COMMERCE, JUSTICE, SCIENCE, AND RELATED AGENCIES APPROPRIATIONS FOR FISCAL YEAR 2008

THURSDAY, MARCH 8, 2007

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:05 a.m., in room SD–192, Dirksen Senate Office Building, Hon. Barbara A. Mikulski (chairman) presiding.

Present: Senators Mikulski, Inouye, Reed, Stevens, Shelby, and Hutchison.

DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

STATEMENT OF VICE ADMIRAL CONRAD LAUTENBACHER, JR., ADMINISTRATOR

STATEMENT OF SENATOR BARBARA A. MIKULSKI

Senator MIKULSKI. Good morning and welcome to the second hearing of the Commerce, Justice, Science Subcommittee. As I said in the first hearing, the themes of the subcommittee will be innovation, security, and accountability. Today's hearing will focus on two of the premiere agencies that promote innovation in our society and using the principles of the gathering storm, which is that innovation rests on research, discovery as well as on education. We are looking forward to hearing from the National Science Foundation (NSF) as well as the National Oceanic and Atmospheric Administration (NOAA).

Just a brief announcement before I go more deeply into my statement and listen to our ranking member. On March 25, the subcommittee will conduct a classified hearing on the Federal Bureau of Investigation (FBI), which will deal with their role in counterterrorism. We remember that after 9/11, we chose not to create—but an agency within the agency. There are aspects of the agency's law enforcement responsibilities that are deeply involved in the global war against terrorism. We will be holding traditional public hearings but we will also be holding classified hearings. So we want to alert the members of the very important meeting with the FBI.

But today, we're examining the budgets for the National Science Foundation and NOAA, focusing on innovation, education, and ac-

countability. This isn't about line items in the budget. It's about our country and how we're going to compete in the global economy. It's about science. It's about the climate crisis. It's about educating our young people to come into the fields of science, technology, and engineering. We're holding this hearing in the midst of an awakening in this country about these particular issues. We all know that the issue just of climate—the climate crisis has resulted in a former colleague winning an Oscar and who knows, maybe a Nobel Prize.

The CJS Subcommittee is the innovation subcommittee in the United States Senate appropriation process.

NSF and NOAA are two key innovation agencies relating to discovery that have power to save lives, protect our communities, protect the planet, and create prosperity for our country. I'm pleased that the NSF is in the President's innovation agenda but I'm sorry that NOAA isn't as well.

As we look at today's hearing, we will be looking at broad topics but I want to assure everyone that one of the areas of focus will be on the climate crisis. The CJS Subcommittee is going to look a little green while we look at the blue planet.

What do I mean by that? I believe that every public policy should be based on sound science. In that way, we can build the coalitions necessary to create the positive and constructive solutions while minimizing at the same time, any economic increase or dislocation.

As we look at the budget requests for NSF and NOAA, we're going to follow the roadmaps given to us by the National Academy of Sciences and the blueprint given to us by the Joint Ocean Commission initiative.

Seventy percent of the Earth is covered by oceans. When you look at us from space, we are big blue. Our Nation's economy depends on the oceans, contributing over $120 billion to our Nation's economy, supporting 2 million jobs. The Senator from Alabama as well as myself, are coastal Senators. We know how important our oceans and our estuaries are. We also know how oceans influence the weather and we know that the focus also of this subcommittee will be a very good weather prediction.

Alabama was hit very hard by Katrina and they worry about every hurricane season. Maryland was hit so hard most recently by Isabel. We need the National Weather Service but we need also those scientists and so on, that can give us early predictions and early warnings but also those kinds of things that mitigate against what is changing in our climate that then could be exacerbating these weather disruptions that we are seeing, from wild fires to hurricanes.

At the same time, we want to know about education, how we're going to be able to attract the best and the brightest into science, engineering, and technology. What are the financial supports that we need to provide to be able to do that? Because that is where our future lies.

At the same time, we'll be focusing on the accountability from the NOAA satellites to the NSF research stations and observatories. We know they are critical tools but we have faced cost overruns and schedule slippages.

So we're here—we're here to really promote innovation. So it is not about agencies. It's not about line items, though it is about that. But it is about our Nation's future. I want to make sure we continue to be a superpower but that our superpower rests on our intellectual capital and the values that we stand for in the world.

Having said that, I turn to my ranking member, Senator Shelby, for anything he has to say.

STATEMENT OF SENATOR RICHARD C. SHELBY

Senator SHELBY. Thank you, Madam Chairman and thank you, Admiral Lautenbacher and Dr. Bement for joining us today.

This is an important hearing, as the chairman has pointed out because it gives me the opportunity to talk about the critical roles the National Oceanic and Atmospheric Administration we know as NOAA and the National Science Foundation, the NSF, play in the economic, scientific, and technology drive the engine of our country's economic future, as the chairman mentioned.

Cutting edge technology creates a better quality of life for all of us. The strategic Federal investment in scientific research, particularly the funding supporting NSF has led to innovative problem solving and technological developments that have dramatically increased the country's economic growth.

NOAA's budget request for the year 2008 is $3.8 billion. This is a decrease of $100 million from the funding level provided in the joint resolution of 2007.

In stark contrast to the budget for NOAA, the budget request for NSF is $6.4 billion, an increase of $513 million over the 2007 joint resolution level.

Our Nation as a whole seems to do more to protect—needs to do more to protect our citizens, not just with storm prediction but also with disaster response and community preparedness. We must improve short-term forecasting and gain a better understanding of long-term climate change. The National Weather Service, which is an important part of NOAA, is key to this understanding. After forecasting, we must explore what can be done in advance communications so that warnings can reach communities quicker. We must find better ways to respond. Emergency coordination after a severe storm is a critical but often overlooked function in saving lives.

Last Friday, as a lot of you know, my home State of Alabama was devastated by a storm system that spawned killer tornadoes—I believe it was Thursday that claimed the lives of 10 people and destroyed hundreds of homes and a school and severely damaged another school. In southeast Alabama's Coffee County, a tornado slammed into Enterprise High School. Not far from the school in Enterprise, an elderly woman was killed by flying storm debris. In west Alabama's Wilcox County, the storm claimed the life of a Miller's Fairy father who was crushed in his home.

While we will never recover from the loss of life, I'm certain that the people of Alabama will work to rebuild even stronger communities and I will continue to do everything in my power to get them the resources that they need to do so. It will take time and resources for the damaged communities to begin to heal and erase the scars of this destruction and death.

The people of Alabama—my State—are resilient and have already begun cleaning up and planning to rebuild. I saw this firsthand when I toured some of the damaged areas this past Saturday.

But how can we ensure that they rebuild safer homes and schools to withstand the next storm? I don't have to be a NOAA weather forecaster to predict that another devastating storm will hit my State again and other States. It's just a matter of time.

Will our citizens be any safer? Hurricanes Ivan, Katrina, and Rita showed us how vulnerable we are to natural disasters. Last week, we were grimly reminded that we still have a long way to go in finding answers to the lessons taught us by those hurricanes. Science, technology, and research hold many of these answers.

Today, Admiral, I will be asking for your support and guidance on how we can better respond to these natural storms, be they hurricanes, tornadoes or what. Last week's storms claimed 20 lives from Alabama, Georgia, and Missouri. We cannot eliminate severe storms—we know that. But we should envision a day when we can live with them more safely.

Overall, I'm concerned about the health of NOAA's science budget. Congress continually receives a budget request from the administration that downplays critical science activities when compared to the previous year's funding levels. The NOAA 2008 request is less than what the agency received in 2007, 2006 and Madam Chairman, even 2005.

In past years, the Joint Ocean Commission has clearly and objectively laid out the budgetary requirements to better support ocean-related science research and education. NOAA's budget request boasts a $123 million increase for ocean-related activities while the National Science Foundation requests to study marine ecosystems and associated human impacts, contains only a $17 million increase. These mighty figures represent only a fraction of the true budgetary needs for the marine community.

I'm pleased to see that the American competitiveness initiative, ACI, has continued to receive support from the administration through the National Science Foundation's budget request. The ACI will keep the competitive edge that our Nation expects in the world economy through research and innovation by focusing on the ingenuity of our people and tying our capabilities to policies that will keep us at the forefront of scientific and technical advancement for generations to come. The ACI provides a tremendous opportunity to maintain our national technological advantage in a more competitive world.

I think—I do not think that it goes far enough to take advantage of our existing Federal investments, however. The funding of ACI includes an increase of $366 million in the research and related activities account in NSF. While this benefits current research, I'm concerned about what we're doing to encourage the next generation of researchers. The long-term vision, Madam Chairman, I believe must include increasing opportunities for colleges and universities across the country to participate in innovation. Many of the funds provided to NSF as part of the ACI will go to traditional research schools that have historically fared well in retaining its research grants.

We should find ways to raise the bar of competitiveness, to reach out to universities that have not traditionally been taken into consideration. We also need to provide the funds to increase the level of science education through better curriculum and inspiring K through 12 science teachers. NSF is the ideal place to begin such a long-term investment for this country.

I'm also concerned about the number of American students enrolling in science and engineering fields of study. The most recent report from the Council on Competitiveness states that foreign students account for most of the growth in Ph.D.s in science and engineering, despite the progress being made by females and minorities in this area. Our lack of new scientists and engineers will eventually become a crisis. We're not attracting enough young students into these disciplines and are relying too heavily on foreign students. These same students return to their homeland where competitive jobs are becoming increasingly available.

To remain at the cutting edge of innovation, I believe we need to act now in cultivating our next generation of engineers and scientists. There is much untapped potential within our own borders. We must make this a priority. The Office of Science and Technology Policy states that the goal of the ACI's goal is not to introduce entirely new Government programs but to increase fundamental research capacity and while there is significant Federal investment in research and innovation, there should be a much broader vision to include agencies beyond those already included in the ACI while not diluting current efforts.

Along those lines, it is discouraging to see that the administration wants to see the Nation at the forefront of innovation yet chooses to exclude NOAA from the initiative. This is perplexing.

NOAA stands out as an international leader in marine and atmospheric science and is a cornerstone of our Nation's research community. NOAA's education and outreach activities appear to fall directly in line with the ACI's educational goals. As I stated here in last week's Department of Commerce hearing, I'm concerned why this agency is not recognized as a candidate for the ACI program.

At this point, I want to thank Chairman Mikulski for having this hearing today and I look forward to the testimony.

Senator MIKULSKI. Thank you very much, Senator Shelby and as usual, I'm going to associate myself with your remarks. There are two key agencies that have, I believe, been left out of the ACI. Certainly NOAA, our flagship agency and on oceans, fisheries, and weather as well NASA. The fact that NASA was left out of ACI is absolutely stunning. There are two colleagues. I'd like to go right to the testimony rather than opening statements and you make them then when you get to the questions and answers. That way, we can move right along. Does that sound good?

Therefore, let's go right to those who are ready to testify. Why don't we start with, Admiral Lautenbacher and go to the National Science Foundation?

SUMMARY STATEMENT OF VICE ADMIRAL CONRAD LAUTENBACHER, JR.

Admiral LAUTENBACHER. Madam Chair, Ranking Member Shelby, Senator Hutchison, Senator Reed, distinguished staff members,

thank you very much for this opportunity to testify on behalf of the President's fiscal year 2008 budget request for NOAA and also thank you for your extremely important leadership in the areas that are under NOAA's responsibility. The support of this subcommittee has been extremely important to our ability to carry out the mission that is required for our country, so thank you very much for your continued support of our programs.

Our programs and services impact one-third of U.S. gross domestic product. Our environmental information is vital to the competitiveness of our country in the world marketplace and to the security and safety of our people here at home. Our investments in research and technology contribute to our Nation's innovative culture and our work to conserve and manage coastal and marine resources ensures economic vitality and enhances U.S. trade.

NOAA has had many notable accomplishments in 2006, some of which are mentioned in my written statement. I would like to take a moment to just highlight a couple of those before I move into the fiscal year 2008 budget request.

Thanks to the funding from Congress, NOAA was able to provide a NOAA weather all-hazards radio to every public school in America. That's 97,000 radios. These radios provide automatic alerts for severe weather, manmade disasters such as chemical spills and terrorist threats as well as Amber Alerts for missing children. While tragedies will still occur as they did last week with the tornado mentioned by Senator Shelby, officials there did receive our warnings on their weather radio and actions were taken. Unfortunately, lives were still lost but many fewer were lost as a result of the warning and the radios and the procedures that were in effect.

In June, the President designated the northwestern Hawaiian Islands as a marine national monument, the largest single act of marine conservation in history. Encompassing nearly 140,000 square miles, the monument includes 4,500 square miles of relatively undisturbed coral reef habitat, home to more than 7,000 species. For the first time, NOAA will play a leading role in managing a national monument. This is an exciting and important opportunity for NOAA.

In December, NOAA achieved initial operating capability for the expanded U.S. tsunami warning system. This means that the most dangerous tsunami generation areas are covered by tsunami deep-water buoy stations and last April, the Nation's two tsunami warning centers became operational 24 by 7. This combination of buoys and around-the-clock warning capability has greatly increased the security of the Nation's people living along Pacific coastlines.

Before I highlight the fiscal year 2008 budget request, I want to draw your attention to the fact that this year, NOAA is celebrating 200 years of science, service, and stewardship. In 1807, President Thomas Jefferson founded the Survey of the Coast to provide nautical charts to the marine community. Safe passage of vessels to American ports and along our coastlines was critical to increasing trade and building the U.S. economy, just as it is today. The Survey of the Coast, along with the Weather Bureau founded in 1870, the U.S. Commission on Fish and Fisheries in 1871, were brought together in 1970 with the establishment of NOAA. We're very

proud to be celebrating this 200-year legacy with Americans across the Nation at events throughout the year.

