the challenges that are ahead of you. I know the commitment that our men and women out there in your position are looking at today to make us all safer, and I thank you for that.

Mr. Chairman, I want to associate myself with your words and that of Mr. Abercrombie in your opening remarks about the responsibility of this committee, the responsibility of our government to protect our troops. We grow, we evolve just as the attacks as on our troops do, and I hope that we are able to find those solutions quickly so that not another life is risked or lost unnecessarily. But I can think that these people out here know how difficult it is to

send somebody to war, and how much they want to protect those individuals as well as anybody else. So thank you.

Mr. WELDON. I thank the gentleman.

The gentleman from Texas Mr. Conaway is recognized.

Mr. CONAWAY. Thank you, Mr. Chairman. I just have one question.

The idea of fratricide, in other words, our dismounted troops alongside most of these vehicles, right now at this stage the risks for an RPG or an antitank missile exploding against the side of a vehicle and the collateral damage for that, is that more or less than if we blow up that RPG round or that antitank missile away from that unit? What does that look like from a test standpoint?

General SORENSON. With respect to the reactive—first of all, the Slat armor is essentially something that is going to just prevent the capability from basically penetrating. With the reactive armor tiles, there is a blast effect from the collateral damage, but it is localized. And we have done extensive testing on exactly what that particular dimension of vulnerability would be with respect to those reactive armor tiles.

With respect to the Trophy system, or in this case as well with the Raytheon Quick Kill system, these two issues with respect to collateral damage are yet to be investigated or fully understood. But clearly it is going to be a little farther out as opposed to right against the vehicle, so consequently you are going to put a lot more people in harm's way just because of when those explosions are going to take place.

But again, with the reactive armor tile, it is more or less a blast issue. When you begin to use a Trophy system or another type of APS system, you now begin to introduce fragmentation, which becomes a lot more deadly and a lot more lethal.

Mr. CONAWAY. Any one of the three. Part of this hearing was triggered by the NBC report, maybe the Fox report, whatever, and you may have covered this in your opening statements, but just in a free kind of a response, what should we be saying to our constituents back home in response to their concerns raised by obviously an emotional appeal that went out over that two-night broadcast? What should our response be?

General SORENSON. Sir, I would say from the Army perspective, the response is we have provided—again, thanks to this committee for the funding that we have received—Slat armor, which essentially is Slat tiles on our Stryker systems, two brigade sets' worth; 950 sets of the Bradley reactive armor; 1,000-plus sets of the reactor armor tiles for the M–113 personnel carriers. Those have found to be the most effective capabilities.

The proof in the pudding is in this data chart. If you go to chart two and look at the attacks that have taken place from RPGs and our combat systems, the current capabilities that we have fielded have resulted in only minimal damage to our platforms. You can see that in red with respect to the percentage there, it is a low percentage. In addition, you can see in terms of the killed in action is basically zero.

So the systems that we currently field have in fact protected our soldiers today. We are continuing to look at new threats, evolving threats, and I would contend, based upon our discussions with the

Israelis and so forth, that right now what we have postured in terms of our developments for both short and long range is the most effective capability that we can give our soldiers into the future. I could go into that in more detail, but not in this particular setting.

Mr. FELDMAN. I would also like to say, in addition to what the Army has contributed at this point in time and is going forward with, that the elements of force transformation that will continue to work in the environment under Secretary of Defense for Advanced Technology and Logistics, exploring some concept technology solutions, fully intend to press ahead with an experimental article to allow us to explore the capabilities of this close-in generation's active protection system in a sweep of lethal and nonlethal countermeasures to allow us to do the exploration of tactics and concept development.

In addition to that, there has been some discussion that, in fact, we were going to explore the possibility of doing a comparative test evaluation of something like what we have been talking about here, the Trophy active protection system. It is not on the table at this point, but it is being explored.

It is very important for us to understand, as to the Department's future in force transformation, that looking at those things which are hitting us right now and which we have had some success against is not all we need to do. We need to take a look at the recent engagement in Lebanon in which areas were flooded with antitank munitions, hundreds of them, in fact. And these things do provide enhanced lethality. Additional variants of RPGs in our future provide enhanced lethality, and things that engage these are highly nuanced.

As we noticed before with antishift munitions coming at vessels, when you interdict the kinematic package of a Mach 2 2-ton missile coming at you, in fact, you have to deal with the residuals and the fragmentations are significant. But there is a great benefit to interdicting weapon systems that come at you in a way that interferes with their design function of the warhead, whether it be shape charge or whether it be high explosive. In those cases we need to understand with witness boards and tactics the nuance of how we like to deploy our forces and how we would like to be able to utilize some of the benefits that come with systems that are highly directional in their response, as the Trophy system was, and that enable you to virtually put a capability down the bearing through which an RPG or a weapon has come in a retrodirective manner.

So an additional part of the answer should be, we are looking in small numbers in prototypical programs at the potential to address this and develop the concepts and the tactics to go with it. And that informs the debate and informs the requirements for what we would do in the future.

General SORENSON. If I could just have one more alibi. I would say the other piece of it, which I found to be extremely disturbing and disheartening, was the second part which talked about the Army's attempt to block the potential selection based upon intent to cook the books. And I can tell you without any equivocation—and any member of the committee can inspect those books if they would like—that particular source selection was above board; there

were no improprieties conducted by any member of the LSI nor the government team, and they were the ones that made the decision, not Raytheon.

Dr. BUHRKUHL. Sir, I would just like to add that the Department is committed to the safety of our warfighters, and we try to provide them with the best equipment possible.

And for the record I want to make sure, Mr. Chairman, that you understand on the two joiners and operational needs that were turned back, neither was the result of a lack of funds. The Department has been very good in that regard.

Mr. WELDON. Thank you.

The gentleman from New Jersey is recognized.

Mr. Taylor is recognized.

After consultation with the Minority, I now ask unanimous consent that Mr. Simmons, a member of the House Armed Services Committee, be allowed to participate in today's Tactical Air and Land Subcommittee hearing and be authorized to ask the witness questions. Any objections?

Mr. Simmons will be recognized now for his time.

Mr. SIMMONS. I thank the Chairman, and I thank the Ranking Member, and I commend them for the hearing, but more importantly, over the years that I have seen the Chairman and the Ranking Member operate, I commend them for their bipartisanship and their fairness and their insight into these issues, and I think this hearing is a very good example of that.

Years ago, in another life and in another place, I had some up close and personal associations with RPGs, RPGs 2 and 7 in Vietnam, and in particular during the Tet Offensive. And what I learned about them was that if they were fired correctly, if the rocket-propelled grenade was fired correctly, the shape charge was properly aligned with the metallic surface, whatever it may be, it could be very devastating. But if you were able to disrupt its trajectory, if it hit at an angle—and we, in fact, had one hit during the Tet Offensive off an Armored Personnel Carrier (APC) at an angle, hit a soldier in the back in his flack jacket, knocked him out and hospitalized him for three days, but it didn't even explode. So the unique properties of the RPG are such that it has to be aimed properly, it has to be in proper alignment to be fully successful.

And so when I went with the Ranking Member up to Mosul to the Stryker Brigade and talked to the troops, I asked them about the Slat armor and the stand-off gauges. And one soldier told me, we got hit six times and continued to function. He said, I am not going to operate in any other vehicle than this Stryker vehicle. They are absolutely enthusiastic and positive about how that fix was working. And that was the clear impression I got.

We have photographs that we brought back from the Stryker Brigade, and I think in the text of our report, our bipartisan report, which was signed off on by every member, both sides of the aisle, that was one of the success stories that we encountered.

And I think your data shows that these approaches are almost—they are not 100 percent successful, but they are pretty close to it for this type of weapon.

Point two. If you are firing a projectile to intercept a projectile, you don't want anybody in the way of it. One of my closest near-

death experiences in Vietnam was from friendly fire. And there is no such thing as friendly fire, let me tell you. It will kill you just as much. It will kill you just as much. So the idea of friendly fire, the idea that you are shooting a projectile to hit a projectile, creates lethality for the battlefield, for friendly soldiers and civilians. We just have to understand that that is the nature of the beast. And so we don't want to create another hazard in an already hazardous situation. I think that is certainly the case.

Now, the one concern that I do have—and I think it is an important concern, Mr. Chairman, and I hope that we might at some point perhaps pursue it in a closed session—is if you design an RPG that has multiple explosions—I am talking hypothetically—where the first explosion basically destroys the cage or destroys the tile or destroys the Slats, and then there is a second explosion of the shape charge behind the first, then that may tend to defeat everything that we have deployed.

So I guess the way I look at it is I don't see an immediate threat based by the RPG that we find in the field. I think we have met that threat. I think this committee and this Congress, in a bipartisan fashion, has met that threat almost 98 percent, maybe almost 99 percent of the time. But when we look to the future, we may need an alternative system that deals with the multiple explosive device which somebody might be cooking up at some time in the future because they know—based on the data that you have presented, they know that the current system is pretty much ineffective against the three types of vehicles that we have deployed that are designed to deal with this.

So I would ask you if you are looking ahead and planning ahead, and if you are future planning, does it meet that future threat.

General SORENSON. And, Congressman, that is a great question. I think the answer to that is, yes, we are looking at that type of capability in terms of a threat right now, in terms of even modifying and making changes to our current suite that we have already deployed. But we are clearly looking at that threat long term, as well as potential issues with respect to antitank kinetic threats, which we think are more longer-term, as well as more deadly in the future.

Mr. SIMMONS. And very briefly, a second comment. RPGs are successful against helicopters. A helicopter, when it is airborne, could be mounted with a Trophy-style system with 360-degree—not a lot of ground troops around a helicopter in the air, and it might have some applicability for a Trophy or a similar system. Have you given any consideration to this system as a possible air defense system for helicopters?

General SORENSON. Sir, we have not. We have actually deployed our current suite of aircraft survivability equipment, otherwise known as the Common Missile Warning System, and we have found that to be effective against the threats, as required.

Mr. SIMMONS. Thank you very much.

Again, Mr. Chairman, and to the Ranking Member, thank you for your aggressive oversight of this issue.

Mr. WELDON. I thank the gentleman for his participation.

One final point I would like to make before we have votes—and we do have three votes back to back, so this will probably be it, unless my friend has additional questions.

There has been some confusion with regard to the source selection process FCS/APS system. Was the decision to go with a Quick Kill APS the result of a source selection process or the subsequent trace study analysis?