My written testimony presents the details of the budget as it aligns with five priority areas. First of all, sustaining critical operations, supporting the U.S. ocean action plan, improving weather warnings and forecasts, climate monitoring and research, and critical facilities investments. I will just highlight a couple of those.

FISCAL YEAR 2008 BUDGET REQUEST

The fiscal year 2008 request, as already stated, is $3.8 billion. That does represent a $131 million or 3.4 percent increase over the President's request from fiscal year 2007 but it does represent a $96 million decrease from the fiscal year 2006 enacted level.

The budget is able to provide modest new investments in our priority areas while maintaining critical services. In critical operations, we are providing an increase of $10.1 million for operations and maintenance of NOAA vessels and aircraft. NOAA is also driving innovation in research and monitoring by requesting $3 million in funding to support the further use of unmanned aircraft systems or UAS. With this funding, NOAA will evaluate the benefits and potential of using UAS to collect data crucial for such missions as fishery enforcement, coastal zone studies, and hurricane forecasting.

Continued implementation of the President's ocean action plan remains a priority. The fiscal year 2008 budget requests $123 million in increase to support the plan, including $60 million to advance ocean science and research, $38 million to protect and restore marine and coastal areas, and $25 million to ensure sustainable use of ocean resources.

Specifically, the request includes $16.4 million for the integrated ocean observing system or IOOS for development of regional systems and improved data management and communications. It also includes $8 million for enforcement and management activities in the newly designated Northwestern Hawaiian Islands Marine National Monument.

Funding of $10 million is requested to restore nearly 1,000 miles of habitat for endangered Atlantic salmon and other fish species in New England's largest watershed. Increased funding of $3 million will support Klamath River salmon recovery projects.

The fiscal year 2008 budget also provides $20 million in increases to support better management of fish harvests. This includes $6.5 million in increases to implement the new and expanded requirements of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act, passed last season. It provides $3 million to establish the regulatory framework to facilitate environmentally sustainable commercial aquaculture. Our Nation currently has an $8 billion trade deficit in seafood. Providing regulatory certainty will foster private sector investment in offshore aquaculture, increasing the Nation's competitiveness in the world seafood market and decreasing our reliance on imported seafood.

To improve weather warnings and forecasts, we are requesting a $5 million increase for the support of operation and maintenance of hurricane data buoys and research on hurricane intensity that

will ultimately save lives. More than $23 million is requested to continue strengthening the U.S. tsunami warning program, including an increase of $1.7 million to deploy additional deep ocean buoy stations.

Climate monitoring and research includes a $9.4 million increase to support the development of an integrated drought early warning and forecast system that will also enhance the Nation's food security by providing earlier and more accurate drought forecasts. More than one-half of this increase will be used to research the link between ocean currents and abrupt climate change.

Finally, critical facilities investments include an increase of $20 million for the Pacific Regional Center in Hawaii, which will bring NOAA's Pacific Island programs together in one facility to improve operations and strengthen our performance.

Let me conclude briefly by talking about two oversight issues important to the subcommittee and extremely important to NOAA. There have been many challenges with our satellite programs and the national polar-orbiting operational environmental satellite system (NPOESS) in particular. Let me assure the subcommittee that I and my staff are doing everything we can do to ensure that this program stays on track. We have made numerous personnel and organizational changes. We are implementing every recommendation from the Government Accountability Office (GAO) and Department of Commerce inspector general and I meet with the Under Secretary of the Air Force and NASA Administrator once a quarter at least, to review the program in detail, along with the presidents of the companies who have signed the contract to develop those satellites. Satellites are complex and risky tools but they are vital to all aspects of NOAA's mission. I also want to assure the subcommittee that the Department of Commerce is in the final stages of updating its communication policy, which will ensure for generations into the future that our scientists are able to freely and openly communicate their science to the media and the public. I have been on the record with my scientists numerous times supporting their ability to communicate freely their science activities to the public.

PREPARED STATEMENT

Again, I appreciate the opportunity to testify and I am happy to answer any of your questions. Thank you.

[The statement follows:]

PREPARED STATEMENT OF VICE ADMIRAL CONRAD LAUTENBACHER, JR.

Madam Chairwoman and members of the subcommittee, before I begin my testimony I would like to thank you for your leadership and the generous support you have shown the National Oceanic and Atmospheric Administration (NOAA). Your continued support for our programs is appreciated as we work to improve our products and services for the American people. Thank you for the opportunity to testify on the President's fiscal year 2008 budget request for NOAA.

The fiscal year 2008 President's budget supports NOAA's priority to advance mission-critical services. The fiscal year 2008 request is $3.815 billion, which represents a $131 million or 3.4 percent increase over the fiscal year 2007 request. This request includes the level of resources necessary to carry out NOAA's mission, which is to understand and predict changes in the Earth's environment, and conserve and manage coastal and marine resources to meet our Nation's economic, social and environmental needs. At NOAA we work to protect the lives and livelihoods of Americans, and provide products and services that benefit the economy, environment, and pub-

lic safety of the Nation. Before I discuss the details of our fiscal year 2008 budget request, I would like to briefly highlight some of NOAA's notable successes from the past fiscal year (2006).

FISCAL YEAR 2006 ACCOMPLISHMENTS

President Designates Largest Fully-Protected Marine Area on Earth

Recognizing the continuing need for resource protection, President Bush designated the Northwestern Hawaiian Islands as a marine national monument on June 15, 2006. Encompassing nearly 140,000 square miles, the monument covers an area larger than all of our national parks put together, including 4,500 square miles of relatively undisturbed coral reef habitat that is home to more than 7,000 species. The creation of the largest fully-protected marine area in the world is an exciting achievement and recognizes the value of marine resources to our Nation.

Successful Launch of NOAA Satellite GOES–13 and New Satellite Operations Facility Ensure Continuity of Improved Data Collection

On May 24, 2006, officials from NOAA and the National Aeronautics and Space Administration (NASA) confirmed that a new geostationary operational environmental satellite, designed to track hurricanes and other severe weather impacting the Nation, successfully reached orbit. Upon reaching final orbit, the satellite was renamed GOES–13. This is the first in a new series of satellites featuring a more stable platform enabling improved instrument performance. NOAA instruments were also launched on the European MetOp-A polar-orbiting satellite in October 2006. Combined with NOAA and Department of Defense (DOD) operational satellites, MetOp-A will help provide global data for improving forecasts of severe weather, disaster mitigation, and monitoring of the environment. This launch ushered in a new era of U.S.-European cooperation in environmental observing.

In 2006, NOAA satellite operations and data processing groups began moving into the new NOAA Satellite Operations Facility (NSOF). The NSOF will house the NOAA satellite command and control functions and data and distribution activities that are central to NOAA's mission. The NSOF will also house the U.S. Mission Control Center for the Search and Rescue Satellite-Aided Tracking (SARSAT) program and the National Ice Center (NIC), a joint NOAA/DOD mission to track ice floes and issue warnings to the Nation's maritime force. The NSOF will become fully operational in Spring 2007.

Enhancements to NOAA's Fleet of Ships and Aircraft

Significant progress is being made in modernizing NOAA's fleet. NOAA took delivery of the Fisheries Survey Vessel (FSV) Henry B. Bigelow, the second of 4 new FSV, on July 25, 2006. The Bigelow has high-tech capabilities that make it one of the world's most advanced fisheries research ships. These ships will be able to perform hydro-acoustic fish surveys and conduct bottom and mid-water trawls while running physical and biological oceanographic sampling during a single deployment—a combined capability unavailable in the private sector that will enable research and assessment to be carried out with greater accuracy and cost efficiency. NOAA also took delivery from the Navy of a "retired" P–3 aircraft in response to the hurricane supplemental bill attached to the fiscal year 2006 Defense appropriations legislation. Rehabilitation of the P–3 is expected to be completed by the start of the 2008 hurricane season.

Magnuson-Stevens Fishery Conservation and Management Act Reauthorized

Congress reauthorized the Magnuson-Stevens Fishery Conservation and Management Act (MSA) in December, 2006, and it was signed into law by President Bush on January 12, 2007. The MSA is the guiding legislation that authorizes fishery management activities in federal waters. Enactment of this bill was one of the top priorities of the U.S. Ocean Action Plan. The reauthorized MSA strengthens NOAA's ability to end overfishing, rebuild fish stocks, and work collaboratively on conservation.

U.S. Tsunami Warning System Improved

NOAA designed easy to deploy Deep-ocean Assessment and Reporting of Tsunamis (DART)-II technology, which provides two-way communication between the buoys and NOAA facilities. This technology allows engineers to troubleshoot these systems from the lab and repair the systems remotely when possible. This functionality can minimize system downtime and save money by not requiring a ship be deployed to make minor repairs. The U.S. Tsunami Warning Program also created tsunami impact forecast models for nine major coastal communities, providing information for inundation maps. With the December 11, 2006 deployment

of DART #23 in the Western Pacific Ocean, NOAA achieved initial operating capability (IOC) of the planned expanded U.S. Tsunami Warning Program. NOAA also achieved full 24/7 operations of the Nation's two Tsunami Warning Centers. Plans call for the U.S. Tsunami Warning Network to total 39 DART–II buoy stations by mid-summer 2008 (32 in the Pacific, 7 in the Atlantic).

NOAA also continued to monitor sea height through a network of buoys and tide gauges, collecting information critical to understanding the time of arrival and the height of tsunami waves. In 2006, NOAA completed the installation of eight new National Water Level Observation Network (NWLON) stations to fill gaps in the detection network, bringing the 2-year total to 15. The 15 stations were installed in California, Oregon, Washington, Alaska, Puerto Rico, and the Virgin Islands. These and other new stations brought the NWLON to 200 stations by the end of calendar year 2006. In addition, NOAA continued to upgrade the entire NWLON to real-time status by replacing over 50 data collection platforms.

Red Tide Monitoring Protects Human Health and Coastal Economics in New England

In the wake of the 2005 New England red tide crisis that forced the closure of most shellfisheries in the region, NOAA provided additional emergency funding in 2006 to provide timely and critical information to State managers to build upon long-term research supported by the Ecology and Oceanography of Harmful Algal Bloom, and Monitoring and Event Response for Harmful Algal Bloom programs at the Woods Hole Oceanographic Institution, as well as other partner institutions. In the spring of 2006, NOAA-sponsored monitoring detected rapid escalations of the bloom, which subsequently closed shellfisheries in Massachusetts, New Hampshire and Maine. Additional NOAA efforts allowed New England managers to make more strategic sampling and shellfish bed closures/openings to protect human health and minimize the economic impacts of harmful algal blooms.

National Estuarine Research Reserve System Adds 27th Reserve

On May 6, 2006, commerce and congressional officials dedicated the newest site in the National Estuarine Research Reserve System in Port Aransas, Texas, bring the total to 27 reserves. This new reserve introduces a new biogeographic area type into the system, and adds 185,708 acres of public and private land and water. The reserves are Federal-State partnerships, where NOAA provides national program guidance and operational funding. These reserves serve as living laboratories for scientists and provide science-based educational programs for students and the public.

Wide Application Potential of Unmanned Aircraft Systems Demonstrated

In 2006, NOAA worked with federal and private sector partners to successfully demonstrate Unmanned Aircraft Systems (UAS) technology. NOAA is interested in UAS as a tool to explore and gather data to help us reach new heights in our ability to understand and predict the world in which we live. Use of UAS could help NOAA achieve our mission goals and provide cost-effective means to: enforce regulations over NOAA's National Marine Sanctuaries, conduct long endurance flights for weather, conduct research over areas that pose significant risks to pilots, validate satellite measurements, provide counts of marine mammal populations, monitor atmospheric composition and climate, and hover above hurricanes and gather critical data for input into hurricane models. NOAA will continue to examine how UAS can assist in the collection of environmental data.

Protecting Habitat Essential to Fish

In 2006, over 500,000 square miles of U.S. Pacific Ocean habitats were protected from damage by fishing practices, particularly bottom-trawling. Combined, these areas are more than three times the size of all U.S. national parks. The historic protections, implemented by NOAA with the support and advice of the regional fishery management councils, fishing industry, and environmental groups, made the protection of essential fish habitat and deep coral and sponge assemblages a significant part of management efforts to conserve fisheries in the Pacific Ocean.

NOAA Continues Efforts to Assist with Gulf Coast Recovery Following 2005 Hurricanes Katrina and Rita

In addition to providing the forecasts and immediate response assistance in 2005, following Hurricanes Katrina and Rita, NOAA has continued to assist with Gulf Coast recovery efforts in fiscal year 2006.

NOAA ships and aircraft provided critical response and recovery capabilities in the aftermath of Hurricanes Katrina and Rita. NOAA Ship Thomas Jefferson completed obstruction surveys in the Gulf of Mexico so that busy ports and shipping lanes could be re-opened to traffic. NOAA's citation aircraft flew post-storm damage

assessment surveys along the coasts of the Gulf States. This imagery was downloaded on the NOAA website, enabling emergency managers, local officials and average citizens to inventory damage and prioritize recovery efforts.