General SORENSON. Sir, the answer to that is a little bit of both, and let me just try to frame the issue here.

Clearly when the contract was written for the RFP, that there was to bid back on, it was to be the APS developer as part of the overall hit avoidance requirement. As we were—as that contract was put out, the requirement was that they would develop an architecture, a system engineering plan, and they could propose their particular candidate. While the candidate was not specifically evaluated in terms of a major factor, it was a subfactor analysis within the source selection. Obviously, if they got a great engineering plan, but the particular system they are going to actually put on there would be something that we couldn't really accept at some time in the future, or it was too costly, schedule issues and so forth, then that probably would have downplayed, if you will, hypothetically that type of proposal.

Once the particular developer was identified, in this case it was Raytheon, they then conducted a trace study, they, GD, with the LSI, and basically did the analysis of particular systems that could be put into place not only for the current force, but also for the future combat system. It was at that point in time that the vertical launch system that was proposed by Raytheon was validated as the particular APS to proceed further with. But all the others—we net down those, as I had mentioned before, 20 systems down to 7. Those were evaluated in the trace study based upon burdens to the particular system, i.e., system integration problems, based upon cost, based on performance, and that pretty much identified about 80 percent of the criteria. And those selections were then evaluated, and what came out was the Raytheon Quick Kill system.

Mr. WELDON. Any other comments by our witnesses?

Mr. Abercrombie.

Mr. ABERCROMBIE. No.

Mr. WELDON. I want to thank all of you for your appearance today and for your service to the country. We want you to continue to be aggressive.

Mr. Feldman, we want you to continue to play your role and be aggressive. We need to have systems of checks and balances within the Pentagon itself. That is healthy. And we are prepared to provide the financial support and the resources to fund those systems as you deem that they are appropriate and safe and will, in effect, protect our troops from injury or death.

Thank you very much. This hearing now stands adjourned.

[Whereupon, at 11:28 a.m., the subcommittee was adjourned.]

A P P E N D I X

SEPTEMBER 21, 2006

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

SEPTEMBER 21, 2006

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HOUSE ARMED SERVICES
SUBCOMMITTEE ON
TACTICAL AIR AND
LAND FORCES

TESTIMONY OF

DR. ROBERT L. BUHRKUHL

DIRECTOR, JOINT RAPID ACQUISITION CELL

OFFICE OF UNDER SECRETARY OF DEFENSE

(ACQUISTION, TECHNOLOGY& LOGISTICS)

BEFORE THE UNITED STATES HOUSE

ARMED SERVICES SUBCOMMITTEE ON TACTICAL

AIR AND LAND FORCES

September 21, 2006

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SUBCOMMITTEE ON
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LAND FORCES

Chairman Weldon, Congressman Abercrombie, and Members of the Subcommittee:

Thank you for the opportunity to appear before your Subcommittee today to discuss the concerns expressed over delaying integration of the Israeli Active Protection System (APS), named Trophy, onto the Full Spectrum Effects Platform, commonly called "FSEP".

As the Director of the Department's Joint Rapid Acquisition Cell, I am responsible for facilitating the Department's response to immediate warfighting needs submitted to the Department from the Combatant Commanders that are not Improvised Explosive Defeat requirements. I believe you are aware, that improvised explosive defeat initiatives are the responsibility of the Joint IED Defeat Organization.

This committee and the Congress have supported the Department's efforts to respond rapidly to the unforeseen needs of our forces that are engaged in the Global War on Terror. The FSEP is an example of how the Department expedites new and evolving capabilities that can provide our warfighters with safe and effective systems while serving as a good steward of the taxpayers' dollars. The Department is able to speed these new capabilities to the warfighter as a result of the flexibility and cooperation provided to the Department by the Congress. The Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD(AT&L)) provides oversight of major weapons acquisitions and not components or subsystems that may be part of those systems.

I will discuss the Joint Rapid Acquisition Cell's mission and involvement in the decision to delay integrating Trophy on the FSEP, and provide the rationale for that decision. Also, I intend to address the other issues of concern to the Subcommittee.

Role and Oversight in Fulfilling Requirements

The Deputy Secretary of Defense created the Joint Rapid Acquisition Cell in September 2004 to help overcome the institutional barriers that inhibit timely and effective responses to immediate Warfighter needs. I have been the Director of the Joint Rapid Acquisition Cell since its inception. As the Director, I am responsible to the Secretary and the Deputy Secretary of Defense for accomplishing the Joint Rapid Acquisition Cell's mission. I work through the Under Secretary of Defense for Acquisition, Technology and Logistics and the Under Secretary of Defense, Comptroller, to respond to the immediate warfighter needs that have been validated by the office of the Chairman of the Joint Chiefs of Staff.

The Joint Rapid Acquisition Cell provides a single point of contact in the Department for facilitating solutions to these Immediate Warfighter Needs. We focus on near-term, materiel solutions, typically involving existing, off-the-shelf, capabilities that can satisfy, to some degree, the urgent need of the Combatant Commander.

On April 19, 2005, the United States Central Command's Chief of Staff sent the Joint Staff's Deputy Director for Resources and Acquisition an urgent operational need statement for a capability that included a suite of scalable non-lethal weapons combined with a set of lethal weapons mounted onto an existing military vehicle, such as the Stryker. The suite of weapons, non-lethal and lethal, would enable the warfighters' use of a full spectrum of components in conducting force protection missions, route reconnaissance, crowd control, raids, and point defense – all in the effort to save lives and reduce collateral damage.

The Central Command believed that the requested weapon system, the Full-Spectrum Effects Platform, represented a combination of near-term technologies, which were critical to success in the counter-insurgency battle and recommended it be evaluated as a potential solution.

In fact, at the time of the Central Command's request, FSEP was a concept. That concept included a component for a fully automated, active protection system against rocket propelled grenades and anti-tank missiles. This component subsystem for FSEP was the *Trophy* Active Protection System, and was to be used on the candidate Stryker vehicles in lieu of the slat armor, or the reactive tile armor subsystem. Slat armor forms a metal cage around the vehicle, and detonates rocket propelled grenades before they can penetrate the vehicle. In a similar manner, the reactive armor tiles defeat the threat through deflection and/or attenuation of the penetrating mechanism.

Besides the *Trophy* Active Protection System, the suite of lethal and non-lethal components included the Gun Slinger counter-sniper and enemy Fire Detection System; a Mobile Multi-Band Jammer to Counter IEDs; an Active Denial Technology using millimeter wave technology; a Long Range Acoustic Device; and a Laser Dazzler. These components represented a range of potential capabilities with different technology readiness levels, insofar as being integrated onto a single platform for the operational concept intended by the warfighter.

On April 28, 2005, after evaluating the Central Command's request, the Joint Staff's Deputy Director for Resources and Acquisition supported the Central Command's need, but stated that the proposed FSEP solution, with all its subcomponent systems, was "unachievable in the near-term," which is a prerequisite for taking action to resolve an Immediate Warfighter Need. The time frame for defining "near-term" is flexible, and can extend up to two years in order to deliver some capability to the warfighter to satisfy, or mitigate, an immediate need. However, the near-term time period does not include weapon systems development.

Subsequently, the Office of Force Transformation, working with the Army officials and Naval Surface Warfare Center engineers at Dahlgren, Virginia, planned a more thorough and accelerated schedule for integrating subsystems onto and developing the FSEP vehicle.

Representatives from the Office of Force Transformation presented their accelerated schedule to the JRAC on September 19, 2005.

Their plan included an aggressive effort for testing, evaluation, and spiral development, which would lead to deployment of some capability to the warfighter in 2007. The JRAC accepted the aggressive schedule after review with the Office of Force Transformation and after discussion with Army Force Developers.

Based on the JRAC's recommendation, in January 2006, the Deputy Secretary of Defense approved the use of $31.3 million for the Army to proceed with Spiral 1 Development of FSEP. The Army received funding in February 2006. In May 2006, however; the Army Program Manager identified potential delays in delivering Spiral 1 capabilities. The Active Denial Technology Subsystem and the Active Protection Subsystem, *Trophy,* displayed technical development and performance risks which ultimately led to the decision to delay the integration of these capabilities onto the FSEP Spiral I Strykers.

Since the focus of this Subcommittee is primarily on the Active Protection subsystem, the remainder of my remarks will focus on it.

System Operation

The Army program manager, working with the Army Test and Evaluation Command, highlighted the risks to Spiral 1 objectives should the *Trophy* Active Protection subsystem be a component of the overall suite of capabilities. Issues included technical immaturity of major subsystem components, such as the autoloader, and the risk of collateral hazards from *Trophy* to friendly forces and noncombatants in an area where it might be used.

The *Trophy* auto-loader, a key component for quickly engaging multiple rocket-propelled grenades, had not then been built and was not forecasted to be available until May 2007, too late for the planned integration and testing prior to operational demonstrations and use.

Retaining *Trophy* as a component of Spiral 1 would add, at a minimum, an additional six to fourteen months to the schedule, thereby delaying other useful *FSEP* capabilities for the warfighter. A simple, readily available interim solution was to equip the Spiral 1 FSEPs with slat armor protection, which is currently in use and extremely successful in protecting Strykers and our service members against rocket-propelled grenades.

Organizational Recommendations

During my deliberations, I consulted with numerous stakeholders that included the Joint Staff's Deputy Director for Resources and Acquisition; the Commander, Army Test and Evaluation Command; the Deputy Director of Land and Expeditionary Warfare from the Office of the Director for Operational Test and Evaluation; and the Director of Capabilities Developments from the US Army Capabilities Integration Center; representatives from the Naval Surface Warfare Center, Dahlgren and Office of Force Transformation who advised me on their perspectives of the availability and readiness of the Active Protection Subsystem. The preponderance of stakeholders advised me that the Active Protection Subsystem would slip significantly due to its technological immaturity and qualification testing requirements.

I presented the available facts to the CENTCOM Chief of Staff, and asked that the requested capability be revalidated. In doing this, I specifically raised the issues about the potential cost and schedule impacts of the Active Protection Subsystem on the *FSEP*.

On May 16, 2006, Central Command responded that proceeding with Spiral 1 with readily available capabilities was preferred, and that the Active Protection capability could be integrated as it became mature in a later spiral of FSEP development, if it proved successful.