NOAA mounted a multi-pronged effort to address fishery-related impacts in the Gulf of Mexico in fiscal year 2006. In August, 2006, NOAA awarded $128 million to the Gulf States Marine Fisheries Commission to reseed and restore oyster beds and conduct fisheries monitoring in the Gulf. In addition, NOAA Ship Nancy Foster conducted a seafood contamination survey for NOAA Fisheries near the Mississippi Delta to spot potential safety issues. This research monitored the seafood coming in from the Gulf to ensure it was safe for public consumption (free of PCBs, pesticides, and fossil fuels).

Collaboration Enables a NOAA Weather Radio to be Placed In Every Public School in America

NOAA and the Departments of Homeland Security and Education worked to get 97,000 NOAA weather radios placed in every public school in America to aid in protecting our children from hazards, both natural and man-made. In many cases, local weather forecast office staff provided expertise in programming the radios to select specific hazards and geographic areas for which the school wanted to be alerted. This multi-month effort required close collaboration between the Departments of Homeland Security, Education, and Commerce (NOAA). This effort enabled schools to connect to part of the Nation's Emergency Alert System and greatly increases environmental situational awareness and public safety.

World Ocean Database 2005

NOAA's National Oceanographic Data Center (NODC) released a major upgrade to its World Ocean Database product. World Ocean Database 2005 (WOD05) is the largest collection of quality-controlled ocean profile data available internationally without restriction. All data are available on-line for public use. Data are available for 29 ocean variables, including plankton data. The database includes an additional 900,000 temperature profiles not available in its predecessor. The database provides the ocean and climate science communities with research-quality ocean profile data sets that will be useful in describing physical, chemical and biological parameters in the ocean, over both time and space. This database is a crucial part of the Integrated Ocean Observing System and the Global Earth Observation System of Systems.

New Arctic Observatory Established for Long-Term Climate Measurements

NOAA's Earth System Research Laboratory in Boulder, Colorado, in conjunction with our Canadian counterparts, established a research site located on Ellesmere Island to make long-term climate measurements of Arctic clouds and aerosols. This observatory supports NOAA's activities for the 2007–2008 International Polar Year.

NOAA Scientists Identify Carbon Dioxide Threats to Marine Life

A report co-authored by NOAA research scientists documents how carbon dioxide is dramatically altering ocean chemistry and threatening the health of marine organisms. The research also uncovered new evidence of ocean acidification in the North Pacific. The report resulted from a workshop sponsored by NOAA, the National Science Foundation, and the U.S. Geological Survey.

First Operational Satellite Products for Ocean Biology

In June, 2006, NOAA began to process and distribute ocean biology products for U.S. coastal waters, using satellite observations. This activity represents a successful transition of NASA research to NOAA operations. These products (e.g. chlorophyll concentration) represent the first satellite-derived biological products generated by NOAA for coastal and open ocean waters. These products are useful in detecting and monitoring harmful algal blooms, assessing regional water quality, and locating suitable habitat for fish and other important marine species. Development of these products prepares NOAA for generating and distributing ocean biology products in the global ocean after 2010.

FISCAL YEAR 2008 BUDGET REQUEST HIGHLIGHTS

Supporting the U.S. Ocean Action Plan

Coastal and marine waters help support over 28 million jobs, and the value of the ocean economy to the United States is over $115 billion. The commercial and recreational fishing industries alone add over $48 billion to the national economy each year. The fiscal year 2008 President's budget requests $123 million in increases for NOAA to support the President's U.S. Ocean Action Plan. This oceans initiative in-

cludes $38 million to protect and restore marine and coastal areas, $25 million to ensure sustainable use of ocean resources, and $60 million to advance ocean science and research.

New investments in ocean science are aimed at monitoring and better understanding marine ecosystems. Increased funding of $16 million is included for the Integrated Ocean Observing System to enhance models and information products through development of regional systems and improved data management and communications. A total increase of $20 million is provided for NOAA research on four near-term priorities established through the national Ocean Research Priorities Plan. An additional $8 million will support exploring and defining areas of the continental shelf that are adjacent to, but currently outside of, U.S. jurisdiction. This work will enable a U.S. claim to these areas and the potential $1.2 trillion worth of resources they are estimated to contain.

The fiscal year 2008 President's budget builds on NOAA's strong record of investing in projects that embody the spirit of cooperative conservation. Projects to protect and restore valuable marine and coastal areas include funding of $8 million for enforcement and management activities in the recently designated Northwestern Hawaiian Islands Marine National Monument, and $10 million for a project to restore nearly 1,000 stream miles of habitat for endangered Atlantic salmon and other fish species. A total of $15 million is provided for the Coastal and Estuarine Land Conservation Program, to assist State and local partners in the purchase of high priority coastal or estuarine lands or conservation easements. Increased funding of $3 million is also included to support Klamath River salmon recovery projects. Finally, an increase of $5 million will support competitive grant programs focused on the Gulf of Mexico Alliance coastal resource priorities, as identified in the Governors' Action Plan for Healthy and Resilient Coasts.

Finally, the fiscal year 2008 NOAA budget provides support to ensure sustainable access to seafood through development of offshore aquaculture and better management of fish harvests. The administration will propose legislation to establish clear regulatory authority and permitting processes for offshore aquaculture. An increase of $3 million is included to establish the regulatory framework to encourage and facilitate development of environmentally sustainable commercial opportunities. In addition, $20 million in increases are provided to improve management of fish harvests, including $6.5 million in increases to implement the new and expanded requirements of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, $3 million for observer programs, and $6 million for market-based approaches to fisheries management. Market-based approaches—such as Limited Access Privilege Programs (LAPPs) that provide exclusive privileges to harvest a quantity of fish—move fisheries management away from cumbersome and inefficient regulatory practices and have been shown to lead to lengthened fishing seasons, improved product quality, and safer conditions for fishermen. The administration has set a goal of doubling the number of LAPPs in use by the year 2010, and the increased funding of $6 million for LAPPs in this request supports that goal. Finally, an additional $2 million in funding is provided to meet the management challenges of assessing and mitigating the impacts of sound from human activities, such as national defense readiness and energy exploration and development, on marine mammals.

Sustaining Critical Operations

As always, I support NOAA's employees by requesting adequate funding for our people, infrastructure, and facilities. NOAA's core values are science, service, and stewardship, as well as people, ingenuity, integrity, excellence, and teamwork. Our ability to serve the Nation and accomplish the missions outlined below is determined by the quality of our people and the tools they employ. Our facilities, ships, aircraft, environmental satellites, data-processing systems, computing and communications systems, and our approach to management provide the foundation of support for all of our programs. Approximately $54.6 million in net increases will support our workforce inflation factors, including $44.9 million for salaries and benefits and $6.6 million for non-labor related adjustments such as fuel costs.

This year, we focus on the operations and maintenance of NOAA vessels and necessary enhancements to marine safety, facility repair, and modernization. A funding increase of $8.3 million will be used to support marine operations and equipment, including $5.6 million for new vessel operations and maintenance and $1.7 million to implement a more effective maritime staff rotation and safety enhancements. This funding will support the operations maintenance for the Okeanos Explorer, NOAA's first dedicated ocean exploration vessel. Increased funding of $5.5 million will support operations and maintenance for NOAA's third P–3 aircraft. NOAA is also moving forward this year with increases in funding for unmanned vehicles,

with $0.7 million in support of Autonomous Underwater Vehicles (AUV) and an increase of $3 million in funding to support the further use of Unmanned Aircraft Systems (UAS). With this increase, NOAA will evaluate the benefits and potential of using UAS to collect data crucial for climate models, weather research, fisheries enforcement, and coastal zone studies.

The backbone of the NOAA infrastructure is our integrated Earth observation effort. NOAA, NASA and the Office of Science and Technology Policy (OSTP) serve as the lead agencies for the Federal Government in developing our U.S. integrated Earth observing strategy. In addition, I serve as one of four intergovernmental co-chairs of the effort to develop the Global Earth Observation System of Systems. Building and maintaining state of the art satellite programs is an important component of NOAA's integrated observation efforts. An increase of $25 million in the Polar Operational Environmental Satellite (POES) program continues support for development and acquisition of polar-orbiting weather satellites to improve weather forecasting and our understanding of the climate. This increase will allow NOAA to complete acquisition of this series of polar satellites and install and maintain instruments important to U.S. Government interests on the European MetOp partner satellite. Following the completion of the POES program, it will be replaced by the tri-agency National Polar-orbiting Operational Environmental Satellite System (NPOESS). This transition is expected in 2013. We will continue to partner with the Europeans on their MetOp satellite as NPOESS replaces our current POES satellites.

Improving Weather Warnings and Forecasts

Severe weather events cause $11 billion in damages and approximately 7,000 weather-related fatalities yearly in the United States. Nearly one-third of the economy is sensitive to weather and climate. Realizing this, NOAA seeks to provide decisionmakers with key observations, analyses, predictions, and warnings for a variety of weather and water conditions to help protect the health, lives, and property of the United States and enhance its economy. Increased funding of $2 million will accelerate research to improve hurricane intensity forecasts through targeted research for new models and observations. Another $3 million will support the operations and maintenance of 15 hurricane data buoys in the Caribbean, Gulf of Mexico, and the Atlantic Ocean. Finally, NOAA continues to strengthen the U.S. Tsunami Warning Program with an increase of $1.7 million to deploy additional deep ocean buoy (DART) stations. Strengthening the U.S. Tsunami Warning Program provides effective, community-based tsunami hazard mitigation actions including required inundation flood mapping, modeling, forecasting efforts and evacuation mapping, and community-based public education/awareness/preparedness for all U.S. communities at risk.

Climate Monitoring and Research

Society exists in a highly variable climate system, and major climatic events can impose serious consequences on society. The fiscal year 2008 budget request contains investments in several programs aimed at increasing our predictive capability, enabling NOAA to provide our customers (farmers, utilities, land managers, weather risk industry, fisheries resource managers and decisionmakers) with assessments of current and future impacts of climate events such as droughts, floods, and trends in extreme climate events. NOAA is building a suite of information, products and services to enable society to understand, predict, and respond to changing climate conditions. These activities are part of the U.S. Climate Change Science Program and are being conducted in collaboration and coordination with our important interagency partners including NASA, NSF, and the Department of Energy. We will continue to expand and improve access to global oceanic and atmospheric data sets for improved climate prediction and development of climate change indicators. NOAA will support the critical National Integrated Drought Information System with increases of $4.4 million to develop an integrated drought early warning and forecast system to provide earlier and more accurate forecasts of drought conditions. This request also supports the administration's efforts to create a U.S. Integrated Earth Observation System. With an increase of $0.9 million, we will support research on water vapor to refine climate models. In support of the Ocean Research Priorities Plan, NOAA will enhance our understanding of the link between ocean currents and rapid climate change with an increase of $5 million in support of research on this topic. Finally, an additional $1 million in funding will provide additional computational support for assessing abrupt climate change.

Critical Facilities Investments

The fiscal year 2008 President's budget request also includes important increases for critical facilities, necessary to provide a safe and effective working environment for NOAA's employees.

Of particular importance this year is the $3 million funding increase to begin design of a replacement facility at the La Jolla Southwest Fisheries Science Center. NOAA is also requesting $20.3 million for continued construction of the new Pacific Region Center on Ford Island in Honolulu, Hawaii. This increase in funding will allow NOAA to complete the exterior renovation of one of the Ford Island buildings, a crucial next step in the construction process.

CONCLUSION

NOAA's fiscal year 2008 budget request provides essential new investments in our priority areas while maintaining critical services, reflecting NOAA's vision, mission, and core values. The work NOAA accomplished in 2006 impacted every U.S. citizen. We will build on our successes from last year, and stand ready to meet the challenges that will surface in fiscal year 2008 and beyond. NOAA is dedicated to enhancing economic security and national safety through research and accurate prediction of weather and climate-related events, and to providing environmental stewardship of our Nation's coastal and marine resources. That concludes my statement, Madam Chairwoman. Thank you for the opportunity to present NOAA's fiscal year 2008 budget request. I am happy to respond to any questions the committee may have.

NATIONAL SCIENCE FOUNDATION

STATEMENT OF DR. ARDEN BEMENT, JR., DIRECTOR

Senator MIKULSKI. Dr. Bement.

Dr. BEMENT. Yes, thank you, Chairman Mikulski, Senator Shelby, Senator Hutchison, and Senator Reed. I am pleased to present the National Science Foundation's (NSF) budget for the next fiscal year. Before I begin, however, I must express my heartfelt appreciation for your support of NSF's research budget in the fiscal year 2007 continuing resolution.

The President's request for NSF is $6.43 billion for fiscal year 2008. This represents a $513 million or 8.7 percent increase over the continuing resolution. Funding at this level will keep NSF on a course set by the President's American competitiveness initiative to drive innovation and sharpen America's competitive edge.

Let me just quickly highlight some of the activities we are emphasizing in the new budget. As the lead agency supporting polar research, NSF will invest $59 million for international polar year (IPY) activities. Climate change research and environmental observations will be a major focus of investigation. The outlines of environmental change from sea ice extent and retreating glaciers to shifting patterns in flora and fauna are already visible in the polar regions, with implications for the rest of the globe. Another research effort will be to explore how life adapts to and survives in the polar extremes. Other major thrusts during IPY will be education and outreach activities.

The budget includes an important new NSF-wide investment of $52 million to develop a next generation of computationally based discovery concepts and tools to deal with complex, data rich, and interacting systems. Cyber-enabled discovery and innovation aims to explore radically new concepts, approaches and tools at the intersection of computational and physical or biological worlds to address such challenges.

Understanding how human activity interacts with the oceans can help ensure that the world's oceans remain clean, healthy, productive, and stable. NSF will invest $17 million in four research areas identified in the ocean research priorities plan as critical near-term priorities, the complex dynamics that control and regulate marine ecosystem processes, variability of Atlantic Ocean currents, the response of coastal ecosystems to a variety of natural events and human influence processes and the development of new sensors for marine ecosystems.

Our request also includes $390 million for nano-technology research. NSF's investment in the interagency national nano-technology initiative will increase by nearly $17 million. We will increase our multidisciplinary and interagency regulatory support efforts that address the environmental health and safety impacts of

nano materials by exploring how nano particles and materials interact with the living world at all scales.

NSF will increase support by $8 million for the experimental program to stimulate competitive research (EPSCoR). EPSCoR investments provide strategic programs and opportunities for participants in States that have historically received less Federal R&D funding to make sustainable improvements in research capacity and national research competitiveness.

We moved EPSCoR to the Office of the Director in order to focus on the research potential and capacity of these States and to integrate this activity across NSF.

Creating a strong science and engineering workforce for the future is vital to maintaining the Nation's competitive edge. NSF will continue to fund a broad portfolio of successful programs that contribute to this goal: CAREER, aimed at junior faculty, advanced technological education aimed at 2 year colleges, Noyce Scholarships for promoting the development of a world-class math and science teaching corp and programs which aim to broaden participation of underrepresented groups and engage a broader spectrum of institutions such as the STEM Talent Expansion Program and Centers for Research Excellence in Science and Technology.

We will fund an additional 200 graduate research fellowships, increasing the total number of students supported to nearly 3,000.

In coordination with the Department of Education, NSF will continue funding for the highly successful Math and Science Partnership Program aimed at improving K to 12 science and math education and teaching. In addition to supporting ongoing awards, approximately $30 million will be available for new awards in fiscal year 2008.

Scientists, engineers, and students need world-class instruments with the best capabilities, the farthest reach, and the finest accuracy. NSF proposes an investment of $32.75 million to initiate advanced LIGO, a gravitational wave observatory that will improve detection rates by a factor of 1,000 over current Earth-based facilities. Observations made with this instrument could revolutionize our understanding of the universe.

The development of a petascale computing capability and world-class cyber-infrastructure will continue to be a high priority. These investments will significantly augment computational and networking capabilities available to scientists and engineers in all disciplines.

The Foundation strategy for research and education must be to keep all fields and disciplines of science and engineering healthy and strong. At the same time, we must be constantly alert to research that has the potential to transform the world. This is the kind of research that can overturn accepted paradigms and open entirely new fields for exploration.

The National Science Foundation looks to the future with these important considerations in mind and we have crafted our fiscal year 2008 budget to address them.

PREPARED STATEMENT

Madam Chairman, thank you for the opportunity to present a brief overview of our request and I look forward to any questions you may have.

[The statement follows:]

PREPARED STATEMENT OF DR. ARDEN L. BEMENT, JR.

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Madam Chairman, thank you for the opportunity to present a brief overview of our request. I look forward any questions you might have.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION TSUNAMI WARNING PROGRAM

Senator MIKULSKI. Thank you very much for your excellent testimony. I'm going to get right to a couple of the questions that I know are pressing in my mind and one is the whole idea—I know of the—kind of the mantra, if you will, of NOAA, saving lives and saving livelihoods. I just want to note the early part of your testimony about early warning for weather. The school alerts. Admiral, I think this is an example of what NOAA develops, works with the private sector then with the larger public sector, truly that develops products, creates jobs, and saves lives and saves livelihoods.

My question then to you is, I'd like to go right to weather warning systems. In this year's budget, you have a set of requests for ensuring the tsunami warning system. We all note when the terrible tsunami hit Indonesia and other parts of the Pacific, the world was alarmed and wondered what it would mean to Hawaii, to other places in the Pacific rim. Could you tell us the status of where you are on the tsunami warning and could you also tell us where we are in terms of having enough resources to implement that because this Pacific is pretty big and what about, also the east coast?

TSUNAMI WARNING SYSTEM

Admiral LAUTENBACHER. Yes, thank you. I'd be happy to. First of all, it's a result of the request that we turned in, the strong support of Congress to provide the money and the authorization for us to do this work. We have right now in place 25 deep-water buoys that are spaced around the Pacific and into the South Pacific as well as the Atlantic and the Caribbean area to provide warnings for the gulf coast and east coast.

So that represents an increase from 6 to 25. We had six experimental buoys in the water at the time of the Indonesian earthquake, buoys off of Alaska and off of the Aleutian Islands and off of the west coast. We now have 25 of these deepwater buoys to protect us from all directions. Thanks to funding from Congress, we also have 24 by 7 coverage, so we have people on duty at the warning centers around the clock that provide those warnings. We are

equipped today to provide the warnings to the Atlantic, to the Pacific and Pacific rim and we now have, from our international efforts, a buoy in the Indian Ocean and we are working to provide the coverage for the Indian Ocean for a worldwide system. We're also building more interest, I think, from communities to become tsunami ready. We've had 10 to 20 new communities join that program.

Senator MIKULSKI. Do you have enough? In looking at this year's appropriations to keep the tsunami program on track?

Admiral LAUTENBACHER. We do. If we are allowed the increase of the $1.7 million, that will provide us the ability to complete the program and to maintain the continuity of it into the future.

SUSQUEHANNA BASIN MONITORING SYSTEM

Senator MIKULSKI. Something that is very important to us in the Northeast, is the Susquehanna River Basin, which stretches from upstate New York, goes through Pennsylvania, touches a bit on Delaware but mostly New York and Pennsylvania and comes into Maryland and converges at a place at Port Depost, that without this Susquehanna warning system, could have tremendous loss of lives and an inability to manage it. I understand that the Susquehanna Basin monitoring system needs upgrading but it is never included in the budget. Can you tell me where we are on that and we do know it needs to be modernized. It was originally put into play in the 1960s and technology has changed and the weather has gotten more severe.

Admiral LAUTENBACHER. It does need to be modernized. We work with the United States Geological Survey (USGS) to try to ensure that there is funding in those areas. Many of our systems need improvement for monitoring of streams. We have some programs to improve the technological capability of these monitoring stations. Our AHPS Program, which is the advanced hydrological prediction system, makes use of these gauges so we've made some increases but more remains to be done in that regard.

Senator MIKULSKI. I would really like, as part of the excellent work that you're already doing, to include funding for this. We're talking about maybe $2 or $3 million that impact four States and billions of dollars of private property and impacting also on Aberdeen Proving Ground. And I would really like you to take a look at that as we move through this and look ahead.

NATIONAL ACADEMY OF SCIENCES REPORT ON CLIMATE CHANGE

Let me get then to the whole issue of climate change, studying our planet and also the oceans. The National Academy of Sciences has issued a report encouraging that NASA and NOAA sign a memorandum of agreement and follow about 17 different projects to really coordinate and have a synergistic leveraging effect on Earth science and encourage this. Have you had a chance to review this document? Your reaction to this document? Where is this heading with Dr. Griffin and where would this be in this budget because again, following the reports of a National Academy, which means it has been peer reviewed recommendations. It's not what anyone of us wants but it seems like it would really leverage what we need to know and play a major role in climate change.

Admiral LAUTENBACHER. It's a very important study and it was one that was chartered and supported, obviously, by NASA and NOAA. I have read the report. I agree with the thrust of the report. Right now, both within NOAA and NASA, we are going through the detailed recommendations and looking at ways that we can bring them into effect. It's an important study for us, for both agencies. I have talked with Dr. Griffin about it and we take it very seriously. It did not come out in time to affect the fiscal year 2008 budget but it is going to be an important factor as we go through this year developing it.

Senator MIKULSKI. Well, NASA itself is under tremendous stress, as my colleagues here at the table would attest to, from exploration, completing the space station as well as science and we work very closely together but in order to leverage every nickel from every agency, to accomplish a science budget, I think it's really important that NOAA and NASA will get at how they can literally leverage each other, particularly in the science area, while we look at completing the very important responsibilities for this station and a crew return vehicle. So we've got a lot here that we're juggling, including my time.

I have other questions. We haven't forgotten the NSF. It shows you how important this hearing is. Senator Shelby, I'll turn to you.

AMERICAN COMPETITIVENESS INITIATIVE

Senator SHELBY. Thank you, Madam Chairman. As I mentioned in my opening statement, Admiral, I'm concerned that NOAA was noticeably excluded from the American competitive initiative, the ACI program. NOAA stands out as an international leader in marine and atmospheric science. We all know that and it's in line with other advanced science agencies that are part of ACI. Admiral, from what you know of ACI and I think it's a lot, what aspects of NOAA do you feel have the potential to be part of this innovative program?

Admiral LAUTENBACHER. I thank you, Senator Shelby. I think that we are part of the American competitiveness initiative. Obviously, not in the funding arena as most people know——

Senator SHELBY. Well, you are and you're not but go ahead.

Admiral LAUTENBACHER. We are and we're not and the issue was to talk about basic research. NOAA doesn't have a definition of basic research so there is an issue with that. But we do have a substantial and very important R&D budget of around $500 million, depending on what categories you use and we are absolutely essential for the competitiveness of our economy. As I pointed out, one-third of our GDP depends on the kinds of environmental information that make our country competitive in a variety of industries.

We have looked very carefully at things like aquaculture. Here's an area where we need to be innovative. We are, in fact, going to try to partner with the National Institute of Standards and Technology (NIST), to leverage some of the money that is in that budget because an $8 billion trade deficit is an important area of our economy so we are looking to try to provide more innovation in building the kinds of tools for sustainable aquaculture, for doing it in an environmentally sensitive way. We're looking at trying to be innovative, given the importance of the satellites.

We have taken the newest instruments that NASA has developed and have figured out how to assimilate them into our weather models and our climate models so we're getting right on the front edge of research to ensure that it provides benefit for the country. We are asking this year to experiment and use unmanned aircraft to help us gain more information. The Arctic is a region that would be very useful for us to work in with these kinds of instruments and certainly, severe weather. Hurricanes, storms at sea and that sort of thing. Phased array radar—as we talked about trying to increase the warning times. Remember that in 1985, our warning time for tornadoes was negative. It was minus 2 minutes to warn people about tornadoes. Today, it's an average of 13 minutes or so and the Enterprise, Alabama tornado was a warning time of about 18 minutes. That's because of the technology innovation that has been created from our research.

We're looking now towards dual polarization radar systems that will help improve that warning time and in the future, we have a program for phased array radars. These are the radars that the Navy has on their ships at sea, which could double for Federal Aviation Administration (FAA) types of radars as well as allow us to gain significant advantage in the warning time that may save more lives. So those are a few of the things that we're working on and there are many others, Senator. Thank you for the question.

NATIONAL SCIENCE FOUNDATION'S EDUCATION PROGRAMS AND AMERICAN COMPETITIVENESS INITIATIVE

Senator SHELBY. Dr. Bement, as I mentioned in my opening statement, the ACI provides substantial dollars on the research side of the National Science Foundation (NSF), yet hardly touches the education efforts at NSF. One of the goals of the ACI as well as the Augustine report, is to develop a sustained pipeline of highly trained U.S. students in scientific fields. You're very aware of this. I'm disappointed that the potential for educating our students to be the scientists and engineers of the future has not been a highlight of NSF's portion of the ACI. Can you take this opportunity here today to talk about the program, such as the math and science partnerships, HBCU and other K through 12 programs where NSF can achieve the goals our country needs to stay on the cutting edge and remain competitive?

Dr. BEMENT. Thank you for that question, Senator Shelby. Obviously I feel very strongly about education because educating the workforce of the 21st century is a major goal of the ACI.

Senator SHELBY. It's the key to our survival economically and our standard of living, isn't it?

Dr. BEMENT. Absolutely. And you know, throughout all of our programs, even our research programs, we include education components, because those who do the research are graduate students who eventually move into the private sector or academia and become the leaders of our innovation system. So it's critically important and we try to keep our program in balance at all levels, K to 12, undergraduate and graduate education. The 2008 request was structured at the time that the Academic Competitiveness Council was formed in response to the Deficit Reduction Act of 2005 and the sense of that legislation was that programs should be increased

on the basis of rigorous evaluation and evidence that they were meeting their goals.

All of our programs are evaluated. Some were evaluated at the time the budget was formulated. Some are scheduled for evaluation this year and next year. You'll note in our budget that the programs that had been shown effective were plus-ed up significantly by 10 percent or more. There were some that were flat funded, pending evaluation this year and next and hopefully those budgets will increase after they are shown to be effective.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION DISASTER RESPONSE CENTERS

Senator SHELBY. In recent years, NOAA has greatly improved, as we know, the timeliness of severe weather warnings. You just mentioned this and I think you will continue to make progress there. It saves lives. Yet despite this warning, many lives are still lost as we know this last week. Effectively safeguarding our citizens from natural disasters involves more than just improving warning times. It requires better education, better planning, better infrastructure, and better emergency response. Does it not? I will—you said yes, didn't you?

Admiral LAUTENBACHER. Yes, absolutely.

Senator SHELBY. Last year, NOAA explored the viability of having a Disaster Response Center on the gulf coast, a NOAA center that can effectively respond to weather and marine disasters as well as serve as a focal point for innovative research that prevents future storms from inflicting such deadly results in the gulf. I think it is necessary. In your opinion, what would such a gulf center need to effectively meet the full spectrum needs of mitigating disaster response before, during, and after these weather events? Because they will occur.