Based upon these consultations, I validated the Army program manager's decision to integrate the Active Protection capability in subsequent development. This action allows the Department to demonstrate the FSEP Spiral 1 capability in response to the warfighter's

immediate need. The FSEP Spiral 1 vehicles will have significant non-lethal capabilities, within a rapid time frame, and with balanced cost, schedule and technical performance risks.

Office of Force Transformation

Throughout this effort, we have had a collaborative relationship with the Office of Force Transformation and we are partners in the FSEP initiative. The OFT was initially the lead for the FSEP effort and facilitated Dahlgren's basic research in its Spiral 0 development. The DepSecDef's January 13, 2006 memo provided $31.3 million in funding to the Army for FSEP Spiral 1 development and the Army has since been responsible for program management.

The Future Combat System APS

Although not directly related to the FSEP discussion, the Army and Marine Corps acquired their active protection subsystem as a component of a larger acquisition program. The Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics did not have oversight of the particular subsystem acquisition; however, the Defense Contract Management Command did provide the Active Protection System Source Selection Committee with past performance evaluations on bidders, which is their normal responsibility. I am not aware of any other involvement that AT&L had in the April 2006 contract awarded to Raytheon.

Conclusion

In closing, Mr. Chairman, there was much thought, consultation and thorough consideration of alternatives that went into the decision to delay fielding of the FSEP APS. The acquisition community is committed to the safety of our warfighters and ensuring they are provided with the best protection and weapon systems available. Thank you for the opportunity to testify before the Subcommittee. I will be happy to answer any questions that you or Members of the Subcommittee might have.

RECORD VERSION

STATEMENT BY

MAJOR GENERAL JEFF SORENSON
DEPUTY ASSISTANT SECRETARY OF THE ARMY
(ACQUISITION, LOGISTICS AND TECHNOLOGY) FOR ACQUISITION AND SYSTEMS MANAGEMENT

BEFORE THE

SUBCOMMITEE ON TACTICAL AIR AND LAND FORCES
COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES

ON COMBAT VEHICLE ACTIVE PROTECTION SYSTEMS

SECOND SESSION, 109TH CONGRESS

SEPTEMBER 21, 2006

NOT FOR PUBLICATION
UNTIL RELEASED BY THE
COMMITTEE ON ARMED SERVICES

STATEMENT BY

MAJOR GENERAL JEFF SORENSON

Chairman Weldon and distinguished members of the House Armed Services Committee, I would like to express my appreciation at this opportunity to appear before this committee to discuss the Army's continued effort to improve the force protection capabilities of our Soldiers, specifically, combat vehicle active protection systems (APS). In discussing this topic, I will attempt to address the following: the threat APS is intended to counter; types of combat systems or vehicles for which APS is planned, currently and in the future; U.S. and foreign systems under development; the LSI/Government award to Raytheon as the APS developer; and the technical and the operational challenges and risks associated with integrating and fielding APS.

The Army's priority is the well-being of Soldiers and their families—ensuring that they are the best trained, best equipped, and best led force, able to fight and win America's wars. The Army is absolutely committed to making sure our Soldiers have the best force protection capability and active protection systems available. However, it is of paramount importance that we ensure the systems we provide our Soldiers meet the current threat and are proven, tested, and validated.

The Army continues to upgrade and modernize its equipment. We will not, however, procure and field any system that is not operationally ready or safe, nor will we give our Soldiers a false sense of security. With respect to our defense contractors and their respective advertisements and reported claims, no system

is procured or fielded to the Army unless we ensure that the system is safe for Soldiers' use and is effective and survivable under operational conditions. Doing otherwise would violate the trust given to us and our fundamental commitment to providing our Soldiers with the best combat equipment possible.

Every Soldier is important and each loss of life is tragic. The Army has taken significant steps to counter the rocket-propelled grenade (RPG) threat for the past 35 years and will continue to modernize our force protection capabilities for future threats. The RPG threat to our combat systems is considerably less than what has been reported in the press. Since 2003, there were a total of 148 Soldiers killed in action (KIA) or died of wounds received in actions involving an RPG. Of the 148 killed in action, 63 were RPG only; the remaining KIAs were the result of complex attacks involving an RPG and some other kind of weapon. Additionally, of the 148 killed in action since 2003, only ten Soldiers killed in action involved current combat vehicle systems that the Army could potentially accept the integration of an active protection capability (Abrams, Bradley, Stryker, etc.). The reactive armor and slat armor protection systems currently deployed contribute to the effectiveness of our current combat systems to defeat the RPG threat without the use of an Active Protection System.

The Army has been working on threat countermeasure systems for the past 40 years. Our deployed heavy combat systems continue to be effective against RPG attacks thanks to the effectiveness of the force protection capabilities we have deployed. To date, the Army has fielded to theater 950 sets of Bradley Reactive Armor Tiles, 1097 sets of M113 Slat Armor Kits, and two brigades of

Stryker Slat Armor Kits. The first sets of Stryker Reactive Armor Tiles will be available for fielding in October 2006 and the first sets of Abrams Reactive Armor Tiles will be available for fielding to theater in June 2007. As evidenced by the low casualty rate of Soldiers using our combat systems, the current suite of force protection systems greatly contribute to the effectiveness of our deployed combat systems to defeat the RPG threat. The bottom line is that Army is continuing to enhance Soldier force protection in theater on a daily basis.

To counter future threats, the Army is embarked on a holistic approach towards survivability, including leveraging the network for improved situational awareness, reducing signature management, improving ballistic protection, modifying operational tactics, and pursuing hit avoidance. In the context of military ground combat vehicles, hit avoidance comprises technologies that enable defeat of the threat prior to its impact with the vehicle. The hit avoidance requirement for our future force is a 360-degree hemispherical "bubble" of protection to our combat platforms. Currently, the Future Combat Systems (FCS) program is developing a full-spectrum solution to counter short- and long-range threats, which include a wide range of ballistic projectiles: RPGs, mortars, antitank guided missiles, tank-KE/HEAT, top attack/precision guided missiles, and large caliber cannon.

APS is an explosive ballistic countermeasure capability that will serve as one element of the overall hit-avoidance solution. The current developmental approach is diligently working parallel paths in order to address current force system needs for defeating short-range RPG attacks, as well as FCS manned

ground vehicles (MGV) requirements for a full-spectrum hit avoidance subsystem that is robust enough to defeat the complete array of anticipated threats, including top attack. Our engineers are seeking as much commonality as possible among current and future force systems; and designs for all systems that will enable upgrades of capability into the future.

I would like to note that the APS development efforts of the Science and Technology community, PEO Ground Combat Systems (PEO GCS), and PM FCS Brigade Combat Team (BCT) are tightly aligned to ensure that we achieve these objectives: provide near-term close-in active protection to the current force, including Abrams, Bradley, and Stryker; and the deployment of full-spectrum survivability and hit avoidance capabilities for the FCS family of manned ground vehicles.

There are roughly 20 U.S. and foreign-based active protective systems under development – ranging in system and technological maturity from near-term availability to mid-term delivery to purely conceptual. These developmental systems stretch across a broad spectrum of capability and each presents a unique set of integration challenges – space, weight, power. Additionally, each system has a unique collateral damage geometry that must be minimized in order to ensure the safety of our Soldiers, non combatants and the system. The number of systems that are suitable, reliable, safe and able to be integrated in the near future into our current combat systems is a very small subset of the worldwide APS development continuum.

Contrary to recent news reports, the Lead Systems Integrator (LSI), Boeing and SAIC, and the government conducted the source selection for the subcontract award of the APS system -- not Raytheon as alluded to by the media. As a result of the Organizational Conflict of Interest (OCI) requirements set forth in the FCS System Development and Demonstration (SDD) FAR-based contract, Raytheon was not allowed to participate in the source selection process.

The general chronology of events leading up to the award begins back in September 2005, when the LSI released the Request for Proposal (RFP) to industry. Industry proposals were submitted in October 2005 and the LSI conducted the source selection evaluation between October 2005 and February 2006. In February 2006, the LSI selected Raytheon for the APS Development subcontract. The Army concurred with the contract awarded to Raytheon in March 2006. As with all contract award decisions, debriefings were conducted with unsuccessful offerors between March and April 2006, including the sponsor of the TROPHY system, General Dynamics.

I would like to reiterate that the Army provided oversight over the source selection process and stands by the ultimate subcontract award. The Army also maintains that no contract improprieties occurred during the source selection process. Raytheon had neither an unfair competitive advantage, nor did the Army "cook the books" as wrongly asserted by recent news reports.

In fact, the reference to Raytheon's participation in the Trade Study process as evidence of bias in this process underscores the misunderstanding of the

facts as they occurred. The terms of the APS subcontract required Raytheon to conduct a technical trade study. Thus, Raytheon's participation in the Trade Study was proper and consistent with the subcontract requirements. The terms of the APS contract required Raytheon to conduct an engineering Trade Study to determine the best short-range APS integrated concept that met the integration requirements for current force active protection requirements consistent with the established growth path for FCS MGVs. Thus, the Trade Study was conducted in May 2006, well after the source selection process was completed which led to the contract award to Raytheon in March 2006. Information distinguishing the source selection process from the trade study was provided both verbally and in writing to the media investigative reporter; however they did not include those facts in their broadcasts.

The Raytheon APS capability, Quick Kill, is a solution envisioned to defeat the full spectrum of threats, provide 360-degree all-aspect protection, from multiple simultaneous threats, and utilize a sophisticated vertical launch interceptor. Quick Kill, with its vertical launch and fire control capabilities, is best suited to support current force active protection ground combat system requirements and concurrently support the Future Combat Systems hit avoidance suite and full spectrum survivability requirements.

To date, no APS sub-system has been fully developed, integrated, and tested on a current combat system. This is because, generally speaking, a number of technical and operational challenges exist with developing, integrating, and fielding APS systems. For example, collateral damage against Soldiers and non-

combatants is a serious issue, especially in confined urban environments. Also, the tactics, techniques, and procedures to safe and effective employment of APS systems are immature. For example, rules of engagement always provide for self defense. However, those same rules of engagement direct our forces to limit or prevent noncombatant casualties and injuries. Employment of an APS system creates a challenge to solve these two fundamental rules simultaneously. We are seeking answers to questions of use of APS systems in urban settings with civilian crowds. We are considering the implications of employing dismounted soldiers around or near vehicles with an APS to prevent fratricide. As the materiel solutions mature, we are working the full realm of tactical considerations in parallel.