Admiral LAUTENBACHER. Yes, sir. They will occur. And we found out that we didn't have a really coordinated response effort to Katrina. I'm very proud of what we did in the gulf in restoring and providing our services down there but the object of having a node that is in the area that has a trained staff, that has the kind of the facilities that are available in an area that is close enough to bring them together.

Senator SHELBY. Does that make a lot of sense?

Admiral LAUTENBACHER. It makes a lot of sense and we are working on regional types of initiatives within NOAA and this region would be obviously very critical to us.

Senator SHELBY. Thank you.

Senator MIKULSKI. Excellent point. Senator Reed, from an ocean State?

REGIONAL FISHERIES COUNCIL

Senator REED. Thank you very much, Madam Chairman and let me first thank Admiral Lautenbacher for the decision by NOAA to evaluate Rhode Island for the home port for the *Okeanos Explorer*, which is a ship that will be, I think, very, very useful in terms of your mission and also for the proposed increase in funding for ocean exploration in this budget. Thank you very much.

Let me turn, Admiral, to a question about the Regional Fisheries Council. Since 1977, the budgets for these councils increased about 25 percent whereas the National Marine Fisheries Service (NMFS) budget went up about 225 percent. We're asking the councils to do more and more with the Magnuson Act reauthorization. Could you tell if there is going to be a funding increase in this budget for regional fisheries councils?

Admiral LAUTENBACHER. There is an increase and it is a modest increase based on the increment that I was able to get for the Magnuson-Stevens reauthorization, so part of the funding that we've talked about there is going to improve the science, and the support that each of these fishery management councils must use to meet the requirements of this bill. It's important to us to maintain fishery councils that are capable of doing the work.

Senator REED. It seems that they have more responsibilities but the resources aren't concomitant with that responsibility, is that fair?

Admiral LAUTENBACHER. I would say that it has been difficult over the years, to keep pace with the increasing administrative and scientific requirements. I'm very sensitive to it and would like to do more in that area.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION SEA GRANT PROGRAM

Senator REED. Thank you. The NOAA Sea Grant Program, for years, has been the mainstay of a great deal of research. In fact, I think at the University of Rhode Island is one of your largest programs and the program took a significant cut in fiscal year 2006 and the President's budget this year is simply a repeat, about $55 million. With increased discussion of ocean research, hurricane effects, tidal issues, all these things, why can't we do more with respect to sea grant funding?

Admiral LAUTENBACHER. Well, quite frankly, I would like to see a larger sea grant budget. We were very sensitive to the congressional compromise, I guess, at the level that we have today so I'd like to keep working on trying to build the sea grant budget but looking at the lay of the land and the priorities and what would be supported at levels we have today, continuing the congressional appropriated level was felt to be the best approach, given the resources that we have.

Senator REED. Now, one following question—I understand National Marine Fisheries Service put out a request for funding proposals for research and those proposals were presented—at least offered to sea grant programs but I understand they are being offered to consulting firms instead of the sea grant programs. Is there a reason why the sea grant program wasn't used?

Admiral LAUTENBACHER. NOAA offers numerous funding opportunities that directly relate to our core mission, including grants for cooperative research. In June and December 2006, NOAA published in the Federal Register Omnibus notices of consolidated sources of program and application information related to its competitive grant and cooperative agreement award offerings for fiscal year 2007. In addition, in February 2007 NOAA augmented the Omnibus notices by publishing in the Federal Register a Broad

Area Announcement (BAA) to request proposals for special projects and programs associated with the agency's strategic plan and mission goals as a mechanism to encourage research, technical projects, or sponsorships that are not normally funded through our competitive discretionary programs. While each grants program has specific guidelines regarding eligibility, in general, researchers at Sea Grant colleges are free to compete for NOAA funding.

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH

Senator REED. Thank you, sir. Dr. Bement, thank you for your testimony and for your leadership and you mentioned EPSCoR—that's to us a very important program. We fought hard to get EPSCoR into Rhode Island and the thought was and I think the theory is that EPSCoR would allow a much more active participation in the national research funds of NSF.

It seems, however, that the NSF distribution of research funds has changed little over 25 years, that there are States that continue to have a lion's share and then many other States are still at 10 percent or less. In fact, one-half the States are 10 percent or less of the funding and my sense was when EPSCoR was rolled out, it was to give you a big footprint all across the country and not just to particular areas of research. So are you evaluating ways in which every State can participate more aggressively in the NSF funding through EPSCoR?

Dr. BEMENT. Yes, we are, Senator Reed. I should point out that I felt that EPSCoR could be more strategic, more effective, so we moved the EPSCoR office into the Office of the Director and the reason that EPSCoR serves and interacts with all the divisions and all the research offices in the Foundation. So it provides much closer coordination through the NSF senior management team, not just rely on the base funding for EPSCoR, which is largely through the research infrastructure improvement program, but to use those improvements to be more effective in addressing the rest of our research budget, which is the $4.8 billion part.

We will be looking at the strategic initiatives to do that and we did have a workshop just last year where we brought the leadership from EPSCoR to the Foundation and they developed their report for "EPSCoR 2020". So that report is informing us on some of the initiatives, but we'll go beyond that report as well.

Senator REED. Thank you very much, Doctor and it's an important program and I encourage you to keep looking at in strategic dimensions. Thank you, Madam Chairman.

Senator MIKULSKI. Senator Hutchison.

WEATHER MODIFICATION RESEARCH

Senator HUTCHISON. Well, thank you, Madam Chairwoman. I think we have discussed a lot in the area of hurricane notification and certainly better timing of notification of hurricanes and violent storms; but in the last Congress, I tried very hard to work with NOAA on weather modification research and NOAA, frankly, blew me off, honestly—didn't care about it, didn't want it. They suggested that we go to the Office of Science and Technology Policy (OSTP) in the White House. OSTP didn't really want it either. My question is, am I missing something? Why wouldn't we want, in ad-

dition to knowing in a timely manner, how we protect against these violent weather storms, tornadoes, and hurricanes, why wouldn't we study if there are ways to modify these types of occurrences and do the research on weather modification in how one area affects another area, either for the better or the worse?

Admiral LAUTENBACHER. Certainly it's an important topic. If you ask our meteorologists and our folks that look at the kinds of things that we do—that we are charged to do in our authorization bills and appropriation bills, obviously the warning and the observation of current storms needs to take top precedence because we can't neglect our ability to be able to warn citizens and save lives today.

Senator HUTCHISON. Of course, of course.

Admiral LAUTENBACHER. And then the next point is that you start looking at the maturity of weather modification as a science and it's really in a basic phase of science. I don't want to force it off on my colleague here, who does basic science——

Dr. BEMENT. I'm glad you did.

Admiral LAUTENBACHER. But in all seriousness, NOAA doesn't engage in the giving of grants that are in the experimental, very grade level of asking fundamental questions. Those kinds of things are done by the basic research agencies and what we felt was that OSTP, as the head of the science enterprise for the U.S. Government, would be in a better position to allocate, to decide how to deal with the issue. I think it is an important issue and certainly we did not try to blow it off at all. I think we need to worry about it and think about it. Other countries do and we should do it as well.

Senator HUTCHISON. Well, where should it go, and where will it get thorough attention? OSTP didn't pick it up. We couldn't—actually, they stopped the bill, to be honest. So where should it go? Should it go to the National Science Foundation? Is that something that would fit there? It seems to me that it would more likely fit in NOAA but putting it in the White House where they have so many other areas of need, didn't seem to work either. Can either of you, Dr. Bement, can you suggest if there is something——

Dr. BEMENT. Senator, there are many ways in which NSF and NOAA collaborate closely and especially in the area of understanding extreme weather formation, hurricanes, and cyclonic events, and also research on climate change. We are very much interested in how best to model the intensification of hurricanes, and we do that very well, but also to deal with other cyclonic behavior like tornadoes, to understand how they form and how they propagate. It is that type of basic research and the cyber-infrastructure that goes with modeling and simulation that will inform us on how to mitigate these very extreme weather events and if modification is the only means of mitigation.

Senator HUTCHISON. Do you think that we could work to bring our bill back and is there a way to bring in NSF and NOAA, together, where I think there is more collaboration—the White House, OSTP, doesn't really—they don't have grantmaking. They're not on the ground studying the research and looking at ways to better notify residents of coming storms and floods. Is there a potential that we could work together to carve an area where we not

only look at notification, which is absolutely the first thing, I understand, but also whether research holds potential that we would lessen the impact of a hurricane forming 1,000 miles out in the ocean?

Dr. BEMENT. Well certainly, Senator, speaking for the National Science Foundation, we would continue to encourage grants from the universities and colleges to do research on that topic. We would certainly make that information available in the open literature.

Senator HUTCHISON. My question is, could I work with you, then, Dr. Bement, to try to set something up that might create a focus there at the NSF?

Dr. BEMENT. I'd be delighted to work with you.

Admiral LAUTENBACHER. If you'd allow us, we'll work with the Office of Science—we can work together, too, if you can provide for——

Senator HUTCHISON. I think that would be helpful since you have so much in that area.

Admiral LAUTENBACHER. We can continue this further than I thought it had been.

RENEWABLE ENERGY RESEARCH

Senator HUTCHISON. Okay. Let's work on that. The other area I want to quickly just ask about is, I am working on a bill now that would establish a council on renewable energy, which would again bring together a focus on research on renewable energy, including wave technology and wind technology, wind energy created in the oceans or the gulf. Do you think that we could do something by bringing all of those entities together? My bill actually puts in either the National Science Foundation or the Federal Lab Consortium for Technology Transfer but do you think that there is a potential and maybe you're already doing it and I would like to know, on wave technology for creation of energy and wind energy in the water as opposed to wind on land?

Admiral LAUTENBACHER. Yes, we are the definer of the resource, so to speak. We have models, wave models and we have the National Oceanographic Data Center that produces reams of data of interest. We don't do the actual research on the energy devices themselves but we're a part of what needs to come together.

Senator HUTCHISON. But you could provide the data on what kind of power would be in the different parts of the——

Admiral LAUTENBACHER. We could tell people where—what sorts of energies are available in different parts of our coasts at what times of the day, et cetera, how things change. We also do that for wind, so if you want to place a wind farm somewhere, you can come to NOAA and see where there are winds and what the potential capability from them is. The same thing works for waves but the actual research on the instruments themselves that you would use to harness the energy would be done by the Energy Department or by some other outfits in the academic or private sector.

Senator HUTCHISON. Okay. We're going to be working with the National Science Foundation on that as well. Thank you, Madam Chairman.

INTERNATIONAL POLAR YEAR AND THE ALASKA REGION RESEARCH VESSEL

Senator STEVENS. Thank you, Madam Chairman. I have noticed that there is a $59 million request for the IPY activities in the budget. I'm sure that you both know that great, desirable Alaska and the Alaska Delegation that this money be used in a way to try to bring about some understanding of the climatic activities in Alaska and really, also the social challenges that we face because of those changes.

We had a hearing last year on this matter and we had hopes that these monies would be spent in that way. I don't know what the plans are and I'd be happy to learn them.

I do hope that you will acknowledge the role that Alaska must play in the IPY activities. I also note the President now has a request for NSF for $42 million for the construction of a new Alaska region research vessel. This will replace the *Alpha Helix*, which is a ship that has been dedicated to science. The replacement will literally be a floating laboratory focusing on chemistry, biology, physics, oceanography, geology. The President had $56 million in the 2007 budget. This year there is $42 million. Had the first been available—this $42 million would have completed construction on that vessel. Unfortunately some people around here think that that is an earmark for Alaska. It's part of the budget and I'm very disturbed at the way it's been viewed by some people.

I also want to note that we have great hopes that NOAA will really use some of these funds available in the President's budget. You've got a 3.4 percent increase. I know, however, that it is still below the enacted level for 2006 and 2007 but we have some enormous changes taking place. One-half the fish that we provide from domestic sources are harvested off the North Pacific of my State and we are very fearful that the NOAA programs that have been ongoing, including the monitoring of sea life and research—we now have a petition to declare the beluga whales endangered in the Cook Inlet. They are there when the fish are there. They follow the salmon. But now we've got lawsuits about that, too. I do think that—you mentioned the Magnuson-Stevens Act—money—I do think that we have to continue our protection against overfishing those areas but I do hope that—my question for that introduction is, what are you going to be doing about IPY and what's the situation with regards to the ship?

Dr. BEMENT. Thank you very much, Senator Stevens. IPY is a 2-year activity but we hope to put in legacy systems that will continue research over the next 50 years on some of these global issues, including sustainability. With regard to the State of Alaska, I have been working, and so has our Office of Polar Programs, with the University of Alaska at Fairbanks. We've been trying to get a closer partnership with the Barrow Climate Change Research Facility. So some of the infrastructure elements that we'll be investing in under the International Polar Year will be first of all, an Arctic observing network that will be linked in with other countries involved in IPY, and this Arctic observing network will be part of what we call SEARCH, which is the study of environmental Arctic change, and hopefully, will eventually be part of GEOSS, the global

Earth observing system of systems. That is a platform to build upon.

Second, we need to be able to measure climate change on a year-round basis, not just in the summertime. At Toolik Lake, we want to make that a year-round facility and we'll be making investments to provide the energy and the heating requirements to make it a year-round facility.