The Army considers TROPHY an engineering development model designed to protect heavy armored combat vehicles. The TROPHY system is not an operationally validated and proven system as proclaimed. The broadcasted TROPHY testing event at the Dalghren Naval Test Center did not constitute qualification or system verification testing as is typically conducted by the Army's Test and Evaluation Command. No formal Department of the Army/Department of Defense technical, live fire or operational testing or evaluation has been performed on TROPHY at the integrated system level.

Integration of the Quick Kill or Trophy will require sub-system and system integration, testing, hardware and software safety verification and qualification, user testing, and safety releases. To date, the Quick Kill system has demonstrated successful warhead, compound maneuver, radar integration and

RPG intercept tests using an advanced detection and tracking capability that incorporates precision fire-control algorithms and vertical launch interception. Currently the Army plans to provide prototypes and conduct a Limited User Test in 2010.

In conclusion, the Army is absolutely committed to providing our Soldiers with the best force protection and active protection available. However, the Army will not procure and field any system that is not proven, tested, and validated to be operationally ready and safe. To do otherwise would cause the Army to breach its implied contract with its Soldiers and families. The Army is diligently and methodically proceeding on a path to obtain the best single short-range APS for current force systems as soon as possible, while developing in parallel a common full-spectrum capable hit avoidance sub-system for FCS MGVs. All systems for both current and future systems must be robust and upgradeable. The Army finds the recent news story on our approach to procuring an APS capability biased, unfair, and truly disheartening. Our nation is at war. The Army is leading the global war and is doing everything within its means to protect this nation's invaluable treasure—our Soldiers.

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UNITED STATES HOUSE OF REPRESENTATIVES

STATEMENT OF

LLOYD FELDMAN

ASSISTANT DIRECTOR, OFFICE OF FORCE TRANSFORMATION

OFFICE OF THE SECRETARY OF DEFENSE

BEFORE THE SUBCOMMITTEE ON TACTICAL AIR AND LAND WARFARE

ARMED SERVICES COMMITTEE

UNITED STATES HOUSE OF REPRESENTATIVES

September 21, 2006

STATEMENT OF THE ASSISTANT DIRECTOR OF FORCE TRANSFORMATION

OFFICE OF THE SECRETARY OF DEFENSE

BEFORE THE SUBCOMMITTEE ON TACTICAL

AIR AND LAND WARFARE

ARMED SERVICES COMMITTEE

UNITED STATES HOUSE OF REPRESENTATIVES

September 21, 2006

Chairman Weldon, Members of the Subcommittee,

I'm honored to address the Subcommittee, and I am grateful for the opportunity to discuss the Office of Force Transformation's innovative work on Project Sheriff and its demonstration of the Trophy Active Protection System. I have included as part of my written testimony four addendums. They include a chronology of relevant events related to the initiative; the process, analysis and rationale that led to the selection of the Trophy system; how the Trophy system was integrated onto an Army Stryker vehicle; and relevant testing information and results.

The United States military finds itself today engaged in a Long War against multiple types of terrorist cells and other malignant non-state actors whose organizations are amorphous and ever changing. Confronting this threat requires shedding long held

assumptions regarding our preferred methods of warfare and how our forces go about finding, tracking and targeting an elusive enemy who hides among civilian populations and exhibits no moral inhibitions to sacrificing innocents to achieve their aims. Confronting this enemy requires waging a War against Individuals. Successfully fighting this type of war requires a willingness to embrace new types of capabilities, vastly different tactics and new ways of acquiring assets optimized for this fight.

That is, in part, what the Office of Force Transformation was established to do for the Department of Defense. The office serves as an internal catalyst for change. It champions those types of concept-technology pairings that are potential "game changers" in terms of how their future use will fundamentally alter battlefields of tomorrow. OFT operates at the intersection of unarticulated needs and non-consensual change. As a result, the office has a wide field of maneuver—a sanctuary—where new ideas and innovations can be experimented outside of the restricted confines of established requirements and acquisition hierarchies. It generates new knowledge and creates unique experimental articles for use by the combatant commands to enable an alternative path for the department to address future needs.

As the pace of change accelerates and we race headlong into the information age, so must the department's transaction rate also accelerate as we create new capabilities and options from "learning." Stagnation of institutional learning comes at the expense of future competitive advantage, flexibility and relevance. As we continue to perfect the familiar and the comfortable "known," we must continue to develop methodologies which accelerate learning and decrease the department's overall level of strategic risk. If

we are to take full advantage of what the information age offers, we must adopt a much faster acquisition and generational cycle rate across the military. The costs imposed by staying with slower turnover in systems—a technology cycle rate that currently runs 15 to 25 years for U.S. forces—is likely to be technological surprise, asymmetric threats and victimization in the measures/countermeasures engagement.

One method that OFT uses to speed the creation of new knowledge across the force is through the idea of Concept-Technology Pairings. The objective is to operate in advance of requirements. These should not be considered programs and they are far removed from normal Pentagon acquisition processes. The intent is the early experimentation with surrogate technologies around a loosely defined concept tied to recognized gaps in current capabilities. To date, OFT has launched Concept-Technology Pairings in the areas of Operationally Responsive Space; Project Sheriff; Redirected Energy; Stiletto/Wolf PAC; and Sense and Respond Logistics.

Concept-Technology Pairing offers a glimpse of what a future, robust capability might be. These pairings are not expected to be 100 percent effective and we should not be surprised if some result in failure. The product here is learning in conjunction with warfighter needs. New knowledge can be best advanced through a process of trial and error. But where the pairings approach differs from other department efforts like Advanced Concept and Technology Demonstrations (ACTDs) is one of intent. ACTDs are expected to enter into production at the completion of their three-year phase. As such, a premium is placed on "finding" or "selecting" for ACTDs only those candidates that

offer a near-term promise of being produced. The result is a collection of relatively well understood technologies and not those more on the cutting edge of innovation.

The output from concept-technology pairings, however, is new knowledge that in turn leads quickly into another more refined version of the concept. Successive iterations of the concept in essence bring that future forward and allow warfighters to use and shape near-term opportunities for concepts like Sheriff that were previously relegated to an ill-defined future. By getting these capabilities into the hands of war fighters early and allowing them to experiment with successive iterations of the capabilities allows for the rapid co-evolution of tactics/concepts and leads to a level of operational dexterity that promotes innovation across the forces.

The Sheriff Project and the follow-on Wolf Pack Platoon Project are Office of Force Transformation experiments that pair leading edge operational concepts for complex, irregular warfare with state of the art enabling technology. The Project Sheriff initiative was started in 2004, and addressed urgent warfighter needs for integrated sensors, lethal and non-lethal weapons, and force protection. It is designed to rapidly and iteratively experiment with pioneering tactics and technology through a close interaction between innovative warriors and a supporting community of industry, government laboratories, and universities.

These rapidly executed experiments are designed to (1) create and test an integrated prototype in no more than 18 months that fit into an overarching operational construct, (2) create a low cost experimental venue where warfighters and the supporting

science and technology community closely cooperate and (3) complement and inform the more deliberate acquisition process by identifying warfighter needs and experimenting with potential technological solutions, tactics, procedures and policies (e.g., employment of non-lethal and autonomous systems).

The ultimate goal is to be a catalyst for meeting the emerging needs of ground battle in irregular warfare, counterinsurgency and security and stability operations. The project also specifically addressed U.S. Central Command's urgent needs in Iraq and Afghanistan. These needs were formally expressed in a Time Critical Joint Operational Needs Statement (JONS) developed by the Multi-National Corps Iraq and endorsed by Central Command in 2005 for capabilities to be provided by the Sheriff Project.

Project Sheriff and the new, follow on Wolf Pack Platoon Project are designed to specifically address the:

- Compressed strategic, operational and tactical levels of war and intelligence;
- Problem of identifying combatants intermixed with non-combatants;
- Need for in-depth situational awareness;
- Blurred distinction between combat and police action;
- Requirement for multiple levels of graduated responses and precise target discrimination;
- Increased Command, Control, Communications, Computers and Intelligence, Surveillance and Reconnaissance (C4ISR) to create tactical options against a distributed threat;

- Digital, organizational and intelligence divide found between tactical units at the edge of battle and technology enabled, higher headquarters;
- Increased threat of Improvised Explosive Devices, Rocket Propelled Grenades, snipers and small arms ambushes.

To meet this new, highly dynamic and evolving threat to American forces, Project Sheriff's goals were to:

(1) Experiment with innovative concepts of operation, tactics, techniques and procedures that would both inform and be informed by potential technological enablers.

(2) Integrate commercial off the shelf or mature technologies into complementary, combined arms solutions mounted on a light armored vehicle under compressed timelines.

(3) Combine non-lethal directed energy—High Power Millimeter Wave technology, High Power White Light, Laser Glare Aversion for Optical Denial, Long Range Acoustic Device—with sensor enabled Active Protection, lethal response, and electronic warfare.

(4) Develop the synergistic, combined arms employment of lethal kinetic energy and non-lethal directed energy weapons in compartmented urban terrain.

(5) Combine active protection, lethal gunfire and electronic warfare to meet the threat of RPGs, snipers, and IEDs.

(6) Serve as an active denial technology proof-of-concept in anticipation of fielding longer-range and more capable directed energy technologies.

(7) Test rapidly and rigorously in an operationally realistic environment prior to deployment.

(8) Complete required bio-effects research, legal, and policy reviews prior to deployment.

(9) Increase learning and inform acquisition programs at minimal expense.

The Active Protection System (APS) is one component of this combined arms approach that aims to fundamentally enhance capabilities for ground battle in complex urban environments. In addition to IEDs, RPGs are an increasingly sophisticated and prevalent threat in irregular warfare. An active protection system enables light armored vehicles to survive a first shot from a hidden enemy while the Trophy Active Protection System was selected as the most promising near term capability for experimental assessment based on a government laboratory evaluation. Initial U.S. defense laboratory testing of Trophy began this year. The ongoing Wolf Pack Platoon Project will continue a testing program that builds on these initial successful tests and that validates extensive Israeli testing and U.S. industry evaluations. The aim of this testing program is to:

- Evaluate near term active protection technology to rapidly meet immediate warfighter needs;
- Determine how APS fits into a combined arms approach to the RPG, IED, sniper and small arms ambush threat, and;

- Conduct experiments led by warfighters to advance operating concepts and refine needs that will inform the development of any active protective system.

My testimony does not address the issue of the deliberations that led to the removal of the Active Protection System from FSEP, as the Office of Force Transformation is not a member of the Joint Rapid Acquisition Cell. Representatives from the Office of Force Transformation were invited to numerous meetings with Dr. Buhrkuhl and the JRAC and we presented our views in the course of these discussions.

I thank the committee for its interest in OFT's Sheriff and follow on efforts and its continued support for department-wide transformation. I look forward to providing more detail to any additional questions you may have.

Project Sheriff/Trophy Active Protection System Chronology of Events:

July- November 2004--Naval Surface Warfare Center, Dahlgren Division conducted a review of available and potentially available Active Protection Systems for use on the FSEP vehicle. The initial study recommended the Chang Industries Full Spectrum Active Protection Close-in Layered Shield (FCLAS) system, but costs to accelerate to meet FSEP schedule were too steep ($18 million). Army efforts were advancing to determine final APS system for the Future Combat System, including a proposed demonstration test series in June 2005.

March 2005--Program Manager-Close Combat Systems (PM-CCS) selected by US Army to be the service's lead material developer for FSEP.

June 2005--APS demonstration series cancelled.

June 2005--NSWCDD and PM-CCS conduct an official market survey with vendors of potential APS systems for FSEP. This resulted in a unanimous recommended selection of Trophy to integrate with FSEP.

August 2005--PEO-GCS (Mr. Kevin Fahey) was briefed on the selection of Trophy as a potential FSEP APS solution. Mr. Fahey approved to use existing PEO-GCS contracts with GDLS to conduct FSEP Stryker/ Trophy integration.

September 2005--NSWCDD and PM-CCS negotiated with GDLS and Rafael to integrate Trophy aboard FSEP. The contract was funded by OFT through NSWCDD to PM-Stryker Brigade Combat Team (PM-SBCT).

October-December 2005--NSWCDD and PM-CCS conduct detailed analysis of Trophy capabilities, integration and design. Secret briefings by Rafael and GDLS detail Trophy capabilities and level of testing conducted by Rafael for Israeli Ministry of Defense.

December 2005--Trophy system integrated aboard FSEP at NSWCDD to demonstrate fit and to conduct electromagnetic testing. Electromagnetic testing results demonstrated that the Trophy had no susceptibility or interference with other systems. Testing also demonstrates that Trophy radars present no hazard to personnel.

January 2006--Decision made that APS would not be functionally demonstrated as part of the FSEP LUA due to concern over potential FSEP vehicle damage and safety constraints. APS demonstration on a separate Stryker vehicle recommended and undertaken. Trophy removed from FSEP and returned to Israel.

February 2006--NAVSEA and IDF update existing Data Exchange Agreement (DAE) allowing official Government to Government information exchange on Trophy. This DEA allowed full access to IMOD data.

February 2006--Rafael integrates Trophy onto Israeli Stryker to mimic exterior layout of FSEP so testing results would be applicable to FSEP effort. Use of Israeli Stryker allows Trophy design to be integrated quickly and saves time (estimate 2 months). Rafael begins series of tests to verify Trophy functionality and personnel safety. Rafael conducts hazard tests. Additionally, RPG engagement tests were conducted similar to those to be conducted at NSWCDD. NSWCDD engineers were either personally present during these tests or verified the tests results and conclusions.

February 2006--NSWCDD, GDLS and Rafael develop a plan to demonstrate Trophy in both static and dynamic environments. Testing gathers data to demonstrate Trophy capabilities and provides a body of data owned by US government.

March 2006--US Interim Hazard Classification for Trophy warheads developed based on data from the IMOD and Rafael. IDF Stryker then shipped to US via USAF transport aircraft. Testing and demonstration work began at NSWCDD on 21 March 2006. Testing included both a stationary and moving vehicle. Tests were conducted with both instrumented and live Trophy warheads for analysis. Of the 38 tests conducted, 35 were kills or rated as kills, for a success rate of 92%. The tests were conducted against RPG - 7 missiles with inert warheads. These RPGs had the same velocity and flight profiles as live RPGs and were certified by NSWCDD EOD techs as being representative of a fully operational missile. The Trophy demonstration was a dramatic success and indicated to the team that Trophy performed as intended.

April 2006--Rafael GDLS and NSWC Dahlgren detail all testing and analysis conducted to support FSEP. Includes information on further testing Rafael was conducting for the IMOD. This presentation was made at the secret level on 28 April to representatives of the Defense Operational Test and Evaluation Office and on 1 May with representatives of the Army Test and Evaluation Command and Marine Corps System Command. At the 1 May meeting a plan was presented for the Trophy 'way ahead' to include an engineering design for an autoloader system.

April 16, 2006--US Army formally requests to OSD - Joint Rapid Acquisition Council (JRAC) that Trophy be removed from FSEP.

May 11, 2006--JRAC considers US Army request to delete APS requirement from FSEP Spiral 1 vehicle. The decision was to get CENTCOM validation of the APS requirement given the time, schedule and cost impacts discussed at this meeting.

May 2006--PM-SBCT was selected as the US Army PM for FSEP development.

May 2006--NSWCDD engineering team reviews extract data from 30 March demonstration testing. Based on US Army approved request to remove Trophy from FSEP, OFT and NSWCDD alter future FSEP strategies to include Trophy in a further developmental process.

1 June 2006--JRAC announces decision, based on CENTCOM feedback, to approve Army's recommendation to slip Trophy to a later spiral.

July 2006--OFT and NSWCDD began negotiations with Rafael to procure one (1) operational Trophy system with autoloader capability and support needed for further test and evaluation.

September 2006--RFP for procurement of 1 operational Trophy system with autoloader and engineering support for testing provided to Rafael.

Process, Analysis and Rationale that led to selection of the Trophy system for testing and evaluation.

On 28 and 29 June representatives from 6 different Active Protection System vendors briefed a combined NSWCDD and PM-CCS team in Crystal City, VA on the capabilities of their systems. Each vendor was required to provide information on their system and discuss with the selection team what capabilities they would be able to provide in order to meet the FSEP timeline of having an integrated system by 31 December 2005.

The systems were evaluated on the vendor's ability to meet the FSEP Urgent Operational need. The following evaluation criterion was established:

Category	Definition
Operational Concept	Fundamental soundness of technical approach and maturity of technology
Procurement Cost per side	Cost to purchase one proposed system for Spiral 0
Integration Cost	Cost to integrate and install system on vehicle beginning on delivery date and ending when fully integrated, operational, and ready for test.
Schedule	Able to delivery and integrate by 31 DEC 05
Past testing and safety analysis completed	Assessment of completed system tests and availability of safety analysis
Weight	Total weight of system (with ammunition) for Spiral 0
Size	Topside and inside volume not interfere with current FSEP layout
Power Requirements	Voltage (AC or DC) and amperage requirement
Cooling Requirements	System interior and exterior cooling requirements
System Performance	Defeat RPG fired from near range, near 360 degree coverage on the move
Availability of models and interface documentation	Engineering data must be available for integration

How was the Trophy System Integrated onto an Army Stryker Vehicle?

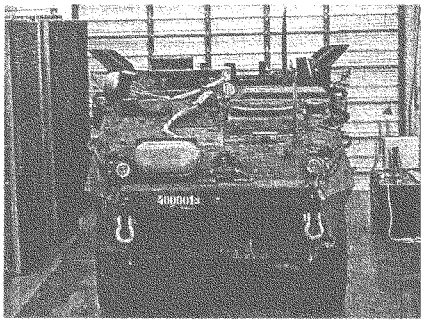
Two integrations of the Trophy system were performed to support the FSEP program:

1. The first was the integration of the Trophy onto the FSEP Stryker vehicle conducted in Dec 05. In this integration the Trophy launchers were mounted to the side of the FSEP vehicle. Structural analysis and testing of the launcher mounting points verified that the Stryker hull would not be adversely affected by the Trophy system. The Trophy search radar systems were mounted on each side and at the front and rear of the vehicle in special mounting brackets.

Trophy on the FSEP Stryker

The internal components of the Trophy system were integrated as part of the FSEP system and were mounted in racks and positions suitable for employment in the FSEP vehicle. The Trophy system was powered by the FSEP system generator. No additional electrical power requirements were needed.

2. The second FSEP Trophy integration was on the Israeli Defense Force Stryker. The integration was conducted to support the tests and demonstration planned at NSWCDD in March 06. The exterior installation of this system was identical to that on the initial FSEP vehicle installation. The interior components of the Trophy system were rack mounted inside the vehicle to facilitate the necessary testing and analysis. Again, in this installation the Trophy system ran exclusively on vehicle power. No additional power systems were needed. Additionally, all US Army agencies involved in the FSEP Project were invited and encouraged to participate throughout the entire testing & demonstration process.



FSEP Trophy on the IDF Stryker

In addition to the Trophy integration done to support FSEP, GDLS and Rafael have completed a concept study and analysis of a Trophy installation that would meet all Stryker Infantry Carrier Vehicle requirements.

What Relevant Testing was Conducted?

Multiple tests were conducted on the Trophy system as part of the FSEP project. The table below lists the tests and the results:

The Trophy integrated on the FSEP Stryker

Test	Result
Fit and Function	Trophy installed and fit as designed. System functioned as expected.
Electromagnetic Vulnerability (Tailored Environment)	No susceptibilities on Trophy
Hazards of Electromagnetic Radiation to Ordnance (HERO)	Trophy caused no effects to any ammunition types expected aboard FSEP.
Hazards of Electromagnetic Radiation to Personnel (HERP)	Below personnel exposure limits.
Electromagnetic compatibility	No interaction of Trophy with other systems on board vehicle

The Trophy system integrated on the IDF Stryker

Test	Result
Fit and Function	Trophy installed and fit as designed. System functioned as expected.
Flash Signature	The flash signature seen through the periscopes of the vehicle would not cause ocular damage to personnel inside the vehicle. Flash outside of the vehicle would not cause ocular damage.
Acoustic Signature	Adequate hearing protection is provided by the required standard hearing protection worn inside the vehicle.
Blast Overpressure	Minimal blast overpressure inside of the vehicle. Trophy is designed to be operated with open hatches.
Debris Protection	Witness panels proved that blast shields protected crew hatch areas from debris. Trophy is designed to be operated with open hatches.
Live Fire tests conducted at NSWCDD	38 tests were conducted with inert RPGs being fired at (or in close proximity to) the vehicle. Multiple tests were conducted firing 2 RPGs nearly simultaneously – one to each side of the vehicle. The tests were conducted against RPG -7 missiles with inert warheads. These RPGs had the same velocity and flight

	profiles as live RPGs and were certified by NSWCDD EOD techs as being representative. RPGs were fired remotely from 100 meters away using test stands. 12 of the 38 tests were conducted as the vehicle was moving at approximately 25mph. 35 of 38[1] tests were rated as a success. System identified, tracked and engaged threat[2] RPGs. Notes: (1) Tests using a "live" Trophy engagement round accounted for 6 tests with 4 countermeasures firing. All other Trophy tests were deemed either a successful or a failure by using tracking cameras in place of the "live" Trophy countermeasure and analyzing the system data with the video coverage with modeling and simulation to predict the outcome. (2) System successfully distinguished between RPGs aimed to strike the vehicle and RPG's that would miss the vehicle.