Third, working with NOAA on the Barrow Climate Change Research Facility, that facility will be completed and will be operational next year, in time for the International Polar Year. As a result of a workshop we had approximately 1 year ago with the University of Alaska and the Barrow Arctic Science Consortium, we've identified a number of opportunities for those two entities to work closely together during IPY and that will require instrumentation of the research facility and also connectivity to broadband communications and to the Internet. That will give researchers at Barrow access to the University of Alaska computing facilities as well as their technical and scientific library capabilities. Those are a few examples of what we have in our plan for Alaska during the IPY.

With regard to the Arctic region research vessel, that program is going well. We had our solicitation. The proposal that was selected turned out to be a sole proposal, from the University of Alaska at Fairbanks. We intend the Arctic region research vessel to be a national asset, more than just an asset for the State of Alaska. There were some issues with the proposal but we will work with the University of Alaska to broaden the scope and improve the plans for managing the project.

We hope to be able to start that project this fiscal year and we will be requesting permission to do so in our 2007 plan.

INTERNATIONAL POLAR YEAR PROJECTS

Admiral LAUTENBACHER. Well, as you're aware, the bulk of the new IPY funding or additional funding is not within NOAA. We are partnering with the agencies as I am with NSF to leverage the basic research funding that is going into it. We have $15 million associated directly with the IPY projects, which is an increase of $1 million for new projects.

The bulk of that is in observations. We need to create, as I know you well know, a better long-term observing system for the Arctic. We've partnered with the Canadians to start a new Arctic Observation Station on Ellesmere Island. We have research crews into the Arctic with the Russians, where we are leveraging some of their money.

We are going to continue looking at the stratosphere of ozone measurements. We have put some money in for looking at improved weather, sea ice, and ocean wave forecasting in the Arctic. That's a special part of the world, as you are well aware. That will be an important part of refining the new information that comes out of it and using it, hopefully, to help improve our weather and climate forecasting. We are looking at predictions on improving arctic environment forecasts from seasonal to centennial. So we want to get into the climate prediction area for that part of the world.

A very important part of the data gathering is the $3.3 million we have for UAS systems, unmanned aircraft systems, a perfect

place to test and experiment with those kinds of systems for continuous observing, is the Arctic. We plan to look for a strong way of doing that during this IPY. Thank you, sir.

INTERNATIONAL WHALING COMMISSION

Senator STEVENS. I'd be remiss if I didn't mention that the meeting in Anchorage of the International Whaling Commission, for almost 25 years, through the great efforts of Sylvia Earl, who is one of your predecessors. We've had the opportunity for Alaska Eskimos to harvest a number of whales that they use to consume. It's not a commercial operation. Japan now, is using surrogates from Pacific and Caribbean Islands to try to threaten that program unless we all support the restoration of their commercial whaling activities, which we oppose, totally oppose.

I hope that you use all the efforts that you can to convince the Japanese that as far as I'm concerned, if they insist on destroying the Eskimos ability to continue their cultural activities and have that meat available for their personal use because of the world's desire not to support their commercial activities, I think this—I will lead the charge and get some severe reaction against the nation of Japan. They're wrong and that's a small group within their country. They should not be doing this politically. They should not be doing it with their Embassy group and I'm really very disturbed with Japan to think that they believe that those 15 to 18 whales that our people consume should be offset by commercial whaling off their country, we've now restored the populations. They are balanced and protected so I hope you will all help us emphasize to Japan, this is not their day to bargain commercial whaling against Eskimos right to survive.

Admiral LAUTENBACHER. Yes, sir. We're working very strongly to support your position. Thank you, sir.

Senator INOUYE. Thank you very much, Madam Chair. I'd like to say that the Senator from Alaska is absolutely correct.

Madam Chair, the two agencies represented here are the guardian angels of the State of Hawaii. Hawaii, as we all know, is rather unique, isolated. For example, we have 85 percent of all the coral reefs in the United States. We just opened up a 140,000 square mile marine sanctuary. That's more than all the national parks combined.

And we're counting upon NSF to save us because of the climate change studies. You may not know this, Doctor, but as a result of your work, real estate people are beginning to look at whether coastal properties are just as good as mountain properties.

Senator INOUYE. The coastal properties used to be the prime ones but now with the sea level getting up there, people are beginning to take a second look. So what do you do? Hawaii is very important and we're working at this moment, Madam Chair, with the NSF on the feasibility and possibility of establishing a major solar telescope on Mount Hale/Akala and we're pleased with the work that NOAA does for us. For example, without NOAA I don't think Hawaii or the rest of the world can get such fast advance notice on tsunamis. I don't have any questions. I just want to thank them and I thank you.

Admiral LAUTENBACHER. Thank you very much, Senator.

Dr. BEMENT. Thank you very much, Senator.

Senator MIKULSKI. Well, the Senator was absolutely right in describing his own State. Before he arrived, we asked about the status, particularly of the tsunami early warning system, which I knew that you've been a real leader in establishing and advocating with this subcommittee, regardless who was Chair. Yes, sir?

Senator INOUYE. I have one question for the National Science Foundation. This is my third meeting this morning and I had to attend all three. Can you devise some system for the United States Senate where we can attend several meetings at the same time? I go to one for 10 minutes, another one for 15 minutes and here I am and I didn't hear your testimony. I wanted to be here in the morning, Madam Chair but——

Senator MIKULSKI. Well, you're here. We're very well mindful of this.

Senator INOUYE. Can you get the NSF to do this for us?

Senator MIKULSKI. We can put that in with Senator Hutchison's Weather Modification Program.

Senator INOUYE. I move to increase——

Senator MIKULSKI. We'll get a College Senate Venture Capitol Fund.

Dr. BEMENT. I think, Senator, perhaps in the next 50 years, we might be able to discover how to clone you physiologically but I don't think we'll ever be able to clone you mentally.

Senator MIKULSKI. Senator Shelby.

Senator SHELBY. Thank you, I think.

Senator MIKULSKI. A wrap-up here.

FUNDING INCREASES FOR NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION SATELLITE PROGRAM

Senator SHELBY. The Senator is absolutely on point, though. We do have to be at a lot of places at the same time and we can't do this but we appreciate your appearance here today. NOAA—the NOAA 2008 budget shows a decrease in overall satellite costs. However, it is my understanding that Congress can expect future increased budget requests for our NPOESS.

At some point, NOAA needs to make up for the $4.1 billion gap between the program's original cost and its projected expenses. NOAA's satellite program dwarfs the funding levels of NOAA's other research and operation programs. Admiral, what assurances, if any, can you provide the subcommittee today, that any increased funding for NOAA's satellite programs, which are important, will not infringe on the budget request for NOAA's other research and operation programs, especially for ocean-related activities?

Admiral LAUTENBACHER. Yes, sir. That's a very important question. We have tried to work on, since I've arrived, a longer range budget forecasting and programming system. One of the results of that is that we have delivered to you, through the chain of command, a budget that goes out 5 years. So you can look—we can look and see what's there.

Senator SHELBY. We know. And you're deeply challenged here. I know this, as we are.

Admiral LAUTENBACHER. Yes, yes we are. But I think there is a realization, certainly through much of my chain of command in the

administration that you have to look at these longer term plans and if you commit to a certain year, you are committing to a budget estimate that must be accounted for. I assure you that I will continue to push to have that capitalization budget held separately from the operating budget. Can I guarantee what will happen as you have future difficult budget decisions to make? That's a very difficult thing for me to make projections and commit to today. But I think there is more interest in dealing with the capitalization budget on a rational basis and looking at the operational budget.

Senator SHELBY. Absolutely. And I think this is going to be one of our challenges here, too.

Admiral LAUTENBACHER. Yes, sir.

NATIONAL SCIENCE FOUNDATION DAYS

Senator SHELBY. The National Science Foundation. Raising the awareness of opportunities available through research grants for the National Science Foundation, we know will benefit the Nation and also bring researchers with great ideas to an agency that funds the best of the best research. One such way to do this is through the National Science Foundation days where Foundation staff go to schools and explain the grant application process and how to improve proposals submitted to the National Science Foundation because we're interested in the best of the best, aren't we, Doctor?

Dr. BEMENT. That's correct.

Senator SHELBY. Could you give us briefly, some examples of how high past NSF Days have had an impact on improving grant approval rates at locations where the National Science Foundation has conducted some of these meetings?

Dr. BEMENT. Yes, sir. As you know, NSF has conducted three NSF days in the State of Alabama over the last 5 years, the last one being at Tuskegee just last March. What we normally discover is that it is an opportunity for all of those who attend these NSF Days. Collectively, for all three of these events, we interacted with 400 principal investigators (PIs) in the State of Alabama. Those who attend the days have an opportunity to talk with program officers and they have an opportunity to talk with other PIs on how best to submit proposals to the Foundation and especially how to submit a successful proposal. The proposal volume does go up shortly after the NSF Days, in fact, sometimes it's a blizzard. That is not the end of the story. Beyond that, it is a matter of our program officers working closely with the PIs after they may have been declined the first time to improve their proposals so that their chances of being accepted the second or third time can go up.

We generally find that that's probably the best way to succeed in getting a grant. It's seldom the case that a grant is approved the first time but usually the second or third time. So the role of the program officer is really very critical.

I should tell you, however, that workload on our program officers has become very enormous, primarily because what was the salaries and expenses account, which we now call the agency operation and award management account, keeps getting truncated, one way or another.

The opportunity to improve success rate depends very much on the ability of the program officers to work with the PIs in improving their proposals.

EPSCOR PROGRAM ENHANCED

Senator SHELBY. How will the elevation of the EPSCoR program into the Office of the Director enhance its position and benefit states in making them more competitive?

Dr. BEMENT. It will get the senior management team more directly involved. We will be working more closely at that level, with the leadership in EPSCoR, to see what more we can do to re-invigorate the program and perhaps take a more strategic approach in improving the leverage of the EPSCoR investment. Those are the directions we'll be taking.

Senator SHELBY. Madam Chairman, I have a number of questions that I'd like to submit for the record, in the interest of time, if you would.

POLAR SATELLITES

Senator MIKULSKI. Certainly, Senator Shelby. We'll welcome those questions and before you might have to depart because I know we're—several appropriations hearings are going on simultaneously. I'd like to pick up on the issue of polar satellites and yesterday, Admiral Lautenbacher, you talked about it because it's accountability and I've got two big issues. You, with this satellite system and where we're heading this way also, with the research facilities that I think are getting overruns at the National Science Foundation.

You outline for me and I'd like you to outline and repeat for Senator Shelby, how you intend to stand sentry over this bill, to bring about the necessary management reforms and oversight that have been triggered by Nunn-McCurdy that I think we can expect a better stewardship of this because this is a program that has overruns. We're worried about spending more money to get less science.

This is one of the most crucial observatory tools that we're going to have, particularly for the climate crisis. But could you share, for the record which you shared with me and I'd like very much if Senator Shelby heard it because every time they hear about overruns, it's just one more excuse to not get support for what we need to do for the agency. Would you agree, Senator?

Senator SHELBY. Yes.

Admiral LAUTENBACHER. Thank you, Madam Chair. I would be very happy to do that. This obviously is a very critical issue to me personally and to the agency.

The entire NOAA team is energized to work on this problem. My Deputy for Satellites, Assistant Deputies, the Deputy Under Secretary. We have set a program management team. We have basically overhauled the management team inside of NOAA from top to bottom. We've made personnel changes where necessary in our chain of command and personnel changes within the program office and set up, basically an inspector general (IG)—internal IG to make sure that there is continual oversight. We have also ensured that we'll work collaboratively with the Department of Defense and NASA, the other two agencies involved and I meet quarterly with

the heads of acquisition for the Department of Defense (DOD) and Space, which is the Under Secretary of the Air Force and Administrator Mike Griffin from NASA. So we are definitely, personally involved and we have gotten the personal attention of the presidents of and chief executive officers (CEOs) of Northrop Grumman and Raytheon, who sit in those meetings, too.

We have program monitoring from the Government down to very fine details inside the program. We are getting independent cost estimates frequently. We have independent review teams looking at it from outside to make sure we have independent advice to make sure people are on track. We track schedules and dollars on an earned value management system down four or five levels into the program and that information is reported daily and weekly, internal to the program.

We are changing the contract to set up the right incentives. That was another criticism and we will reward performance versus just hanging in there. We've also revamped the program so that it is less risky. We have reduced the amount of difficult technical milestones that contractors had trouble meeting, to a level we believe they can be met. I am confident that the schedule that we put in place with the new funding profile is going to achieve success, and I assure you that everyone at NOAA, from top to bottom, is committed to making that happen, Madam Chair. Thank you.

Senator MIKULSKI. Senator Shelby, does that give you a little bit more assurance on this matter?

Senator SHELBY. It does. I like what they're doing and you're trying to do. I think you just need some more funds.

NATIONAL SCIENCE FOUNDATION FACILITY FUNDING

Senator MIKULSKI. Let's go though, to also another area of accountability, is with the National Science Foundation. We're very concerned about the research facilities and also certain tools for research. The Alaska region research vehicle that Senator Stevens spoke about is really important. So we don't in any way minimize the need to have this vessel. And it's a research vessel, as I understand it, Director Bement, that has to operate in ice under very rugged conditions. But at the same time, it's running $25 million over the original estimate.

Now, this ship could run aground here, with cost overruns and as Senator Stevens said, he's being treated like it's an earmark when essentially it's an integral part of Arctic research. And when the overruns come, it sounds like we're picking and porking out here in some Alaska toy when it's not. It is a very important research tool but we're very concerned about this $25 million cost overrun. Now why are there overruns and what are you going to do about it?

Dr. BEMENT. Yes, Senator, thank you. This vessel was scoped a long time ago. The design was completed in 2004. The original baseline budget was set at that time. It is now being re-evaluated. Since that time, there have been changes in regulations, some having to do with environmental operations, some having to do with safety and operating in the Arctic region. And as you know, this ship will operate in ice up to 2 to 3 feet thick so it will be a great advancement over the *Alpha Helix*.

In addition to that, commodity costs, especially the cost of steel has skyrocketed because of global demand, especially from China. Furthermore, shipyards are now value pricing their operations, primarily because they're overloaded with building ships for the oil industry. So it's very difficult to get a shipyard scheduled, and furthermore, the cost of construction in a shipyard these days has also escalated. As we move into the coming year, we're going to have to revisit the budget. I can assure you it will be higher than it is now. This is just the way things are turning out, but the sooner we get a start on that project, and that's one of the reasons we want to start it in 2007, the more I think we can mitigate these cost increases over the next year or two.

Senator MIKULSKI. Do we know how much this is going to cost?

Dr. BEMENT. I'm sorry?

Senator MIKULSKI. Do we—you know, it's a pattern here that I've now experienced in other subcommittees and we're seeing it here, that there was a project. It was 2004. Then we're operating on data that is several years old and then we don't know what the cost is. But when we get into these things and they get started, it has congressional support because of the scientific necessity and then there we are. Now, do we know what this is actually going to cost?

Dr. BEMENT. Madam Chair, we will very shortly revisit the design of this ship, based on current regulations. The redesign will take place over the next 4 months or so, and we then will re-baseline the cost. We will be able to report to you at that time what we think the real cost will be for this ship.

Senator MIKULSKI. But at the same time that you're doing that, are you also going to be rebasing these costs?

Dr. BEMENT. Oh, we do that on a continuing basis, not only internal to the Foundation but also with the grantees that have the responsibility for this ship.

Senator MIKULSKI. Well, just know, we believe that this vessel is important, just like the satellites are important. And the world is mesmerized by Arctic research and now we're also looking at how to have more collaborative work with Greenland. We could elaborate on that. But when these things go $25 million, we also know that the ALMA telescope is $16 million over. Now why is the ALMA telescope $16 million over?

Dr. BEMENT. The ALMA telescope is pretty much the same story. The reflectors on the telescope are made out of a very expensive nickel-based alloy in order to prevent any thermal expansion, because it's a very precise instrument. The cost of those alloys have gone up enormously, again because of world pressure on commodity costs, which was the biggest contributor to the cost of the instrument. There are other factors that also contributed to increased project costs: construction costs in Chile and some upper management costs that escalated because it is a 50/50 joint venture between the United States and the European Southern Observatory that has been a very difficult teaming relationship to put together and to operate.

Senator MIKULSKI. But then my question is—so what? Where do we go from here? And what again are the fiscal disciplines coupled with making sure that the fiscal discipline is so severe we lose the point of the project?

Dr. BEMENT. Madam Chairman, we have re-scoped the project. We've reduced the number of telescopes from 24 to 50 in order to absorb some of the cost increases yet still retain the transformational capability for this facility. We have put in cost tracking methods and other management techniques and it has undergone a high level senior review of all elements and costs associated with the project. The project has been re-baselined. We have re-established a contingency. We have better management tools in place and I think based on the reports that I get, are confident that we'll be able to stay within the current budget.

Senator MIKULSKI. Well, you have a big responsibility here in this agency but I can tell you that as you look at how all of your research endeavors add up, if they begin to have overruns, there will have to then be a moratorium on new projects. I mean, the scientific community needs to know that. That is, once that goes up, there is not just unlimited—I'm not threatening. I'm not saying it. We would not do arbitrarily or capriciously. But every time we turn around, there is some big ticket being added then somebody else comes in and wants to do something new and we have inherited what are now becoming legacy projects and just these two alone come to $41 million in cost overruns. We know that instruments are expensive. We know about the global pressures on commodities, et cetera. At the same time, we are where we are. And, therefore, there needs to be both within the agencies themselves, all within our portfolio, NASA, NSF, NOAA—all—the FBI with their info-tech boondoggle that they are now getting back on track.

The subcommittee is going to be very stern on accountability because it's the only way, particularly in these off austere budget times, that we must get value for the mission and I'm very—I want everyone in the Commerce, Justice, Science to understand it's not being prickly but we just face a real reality.

Dr. BEMENT. Well, Madam Chairman, I accept that. As a matter of fact, I appreciate it because I stake my personal accountability on these projects.

Senator MIKULSKI. And I know you do—we know each other from the National Institute of Standards and Technology.

Dr. BEMENT. And between myself and the Deputy Director and our senior management team, we are spending much more time on this. We are having more frequent reviews and I can assure that going forward, we are going to watch these costs like a hawk.

ADDITIONAL COMMITTEE QUESTIONS

Senator MIKULSKI. What we want to say very loud and very clearly to both the agency directors, to the scientific community and then to the private sector with whom we have to have contracts with, we've got to really—we've got to really exercise every modern fiscal discipline technique at our disposal and the Congress loves science and technology. So do the American people. But we can't rubber stamp. So that's kind of what we wanted to talk about. We also want to encourage ongoing cooperation in ocean research. That's something we'd like to talk about more in another day, also really encouraging our young people in science. I think Senator Shelby raised this. I don't want the subcommittee to end on a downer. It's because Senator Shelby and I are so committed to the

fact of really rising above the gathering storm. But we have to also rise against what we fear is a gathering fiscal morass.

[The following questions were not asked at the hearing, but were submitted to the administration for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO VICE ADMIRAL CONRAD LAUTENBACHER, JR.

QUESTION SUBMITTED BY SENATOR BARBARA A. MIKULSKI

PROGRESS ON THE U.S. OCEAN ACTION PLAN

Question. In response to the U.S. Ocean Commission, the Administration developed the "U.S. Ocean Action Plan". To date what progress has been made regarding implementation of this plan? To what extent does the "U.S. Ocean Action Plan" coincide with the recommendations of the Joint Ocean Commission?

Answer. In January 2007, the Committee on Ocean Policy released the "U.S. Ocean Action Plan Implementation Updates." Seventy-three of the 88 actions have been completed. The remaining actions are progressing on schedule.

The U.S. Ocean Action Plan (OAP) was a required response under the Oceans Act of 2000 to the U.S. Commission on Ocean Policy. Therefore, it is difficult to directly map the OAP to the recommendations of the combined Commissions, represented by the Joint Ocean Commission Initiative. In broad terms, both Commissions outlined the need for: enhancing ocean leadership and coordination, developing the institutional capacity to coordinate across jurisdictional boundaries, and strengthening the agency structure in phases in order to enhance the goals of addressing management needs through an ecosystem-based approach.

"COUNTERFEIT" FISH

Question. A recent article in the Washington Post cited an example of counterfeit fish being sold to restaurants and consumers in Florida. The article reported how undercover agents ordered grouper at 24 Florida restaurants, but the alleged grouper at 17 of 24 restaurants sampled by investigators was actually another, less desirable species, according to DNA analysis conducted. NOAA reported that, in many instances the "grouper" was actually farm-raised Asian catfish from Vietnam or other species that swim with grouper, and the filets have shown signs of salmonella and traces of illegal carcinogenic fungicides.

How rampant of a problem is imported counterfeit fish?

Answer. Mislabeled seafood products are a significant problem in the marketplace worldwide. While no definitive statistics exist about the rates at which fish is mislabeled, the NOAA Seafood Inspection Program (SIP) encounters several types of mislabeling that affect the economic integrity of seafood products. Examples of mislabeling include, substituting a lower cost species for a higher cost species, such as the grouper example in your question, short weighing, and altering the country of origin or fraudulently identifying the area fished and port of landing.

A recent example of the problem is provided by a 2005 case where NOAA SIP rejected over nine million pounds of seafood that was destined for a large retail supermarket chain. Another recently completed investigation disclosed the importation of approximately 3 million pounds of falsely labeled fish product over a three year period. During this investigation NOAA seized approximately 300,000 pounds of this illegal fish which contained malachite green—a known carcinogen banned by the FDA. NOAA SIP works with many retailers to ensure that the seafood they buy meets their quality levels and these scenarios are not untypical.

Question. Does NOAA have enough resources to adequately address this problem?

Answer. Currently, NOAA has approximately 150 special agents and 20 enforcement officers dispersed nationwide. Incidents of mislabeling are an international problem which provides substantial financial profits to those who participate in this illegal activity. Although NOAA's enforcement resources are primarily focused on importers and exporters, this illegal activity extends well beyond these operations to included distributors, wholesalers, retailers and restaurants. Investigations can take years to complete, are labor intensive, demand extensive financial and document analysis, and in many instances requires the cooperation of other countries. NOAA leverages its investigative resources by concentrating on the primary businesses (importers, exporters or large distributors) which have the greatest impact on this illegal activity.

Question. What is being done to prevent this problem from escalating?

Answer. Continued investigations and subsequent successful prosecutions of those found violating our laws is the best deterrent. Our investigations have resulted in the seizure and ultimate forfeiture of hundreds of thousands of pounds of mislabeled product worth millions of dollars on the market. Additionally, the imposition of fines and penalties in the millions of dollars and, in some cases, incarceration has a significant impact. In one recent case, two businesses were forfeited and we have observed the dissolution of business entities involved in illegal activities as a result of our enforcement activities. We continue to focus on the most blatant violators in an effort to have the largest impact on this illegal activity. Publication of our investigations and education of the public through various media sources is extremely helpful.

AQUACULTURE

Question. The NOAA budget for fiscal year 2008 requests an increase of $3 million to develop a regulatory program for marine aquaculture. What is the state of the U.S. marine aquaculture industry? What investment are our international competitors doing in regard to marine aquaculture? Are there technological barriers to more marine aquaculture? What is being done to reduce those technological barriers?

Answer. The U.S. marine aquaculture industry is relatively small compared with overall U.S. and world aquaculture production. U.S. aquaculture production totals about $1 billion annually, compared to world aquaculture production of about $70 billion. Only about 20 percent of U.S. aquaculture production is marine species.

The largest single sector of the U.S. marine aquaculture industry is molluscan shellfish culture (oysters, clams, mussels), which accounts for about two-thirds of total U.S. marine aquaculture production, followed by salmon (about 25 percent) and shrimp (about 10 percent). Current production takes place mainly on land, in ponds, and in coastal waters under state jurisdiction. Recent advances in offshore aquaculture technology have resulted in several commercial finfish and shellfish operations in more exposed, open-ocean locations in state waters in Hawaii, New Hampshire, and Puerto Rico.

Marine aquaculture includes the production of hatchery fish and shellfish which are released into the wild to support commercial and recreational fisheries as well as to enhance or rebuild wild stock populations. Marine aquaculture also includes the production of ornamental fish for the aquarium trade and plant species used in a range of food, pharmaceutical, nutritional, and biotechnology products. There are also related industries—such as equipment production, feed, and nutrition companies and aquaculture consulting service firms—that provide support to the global aquaculture industry.

According to the United Nations Food and Agriculture Organization, the United States ranked 10th in total aquaculture production in 2004, behind China, India, Vietnam, Thailand, Indonesia, Bangladesh, Japan, Chile, and Norway. The United States imports significant volumes of marine aquaculture products from these and other countries, resulting in an annual seafood trade deficit of about $8 billion.

There is significant potential to increase aquaculture production in the United States using today's technology. Preliminary production estimates by NOAA indicate that domestic aquaculture production of all species could increase from about 0.5 million tons annually to 1.5 million tons per year by 2025. The additional production could include 760,000 tons from finfish aquaculture, 47,000 tons from crustacean production, and 245,000 tons from mollusk production. Of the 760,000 tons of finfish aquaculture, 590,000 tons could come from marine finfish aquaculture.

The major barriers to marine aquaculture are finding suitable sites in coastal areas (where aquaculture must compete with many other coastal uses), clarifying the regulatory and environmental requirements for existing as well as new marine aquaculture operations (including offshore), and developing technologies and best management practices to ensure that various types of production systems are compatible with marine ecosystems. There is also a need to develop hatchery operations to provide fingerlings for finfish production systems.

Business needs regulatory certainty to make sound investment decisions and obtain financing. There is currently no way to obtain a permit for aquaculture in federal waters under existing laws and regulations. Thus, in response to the U.S. Commission on Ocean Policy and the U.S. Ocean Action Plan, the National Oceanic and Atmospheric Administration (NOAA) and the Department of Commerce drafted and sent to Congress the National Offshore Aquaculture Act of 2007. The Act would provide the necessary authority to establish a regulatory framework and authorize research for all types of marine aquaculture.

Those concerned about the impacts of offshore aquaculture need to know the industry will be held to strict environmental standards by the proposed legislation.

One way to address these needs at the same time as those of the marine aquaculture industry is through demonstration projects with research partners so that technologies and practices can be tested, their impacts evaluated, and systems improved. Another is to support research projects to develop alternatives to use of fish oil and fish meal in aquaculture feeds, develop culture methods for new species of value to commercial production as well as stock enhancement, and study the impacts (including cumulative impacts) of marine aquaculture on marine ecosystems.

Since 1998, the National Oceanic and Atmospheric Administration (NOAA) has funded a total of $15 million through the National Marine Aquaculture Initiative (NMAI) to support research to boost the production of commercially and recreationally valuable marine shellfish and finfish species in the United States. Projects have responded to key scientific, engineering, environmental, and economic questions for aquaculture. For example, NMAI has funded studies of candidate species, health and nutrition, best management practices, ecosystems monitoring and management, engineered production systems, and legal and operational frameworks.