In addition to the tests noted above a structural test was conducted at Aberdeen Proving Ground to determine that the loading imposed by a Trophy warhead would not overstress a Stryker vehicle. A 1/2 kg charge of C-4 was detonated in place of the Trophy warhead and no structural damage was noted.

QUESTIONS AND ANSWERS SUBMITTED FOR THE RECORD

SEPTEMBER 21, 2006

QUESTIONS SUBMITTED BY MR. WELDON

Mr. WELDON. Do we need an interim capability to protect our military until the objective system comes on line in 2011? Or based on what we know about current threat systems and current armor solutions, is it an acceptable level of risk to wait until 2011 to give our military some sort of APS capability?

Dr. BUHRKUHL. The vast majority of threats currently being encountered are Improvised Explosive Devices (IEDs). Rocket Propelled Grenade (RPG) attacks are much less frequent. For combat vehicles, such as the Abrams, Bradleys and Strykers, reactive armor tiles should be adequate to defeat almost all of the RPGs currently being encountered or expected. Therefore, the risk to combat vehicles of not having an Active Protection System (APS) available until 2011 is considered to be low.

Mr. WELDON. Is Slat armor effective against all known proliferating RPG threats?

Dr. BUHRKUHL. Slat armor is only effective against some Rocket Propelled Grenade (RPG) threats. These specific RPGs have design features which make Slat armor effective. To protect against the remaining types of RPGs, the Army has developed and is procuring reactive armor tiles for the Abrams, Bradley and Stryker combat vehicles. These reactive armor tiles are effective against almost all of the RPGs encountered or expected.

Mr. WELDON. How is the Joint Rapid Acquisition Cell working to respond to CENTCOM's April 19, 2005 urgent operational need statement calling for an "improved active protection capability against RPGs"?

Dr. BUHRKUHL. The Joint Rapid Acquisition Cell responded to the United States Central Command (CENTCOM) Joint Urgent Operational Need (JUON) by funding Spiral 1 Development of the Full Spectrum Effects Platform (FSEP), which includes a suite of capabilities that include lethal and non-lethal responses against a variety of threats. The plan for Spiral 1 Development included an Active Protection System against Rocket Propelled Grenade (RPG) threats, as well as, an Active Denial Technology against threat personnel. The Army program manager recommended that the Active Protection System and Active Denial Technology be delayed until those technologies were adequately developed for operational use in a later development spiral. We coordinated with CENTCOM and obtained their concurrence prior to proceeding with the revised FSEP capability. The Army program manager will be responsible for any later incorporation of active protection capability against RPGs.

Mr. WELDON. A February 9, 2006 notification to Congress indicated that $31.3 million was being transferred from the Iraqi Freedom Fund to the Army for the development of Spiral 1 Full Spectrum Effects Platform (FSEP). The documentation provided to Congress indicated that the system would include "a rocket-propelled grenade Active Protection System." We now understand that APS will not be part of FSEP spiral 1. How is this funding being used now that the decision has been made to delay APS?

Dr. BUHRKUHL. To provide our service members with the most updated capabilities, the Full Spectrum Effects Platform (FSEP) project is following a spiral acquisition strategy. Spiral 0 provided one vehicle for the development of tactics and employment considerations. Since the removal of Active Protection System (APS), the FSEP project adjustments include: 1) procuring three Stryker Infantry Carrier Vehicles for integration, 2) incorporating a training strategy to allow the unit to meet its go-to-war mission rehearsal exercise with the Spiral 0 vehicle and two Infantry Combat Vehicles, 3) adjusting the in-theater support requirements from six months to 12 months in order to provide the operational commander this capability throughout the rotation, and 4) adding an enhanced Counter—Improvised Explosive Device capability. The adjustments provide the best blend of capabilities for training, testing, and deployment.

Mr. WELDON. You mentioned in your written statement that you ". . . validated the Army program manager's decision to integrate the Active Protection capability in a subsequent development." Please discuss this subsequent development effort and if it is funded?

Dr. BUHRKUHL. The Department is pursuing development of Active Protection System capability in a number of ways that have been outlined in other responses.

As that capability matures, we expect that the Army will examine the most suitable alternatives for integrating capability onto the Full Spectrum Effects Platform (FSEP). However, the Army has yet to identify the funding needed to perform that integration and testing onto FSEP.

Mr. WELDON. What services besides the Army need active protection? If so, what has been their position on Active protection so far, and what plans have they made, if any?

Dr. BUHRKUHL. The Navy/Marine Corps are evaluating Army assessments of Active Protection Systems, and will continue to monitor advances in this capability and evaluate its utility for future use by Naval Forces on its vehicles. The Air Force has not yet identified this as a requirement for Air Force vehicles.

Mr. WELDON. Active protection for land forces should not be limited to heavy armored vehicles, but should include trucks and HUMVEES. Are there systems that are scalable to these other, lighter platforms?

Dr. BUHRKUHL. First generation active protection system (examples include the Russian Arena and Drozd and the American Close-In Active Protection System (CIAPS) and Full Spectrum Active Protection Close-In Shield (FCLAS), respectively) were designed for armor-on-armor combat where the active protection systems were designed simply to protect the armored vehicle by reducing the penetration capability of the incoming round. While they reduced penetration to an inch or less, they were characterized by a large lethal fratricide zone. They were also heavy, though still lighter than the armor they could replace.

Some advanced systems (examples include Trophy, Integrated Army Active Protective System (IAAPS), Small Low-Cost Interceptor Device (SLID)) have attempted to address the fratricide issue by increasing the standoff, focusing the lethal mechanism to a smaller volume, or using a hit-to-kill mechanism. While these are a definite improvement over first generation systems, they are more complicated and expensive. They are still relatively heavy (500 lb or more) and still produce collateral effects that represent unacceptable risks when used in scenarios involving dismounted friendly combatants and/or non-combatant personnel in proximity to the vehicles.

Some efforts have been made to address the collateral effects in these systems. For example, the Israeli Iron Fist system uses a non-fragmenting grenade designed to reduce (but not eliminate) the potential for collateral damage. While several of these systems claim to be applicable to light vehicles, they are clearly optimized for armored combat.

Since 2003, Defense Advanced Research Project Agency (DARPA) and the Army have been working on systems that could be used on lighter vehicles. The objectives were:

1) No collateral damage aside from that caused by the threat itself,
2) Residual penetration which could be handled by the light armor appliqués used for tactical vehicles in service today,
3) Light weight, and
4) Low cost.

These systems and components are under test today and promise capability against Rocket Propelled Grenades (RPGs) and even heavy Anti-Tank Guided Missiles (ATGMs). They do not have a growth path to be able to counter standoff kinetic weapons such as gun fired tank rounds, and as such are not replacements for the Quick Kill system under development for Future Combat Systems (FCS).

Mr. WELDON. You state in your written statement that "Retaining Trophy as a component of Spiral 1 (FSEP) would add, at a minimum, an additional six to fourteen months to the schedule, thereby delaying other useful FSEP capabilities." Was this timeline based upon recommendations from the Army's Test and Evaluation Command as well as the Office of Force Transformation? If so, did both organizations agree on this timeline?

Dr. BUHRKUHL. As I stated in my testimony, we collaborated with the Office of Force Transformation (OFT) throughout our deliberations on responding to the Central Command (CENTCOM) Joint Urgent Operational Need. OFT, however, is not a test activity and so we consulted with the Director of Operational Test and Evaluation (DOT&E) and U.S. Army Test and Evaluation Command (ATEC) to determine the most likely timeframe for testing. We were aware of the OFT concern regarding the schedule; however, after studied consideration of the development and performance risks involved, the Joint Rapid Acquisition Cell (JRAC) agreed with the recommendations of the independent test organizations and the program office.

Mr. WELDON. Do we need an interim capability to protect our military until the objective system comes on line in 2011? Or based on what we know about current

threat systems and current armor solutions, is it an acceptable level of risk to wait until 2011 to give our military some sort of APS capability?

General SORENSON. No, the Army's current assessment is that we do not need an interim capability. The vast majority of threats currently being encountered are improvised explosive devices (IEDs). The Rocket Propelled Grenade (RPG) attacks are much less frequent. For combat vehicles, such as the Abrams, Bradleys and Strykers, reactive armor tiles should be adequate to defeat almost all of the RPGs currently being encountered or expected. Therefore, the risk to combat vehicles of not having an Active Protection System (APS) available until as early as 2011 is considered to be low. Note that APS is not effective against IEDs.

The RPG threat to our combat systems is considerably less than what has been reported in the media. Since 2003, and as of 7 November 2006, 148 Soldiers have been killed in action (KIA) or died of wounds received in actions involving an RPG. Of the 148 killed in action, 63 were RPG only; the remaining KIAs were the result of complex attacks involving an RPG and some other kind of weapon. Additionally, of the 148 killed in action since 2003, only ten Soldiers killed in action involved current combat vehicle systems that the Army could potentially accept the integration of an active protection capability (Abrams, Bradley, Stryker, etc.).

Mr. WELDON. Is SLAT armor effective against all known proliferating RPG threats?

General SORENSON. SLAT armor is not effective against all known proliferating RPG threats. To protect against the remaining types of RPGs, the Army has developed and is procuring reactive armor tiles for the Abrams, Bradley and Stryker combat vehicles. These reactive armor tiles are effective against almost all of the RPGs encountered or expected.

Additionally, to counter future threats (proliferating RPG threats being one), the Army is embarked on a holistic approach towards survivability, including leveraging the network for improved situational awareness, reducing signature management, improving ballistic protection, modifying operational tactics, and pursuing hit avoidance. In the context of military ground combat vehicles, hit avoidance comprises technologies that enable defeat of the threat prior to its impact with the vehicle. The hit avoidance requirement for our future force is a 360-degree hemispherical "bubble" of protection to our combat platforms.

Currently, the Future Combat Systems (FCS) program is developing a full-spectrum solution to counter short- and long-range threats, which include a wide range of ballistic projectiles: RPGs, antitank guided missiles, tank-KE/HEAT, top attack munitions. This full spectrum system will be fielded to the entire force.

Mr. WELDON. In reference to the Request for Proposal (RFP) and the source selection process please explain the weighting of the evaluation criteria that led to the selection of Raytheon. Specifically, did the evaluation criteria lean more towards an APS solution for FCS, the current force, or were they weighted the same?

General SORENSON. The source selection criteria were weighted to determine the best Active Protection developer for FCS. A portion of the contract statement of work addressed "spinning out" short-range technology to Current Force (CF) but no specific CF requirements were used as evaluation criteria. The trade study similarly evaluated the best technology for FCS. The FCS objective is to develop a full spectrum capable solution to counter short and long-range threats. The FCS short-range system will be "spun-out" to the CF—the desired end state is to enhance commonality between current and future force systems and to enable future upgrades to both. The Lead Systems Integrator's Request for Proposal (RFP) Statement of Work (SOW) included:

Base Effort: Develop a robust, detailed APS architecture to integrate into Manned Ground Vehicle (MGV) platforms and apply architecture to Army's current force.

Option A: Supply APS B kit for current force (First Priority and Focus)

Option B: Definitize the FCS materiel solution, including short and long range capability

The RFP award factors in descending order of importance were: Technical, Cost, Management/Schedule, and Past Performance. The Technical factor was more important than the combination of Cost and Management/Schedule. The six Technical subfactors in descending order of importance were: Systems Engineering and Architecture; Expertise in APS Technologies; Simulation, Modeling and Test; Fratricide and Collateral Damage; Specialty Engineering; and Integration Capability.

Mr. WELDON. An unclassified Army information paper on APS dated 13 June 2006 states: "The Army is currently not funding the development and procurement of an APS for Stryker." Other than the FCS APS development effort, does the Army

have any other funded APS efforts that could benefit the current force earlier than 2011?

General SORENSON. No, the Army does not have any other funded APS efforts that could benefit the current force earlier than 2011. The Army APS development provides APS solution for both the current (PEO Ground Combat Systems—Stryker, Bradley, Abrams) and the future (Future Combat Systems—FCS MGV) platforms—in close coordination with the Science & Technology community.

The Army is developing a short range RPG countermeasure capability for the Current Force (Stryker, Abrams and Bradley) and a full-spectrum solution to counter short- and long-range threats, which includes a wide range of ballistic projectiles: RPGs, antitank guided missiles, tank-KE/HEAT, top attack/precision guided missiles, and large caliber cannon. Developmental funding does exist and the POM fiscal year 2008-13 is still being worked.

Mr. WELDON. Does the current force have to wait for the FCS program to spin out an APS solution? Why can't the current force develop and field an interim APS solution on its own? Does this mean that current force systems can only get future technology upgrades from the FCS program?

General SORENSON. The Army solution to an Active Protection System currently includes the current force. The Army conducted significant analysis to determine current and future requirements. The current force will not get an APS capability earlier by splitting the APS development approach in two. The current approach ensures commonality and future upgrades to both current force and FCS MGV combat vehicles. The Army approach to active protection includes a tightly integrated team that includes PM Future Combat Systems, PEO Ground Combat Systems (Stryker, Bradley and Abrams), the Science and Technology Community and the Best of Industry. The plan is to provide short-range capability to the current force first (Short-Range RPG defeat) and then full spectrum capability to current (Stryker, Bradley, Abrams) and FCS (Manned Ground Vehicles) second. No system will be procured or fielded unless the Army is confident that the system is safe for Soldiers' use and is effective and survivable under operational conditions. Active protection is not just an FCS program—it is an Army program and approach to full spectrum Soldier survivability. The Army will ensure that both current and FCS equipped Brigade Combat Teams (BCTs) receive future technology upgrades.

Mr. WELDON. In thinking about potential scenarios, it would seem that a close-range attack with an RPG would be very difficult to defend against, given the extraordinarily fast reaction times required. Is that correct? Can an APS be effective in close-range situations at all?

General SORENSON. Generally, the closer the weapon is fired and the faster the incoming round, the harder it is for most APS solutions to identify, track, intercept and neutralize the inbound threat. It requires engagement closer to the vehicle, which means you need to use a more lethal countermeasure to adequately defeat the RPG threat. The short-range APS will be effective against the Army's requirement for close-in attacks. A major part of the solution in the defeat of close-range attacks may be tactics and doctrine. Technical testing and User experimentation with APS will be conducted to establish the best way to defeat close-range RPG attacks.

We are currently investigating different technologies to neutralize close-range RPGs. The APS systems can be effective in close-range situations, but like any system will have design limitations for ranges that it can not protect against. For this reason, the Army's Current Force and FCS APS program is developing a suite of technologies to counter threats with multiple means—a full spectrum hit avoidance suite.

Mr. WELDON. Do we need an interim capability to protect our military until the objective system comes on line in 2011? Or based on what we know about current threat systems and current armor solutions, is it an acceptable level of risk to wait until 2011 to give our military some sort of APS capability?

Mr. FELDMAN. It has been stated that current threat levels do not merit a need for Active Protection Systems (APS) deployment before 2011, but the recent experience of the Israeli Defense Forces (IDF) in Lebanon calls this assumption into question. A majority of the casualties sustained by the IDF in the recent conflict were directly related to Anti-Tank Guided Missiles (ATGMs) provided to the Hezbollah by Syria and Iran. Many of the IDF heavy and light armored vehicles were attacked by more advanced threats in greater numbers than had been expected. It is important that we explore near term protection solutions, which unlike armor, are not reliant on amelioration of lethality upon vehicle impact. An interim capability will provide protection against emerging threats, and also provide a platform for the development of Tactics Techniques and Procedures concerning the usage of Active Protection Systems. It is our understanding that the 2011 timeframe is when the Quick

Kill system will be ready for test. Significant acquisition quantities would not be expected until 2 to 3 years after that. All this time could be used for learning how we employ and specify these systems.

Mr. WELDON. Is SLAT armor effective against all known proliferating RPG threats?

Mr. FELDMAN. This question needs to be answered in a classified forum as it requires a discussion of capabilities, limitations and vulnerabilities.

Mr. WELDON. Various news reports have quoted Office of Force Transformation (OFT) sources implying that the Trophy system is ready for deployment now. What is the official OFT position on the current availability of Trophy as it pertains to the FSEP program?

Mr. FELDMAN. The OFT has never stated that the Trophy was ready for deployment. In order to be ready for deployment the system must first be subjected to additional qualification and performance testing. The Trophy system has continued development with the IDF since the demonstrations at NSWC Dahlgren in March including initial development of an autoloader and the beginning of certification testing. The Army recommended that the Tropy not be included on the FSEP program and the JRAC, after consulting with CENTCOM who in turn consulted with the user in the field, made the decision to delay the use of the Trophy on this spiral of the FSEP program. Trophy is being carried forward as part of the OFT Wolf Pack Platoon project with proposals for further performance testing and certification for US usage should this stage prove out. The OFT position is that with a limited procurement of 3 test systems and 40 countermeasures, and an appropriate test program, the Trophy could be approved for US usage.

Mr. WELDON. I understand that the Office of Force Transformation (OFT) has worked very closely with the Israeli government in regards to integrating Trophy on a Stryker vehicle. Please tell us what your current understanding is of when the Israeli Defense Force (IDF) plans to field Trophy to their forces?

Mr. FELDMAN. OFT worked closely with Rafael, General Dynamics Land Systems (GDLS) and the Israeli Defense Forces (IDF) to integrate the Trophy on the first Full Spectrum Effects Platform (FSEP) vehicle. Independent of that effort, Rafael and GDLS developed an initial integration concept for the Trophy system that would allow a Stryker Infantry Carrier Vehicle (ICV) to fulfill all of its missions with the Trophy system installed. According to the Embassy of Israel Research and Development Attaché the initial low rate production of Trophy will begin by March 2007 with full production by August of 2007. Multiple IDF platforms are being considered for Trophy integration, with the first being Merkava Main Battle Tanks. The first Merkava MK4 equipped with Trophy is expected to leave the production line in January 2008.

Mr. WELDON. There have been statements that there are major collateral damage issues associated with Trophy. Based on your understanding of the data that the Israeli government has shared with you, do you have similar concerns?

Mr. FELDMAN. Of the systems examined for the Full Spectrum Effects Platform (FSEP), Trophy had the lowest potential for fratricide and collateral damage of all of the intercepting systems. This is due to the fact that the Trophy uses a small amount of explosive to fire a limited number of small projectiles towards the incoming round in an extremely focused group. Most of the other alternative systems launch projectiles with large radially exploding warheads. In all cases the Trophy projectiles will have no energy within 250 meters and in most cases, against Rocket Propelled Grenades (RPGs) fired from ground level, the projectiles will be in the ground within 65 meters. First order safety studies done by the Naval Surface Warfare Center, Dahlgren Division (NSWCDD) indicated that troops with body armor would be safe at even closer distances. Additional testing needs to be conducted to understand and characterize the collateral damage to noncombatants at close range (within 65 meters). As part of the proposed Trophy test program, countermeasure characterization and analyses of safety hazards to dismounted troops and civilians would be conducted. In addition, the proposed program will include the initial development of Tactics, Techniques and Procedures by the warfighters to determine how and under what conditions the system should be employed.

Mr. WELDON. What can you tell us about the various testing that the Israeli's have done on Trophy?

Mr. FELDMAN. The Israeli's have conducted a significant amount of testing on the Trophy system. Naval Surface Warfare Center (NSWC), with Rafael and General Dynamics Land Systems (GDLS), has developed a classified summary brief of this testing. The testing includes over 450 test firings in a variety of conditions as well as safety and environmental testing. The table below summarizes the testing that was conducted in conjunction with the Full Spectrum Effects Program (FSEP)/ Project Sheriff efforts.

The Trophy integrated on the FSEP Stryker

Test	Result
Fit and Function	Trophy installed and fit as designed. System functioned as expected.
Electromagnetic Vulnerability (Tailored Environment)	No susceptibilities on Trophy.
Hazards of Electromagnetic Radiation to Ordance (HERO)	Trophy caused no effects to any ammunition types expected aboard FSEP.
Hazards of Electromagnetic Radiation to Personnel (HERP)	Below personnel exposure limits.
Electromagnetic compatibility	No interaction of Trophy with other systems on board vehicle.

The Trophy integrated on the IDF Stryker

Test	Result
Fit and Function	Trophy installed and fit as designed. System functioned as expected.
Flash Signature	The flash signature seen through the periscopes of the vehicle would not cause ocular damage to personnel inside the vehicle. Flash outside of the vehicle would not cause ocular damage.
Acoustic Signature	Adequate hearing protection is provided by the required standard hearing protection worn inside the vehicle.
Blast Overpressure	Minimal blast overpressure inside of the vehicle. Trophy is designed to be operated with open hatches.
Debris Protection	Witness panels proved that blast shields protected crew hatch areas from debris. Trophy is designed to be operated with open hatches.
Live Fire tests conducted at Naval Surface Warfare Center, Dahlgren Division (NSWCDD)	38 tests were conducted with inert Rocket Propelled Grenades (RPGs) being fired at (or in close proximity to) the vehicle Multiple tests were conducted firing 2 RPGs nearly simultaneously—one to each side of the vehicle. The test were conducted against RPG–7 missiles with inert warheads. These RPGs had the same velocity and flight profiles as live RPGs and were certified by NSWCDD Explosive Ordnance Device (EOD) techs as being representative. RPGs were fired remotely from 100 meters away using test stands. 12 of the 38 tests were conducted as the vehicle was moving at approximately 25mph. 35 of the 38[1] tests were rated as a success. System identified, tracked and engaged threat[2] RPGs.

The Trophy integrated on the IDF Stryker—Continued

Test	Result
	Notes: (1) Tests using a "live" Trophy engagement round accounted for 6 tests with 4 countermeasures firing. All other Trophy tests were deemed either a success or a failure by using tracking cameras in place of the "live" Trophy countermeasure and analyzing the system data with the video coverage with modeling and simulation to predict the outcome. (2) System successfully distinguished between RPGs aimed to strike the vehicle and RPG's that would miss the vehicle.

In addition to the tests noted above a structural test was conducted at Aberdeen Proving Ground to determine that the loading imposed by a Trophy warhead would not overstress a Stryker vehicle. A 1/2 kg charge of C–4 was detonated in place of the Trophy warhead and no structural damage was noted.

Mr. WELDON. It has been said that the Trophy testing that was conducted at the Dahlgren Naval Test Center in March 2006 required additional power sources and control panels in the Stryker's crew space. Is this correct, please explain?

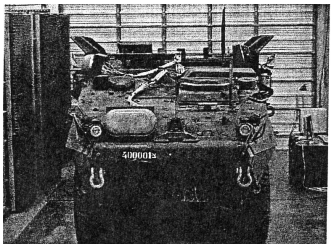
Mr. FELDMAN. Two integrations of the Trophy system were performed to support the Full Spectrum Effects Platform (FSEP) program:

1. The first was the integration of the Trophy onto the FSEP Stryker vehicle conducted in December 2005. In this integration, the Trophy launchers were mounted to the side of the FSEP vehicle. Structural analysis and testing of the launcher mounting points verified that the Stryker hull would not be adversely affected by the Trophy system. The Trophy search radar systems were mounted on each side and at the front and rear of the vehicle in special mounting brackets.

TROPHY ON THE FSEP STRYKER

The internal components of the Trophy system were integrated as part of the FSEP system and were mounted in racks and positions suitable for employment in the FSEP vehicle. The Trophy system was powered by the FSEP system generator. No additional electrical power requirements were needed. This first integration incorporated the Trophy as part of the FSEP system and was reflective of how it would be included in a combat vehicle.

2. The second FSEP Trophy integration was on the Israeli Defense Force Stryker. This integration was conducted to support the tests and demonstration planned at the Naval Surface Warfare Center, Dahlgren Division (NSWCDD) in March 2006. The exterior installation of this system was identical to that on the initial FSEP vehicle installation. The interior components of the Trophy system were rack mounted inside the vehicle to facilitate the necessary testing and analysis. Again, in this installation the Trophy system ran exclusively on vehicle power. No additional power systems were needed. This installation was not intended to represent a combat capable configuration. The installation was developed as a demonstration capability to facilitate the testing, demonstration and extraction of data from the system.



FSEP TROPHY ON THE IDF STRYKER

In addition, to the Trophy integration done to support Full Spectrum Effects Platform (FSEP), General Dynamics Land Systems (GDLS) and Rafael have completed a concept study and analysis of a Trophy installation that would meet all Stryker Infantry Carrier Vehicle requirements. This integration concept utilizes the Trophy system components that have been developed for integration on Israeli Defense Forces (IDF) vehicles.

Mr. WELDON. Is the OFT currently conducting any other efforts in regards to Trophy? If so please explain.

Mr. FELDMAN. Rafael is currently planning to lend OFT an initial production variant of the Trophy system. This variant is identical to the system being provided to the IDF for integration on the Merkava MK4 main battle tank. The updated system includes an autoloader, ruggedized radars and electronics, and an updated countermeasure design. This system will be integrated on the Wolf Pack platoon Cougar vehicle. As part of this effort OFT, the IDF, Rafael and GDLS will establish the plan to ensure that appropriate testing and safety analyses are conducted to demonstrate the capabilities and limitations of the Trophy system.

The current plan is for the testing efforts to be completed in time for Trophy systems to be used as part of the Wolf Pack Platoon experimentation in January of 2008. This proposed effort would be sufficient to demonstrate Trophy applicability on both wheeled and tracked vehicles.

Mr. WELDON. Can you identify a proven, lightweight and low cost RPG defeat system that provides protection for vehicles, including light tactical vehicles, without fratricide that is made in the USA?

Mr. FELDMAN. Although there are several United States systems that have been demonstrated to various degrees, none meets all of the above requirements. All US systems that have been examined by the Office of Force Transformation (OFT) require significant further development and testing.

QUESTIONS SUBMITTED BY MR. BRADLEY

Mr. BRADLEY. Can you identify a proven, lightweight and low cost RPG defeat system that provides protection for vehicles, including light tactical vehicles, without fratricide that is made in the USA?

General SORENSON. To date, no low cost, lightweight US APS sub-system has been fully developed, integrated, and tested on a current ground combat or tactical system. Current systems that might be available require significantly more testing and refinement to prove their capabilities against all threats of interest. In the past, Army Science and Technology program has studied at a number of approaches to APS in programs such as Integrated Army Active Protection (IAAPS), Close-in Active Protection System (CIAPS), Full Spectrum Active Protection System (FSAP) and Full Spectrum Active Protection Close-in Layered Shield (FCLAS). Both CIAPS and FCLAS investigated the possibility of integrating active protection on light tactical vehicles (HMMWVs, trucks, etc). There are significant challenges to overcome with regards to putting APS on a tactical vehicle such as: integration (space, weight, power and cooling—(SWAP–C)), lack of armor to defeat (catch) threat debris and capability to provide 360 degree protection. To date, no APS has been able to overcome all of these challenges for tactical vehicles.

Mr. BRADLEY. Can you identify a proven, lightweight and low cost RPG defeat system that provides protection for vehicles, including light tactical vehicles, without fratricide that is made in the USA?

Dr. BUHRKUHL. There is currently no "proven" lightweight Active Protection System (APS) for either combat or light tactical vehicles. All the systems under development require much more refinement and testing. While these candidate systems under development may have the potential to meet the proven, lightweight and low cost criteria, more development, testing, and certification is needed to prove that potential. Specifically, these candidates include: The Defense Advanced Research Projects Agency's (DARPA) Iron Curtain APS, recently demonstrated on a High-Mobility Multipurpose Wheeled Vehicle (HMMWV); U.S. Army Tank Automotive Research, Development and Engineering Center's (TARDEC) Tactical RPG Airbag Protection System (TRAPS) demonstrated on a HMMWV in 2005; and the Aviation and Missile Research, Development and Engineering Center's (AMRDEC) Close-In Active Protection System (CIAPS II) planned for demonstration on a HMMWV in FY07.

QUESTIONS SUBMITTED BY MR. JONES

Mr. JONES. In the spirit of fielding a system as soon as possible, and if the above information is accurate, would your office support funding and further development of a system like FCLAS?

General SORENSON. FCLAS is one of the active protection (AP) solutions the Army S&T community assessed for vehicle platform protection against close-in fired Rocket Propelled Grenades (RPGs) and man portable Anti-tank Guided Missiles (ATGMs) that is in the early stages of development. FCLAS has undergone range testing of a proof-of-principle prototype design with some success in defeating current threat RPGs during testing. The system experienced radar multipath (i.e., a propagation phenomenon that results in false targets and signal interference) as a result of ground clutter and will have to go through a significant redesign to correct this condition before it would be considered adequate for a ground vehicle.

The current FCLAS configuration presents an integration burden and adds significantly to the system weight. FCLAS autonomously conducts surveillance with the nose cone sense and tracking radar for target acquisition, tracks the threat, launches, fuses, and detonates the countermeasure to defeat the incoming threat. The user is provided control over which tubes can protect the vehicle via a system controller. This capability prevents an FCLAS round from operating in areas where dismounts are known to be. The system is envisioned to be effective against hand held HEAT (i.e. RPGs and man-portable ATGMs) but some vehicle armor will be necessary to protect the occupants from residual debris after threat intercept.

The FCLAS short-comings are: 1) the complexity of mounting and space required to integrate a large number of launchers; 2) side-firing warhead creates large hazard area; 3) supply chain requirement for such a large quantity of interceptors; 4) loss of sector coverage once a countermeasure is fired (no coverage for near simultaneously fired threat in the same azimuth); and 5) no growth potential for long range intercept of large anti-armor threats.

The FCLAS is not ready to hand over to the US Army Test and Evaluation Command for testing to assess its capabilities, limitations and level of safety. Any APS system being considered for fielding would have to be tested to verify the developer's claims, check compatibility, and ensure Soldier and noncombatant safety when the system is being used in environments and conditions like those it will be exposed to in combat. This testing would include a test to define the potential hazard to dismounted troops and noncombatants who may be in the vicinity of the vehicle.

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