In September 2006, NOAA awarded $3.6 million in competitive grants to 11 sustainable marine aquaculture demonstration and research projects under NMAI. The initiative is managed by the NOAA Aquaculture Program and administered by NOAA Sea Grant. The 2006 NMAI funding supports projects to assess the commercial potential of marine aquaculture, the feasibility of stock enhancement, the environmental impacts of aquaculture in various environments, as well as research on key aquatic animal nutrition and health issues.

Another way in which NOAA is working to address technological barriers is through a planning process with the Department of Agriculture and the Department of Interior to develop a national aquatic animal health plan. This plan, which has been in development for four years and has included stakeholders from industry and state agencies, will provide protection for the nation's cultured and wild aquatic resources, facilitate safe commerce of live products, and improve the availability of diagnostic laboratories for aquaculture. This plan will be completed by summer of 2007.

NOAA also has marine aquaculture research capabilities at NOAA laboratories within the National Marine Fisheries Service and the National Ocean Service, and research and extension capabilities through state Sea Grant Programs. Congressionally mandated research—such as an open ocean aquaculture demonstration project at the University of New Hampshire and research around the country on oysters, shrimp, crab, and other species—has also helped to advance the state of marine aquaculture technology. Other federal agencies and research institutions are also investing in research to address technological challenges. For example, the Advanced Technology Program within the National Institute for Standards and Technology has supported a number of advanced research and technology projects. In addition, aquaculture companies have received support for the development of commercial products and services through the Small Business Innovation Program (SBIR) at NOAA and the U.S. Department of Agriculture and, in the past, through the Saltonstall-Kennedy Program.

NOAA'S CENTER FOR WEATHER AND CLIMATE PREDICTION PROJECT

Question. The Committee was recently informed that the planned Center for Weather and Climate Prediction in College Park is behind schedule and cost estimates have increased for NOAA "above standard" improvements.

What are the consequences to NOAA's budget request due to the delayed construction schedule?

Is NOAA reexamining the "above standard" improvements in order to lessen any budgetary impacts?

Answer. The NOAA Center for Weather and Climate Prediction (NCWCP) project is a build and lease-back project under which a private developer is responsible for building a facility, in this case on property owned by the University of Maryland. The developer will own the building once built, and NOAA will lease back the building. The developer is only responsible, under the development lease with the General Services Administration (GSA) who is managing the project for the government, to build general office building space. Tenant specific requirements—such as enhanced heating, ventilation, air conditioning, electrical, and lighting capabilities—required to support specialized (above office-standard) NOAA operations such as weather and climate modeling, laboratory operations, analysis of global environmental satellite data, and protecting the reliable flow of critical weather warning, forecast, and data products to the Public must be paid for by NOAA as part of the initial construction costs of the building.

NOAA has been apprised by GSA that, due to delays in the construction schedule and general increases in construction costs (labor and materials) at rates higher than those projected by GSA when the initial cost estimate for the project was developed in 2002, NOAA should expect increases in the cost of above-standard construction work. NOAA has not yet received final pricing of above-standard construction work from the developer. Once we have received this pricing information, we will assess the impact on fiscal year 2008. Failure by the government to timely fund these costs could further delay the construction schedule; and expose the government to claims from the developer for government-caused delays and associated financial damages.

We are continuing to re-examine areas where we can take reductions in above-standard requirements without compromising the mission conducted at the facility, so as to mitigate budgetary impacts.

NPOESS AND GOES–R FUNDING REQUEST

Question. Please provide a detailed breakout of the NPOESS and GOES–R program funding requests for fiscal year 2008 for each of the major aspects of the programs.

Answer. The fiscal year 2008 request for the Geostationary Operational Environmental Satellite Series R (GOES–R) Series is $279 million. The breakout of the budget request, in millions of dollars, is as follows:

[In millions of dollars]

Development Activity	Request
System Acquisition and Operations	45
Spacecraft	14
Instruments:	
Advanced Baseline Imager (ABI) to meet the production schedule for launch and provide real-time environmental data and uninterruptible observations	54
Solar Imaging Suite (SIS) preliminary design	55
Space Environmental In Situ Suite (SEISS) preliminary design	21
Geostationary Lightning Mapper (GLM) continuation of the acquisition and operations phase	17
Government Program Office Operations	73
TOTAL GOES–R Fiscal Year 2008 Request	279

The combined fiscal year 2008 request for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) is $666 million. Of that amount, NOAA's portion is $331 million, with the remaining funding coming from the U.S. Air Force. The breakout of the fiscal year 2008 budget request, in millions of dollars, is as follows:

[In millions of dollars]

Development Activity	Request
Program Acquisition—NPOESS Prime Contract:	
Ground Systems	98
Spacecraft and Instruments	340
System Engineering/Program Management	142
Government Program Office Operations	86
TOTAL NPOESS Fiscal Year 2008 Request	666

GOES–R PROGRAM TRL LEVEL

Question. The NOAA budget justification states that the GOES–R satellite launch date is now "no earlier than 2014" and that this provides "additional opportunities to mitigate identified risks in GOES–R development."

Using the NASA defined Technical Readiness Scale (TRL), what level is the GOES–R program currently in? What TRL level will GOES–R be in at the end of fiscal year 2008?

Answer. Technology Readiness Levels (TRL) for GOES–R are:

Instrument	Current TRL (September 2006)	Projected TRL (September 2008)
Advanced Baseline Imager (ABI)	5	6
Solar Imaging Suite (SIS)	6	6
Space Environmental In-Situ Suite (SEISS)	5	6
Geostationary Lightning Mapper (GLM)	4	5
Spacecraft contract	([1])	5–6

[1] Not awarded.

GOES SATELLITE CONSTRUCTION TIME

Question. Please provide a summary of how long it took to build each GOES satellite starting with GOES–11 through GOES–P.

Answer.

GOES I–M Series

Contract award for the Geostationary Operational Environmental Satellites (GOES) I–M Series was made on 1985. The first in the series, GOES–I, was launched in April 1994.

Satellite	Contract Award Date	Satellite Launch
GOES–L (GOES–11)	1985	May 2000
GOES–M (GOES–12)	1985	July 2001

GOES N–Series

GOES N–Series used the same primary instruments as the GOES I–M Series but a different spacecraft.

Satellite	Contract Award Date	Satellite Launch
GOES–N (GOES–13)	1998	May 2006
GOES–O	1998	Spring 2008
GOES–P	1998	Spring 2009

For both the GOES I–M Series and GOES N–P Series, it took longest to build and launch the first satellite in the Series. The second and subsequent satellites in the Series are the same design as the first satellite.

PROBABILITY OF GOES–R OPERATIONAL GAP

Question. What is the estimated probability of an operational gap if GOES–R launches in 2013? 2014? 2015?

Answer. In order to minimize the probability of an operational gap, NOAA maintains two operational spacecraft, Geostationary Operational Environmental Satellite (GOES)-East and GOES-West, and an on-orbit spare at all times. The on-orbit spare can be activated to operational status in a short period of time in the event either GOES-East or GOES-West satellites fail.

NOAA constantly assesses the health of the spacecraft and instruments and uses sophisticated statistical techniques to calculate when satellites are needed to avoid an operational gap. Based on these analyses, NOAA has determined that the GOES–R satellite needs to launch in December 2014 to serve as the on-orbit spare. Two years later it will replace GOES–O as an operational satellite.

Launching GOES–R in December 2014 results in a 78 percent probability of two spacecraft availability.

Launching GOES–R in 2013 increases the probability to 86 percent of two operational spacecraft.

Launching GOES–R later in 2015, decreases the two-operational spacecraft availability to 62 percent.

Question. If an operational gap were to occur in GOES–R—what backup plan exists (e.g., utilizing other systems (allied or domestic))?

Answer. A single catastrophic failure of GOES–R would not compromise our ability to provide coverage. Should GOES–R sustain a catastrophic failure, GOES–S is planned to be launched (April 2016) in sufficient time to support the planned GOES–R activation in 2017. If the GOES constellation were to sustain multiple catastrophic failures, then NOAA would continue to rely on potentially degraded sup-

port using existing satellites from the GOES–N Series, or a degraded single satellite constellation located over the central United States.

Further, NOAA would supplement data needs from all available NOAA and non-NOAA polar-orbiting environmental satellites. NOAA also has on-going international agreements to provide mutual geostationary environmental satellite backup with the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and the Japanese Meteorological Agency (JMA) in the event of premature system or launch failure. This arrangement is based on previous experience of NOAA providing backup to JMA, and EUMETSAT providing backup support to NOAA. Under the single satellite constellation, NOAA would lose the ability to detect and track storms at the edges of the Atlantic and Pacific Oceans. This could lead to degraded hurricane forecasting in the Caribbean and Atlantic coasts, and Hawaii, respectively.

Question. If an operational gap were to occur in GOES–R—what backup plan exists (e.g., utilizing other systems (allied or domestic))?

Answer. A single catastrophic failure of GOES–R would not compromise our ability to provide coverage. Should GOES–R sustain a catastrophic failure, GOES–S is planned to be launched (April 2016) in sufficient time to support the planned GOES–R activation in 2017. If the GOES constellation were to sustain multiple catastrophic failures, then NOAA would continue to rely on potentially degraded support using existing satellites from the GOES–N Series.

Further, NOAA would supplement data needs from all available NOAA and non-NOAA polar-orbiting environmental satellites. NOAA also has on-going international agreements to provide mutual geostationary environmental satellite backup with the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and the Japanese Meteorological Agency (JMA) in the event of premature system or launch failure. This arrangement is based on previous experience of NOAA providing backup to JMA, and EUMETSAT providing backup support to NOAA.

Question. If an operational gap does occur—what is the impact to short-term forecasting ability?

Answer. In the event there was a gap in coverage from the Geostationary Operational Environmental Satellite (GOES), the most immediate impact would be loss in the quality of short term weather forecasts and timeliness of data refresh from every 30 minutes with GOES to every 6 hours with polar-orbiting satellite data.

Without GOES, forecasters would be blind to short-term variations in hazard weather events such as hurricanes, thunderstorms, flash floods, low clouds and fog.

QUESTIONS SUBMITTED BY SENATOR DIANNE FEINSTEIN

COASTAL NON-POINT POLLUTION

Question. The Coastal Zone Management Act gives authority to coastal states to implement a coastal nonpoint polluted runoff control program and both the Pew and U.S. Ocean Commissions found that polluted runoff is the single greatest source of ocean pollution. How can you assure us that coastal states will get adequate funding to carry out these coastal water quality programs in the 2007 budget? And because the President's 2008 budget provides zero funding for this program, what will you do to restore funding for this vital program?

Answer. Although NOAA was not able to fund the non-point grants within the fiscal year 2007 plan, NOAA has funded the Coastal Zone Management Grants at $65.7 million. States can reallocate resources within their programs to address their highest priorities, including the coastal water quality programs. In addition, states benefit from NOAA's development and dissemination of management tools and scientific research on nonpoint source pollution problems and responses.

NOAA continues to support state Coastal Nonpoint Source (NPS) Management Programs by fostering program integration, and by helping coastal states focus on managing the cumulative and secondary impacts of development to prevent NPS pollution. NOAA is also investing in monitoring, research, and modeling to support NPS management, such as through the development, testing and transfer of innovative technologies and best management practices to control polluted runoff. We are actively pursuing efforts to link coastal growth and development management with water quality protection by fostering a greater emphasis on community development and planning efforts to address growth issues in a sustainable manner.

The Non Point Implementation Grants have not been included in the President's Request for NOAA for a number of years, as significant funding for this issue is requested through other Federal Agencies.

NOAA and the Coastal States Organization (CSO) have undertaken a project to engage coastal managers and stakeholders to envision the future of coastal management. The goal of this visioning process is to gather feedback on priority issues and innovative ideas for improving the CZMA and the National Coastal Management Program. State coastal managers have identified decreasing water quality as one of the highest priority threats to the coastal resources of their states. Workshops will be held for stakeholders, coastal management experts and other Federal agencies to generate innovative techniques and solutions, explore their feasibility, and assess their potential impacts and degree of support among constituents.

COASTAL ZONE MANAGEMENT GRANTS

Question. Funding for California's core coastal management program has been capped at $2 million for the past 14 years while population growth now finds 1 in 10 Americans living along the California coast. Given that funding for coastal management nationally has increased during the same period by more than $20 million, are you going to allocate funds in the 2007 budget to the large coastal states proportionate to their population and length of coastline as mandated by the Coastal Zone Management Act?

Answer. We greatly appreciate the multitude of issues that California's coastal management agencies face in managing the activities which affect your State's coastal resources. We also recognize the effectiveness of the California's coastal management efforts which have been consistently documented in our Section 312 evaluations of your programs.

As mandated by the CZMA, Section 306 funding is awarded pursuant to a formula based on the shoreline mileage and coastal population of each state. The fiscal year 2007 funds have been allocated pursuant to this formula.

A $2 million cap on individual state allocations has been put in place by Congress for the past 14 years through the appropriations process. NOAA has followed this Congressional direction.

NRDC VS. RODGERS SETTLEMENT IMPLEMENTATION

Question. The National Marine Fisheries Service (NMFS) is a Party to the Settlement in *NRDC* v. *Rodgers* (concerning restoration of flows below Friant Dam in the Central Valley Project) and NMFS has an important role to play to ensure the success of the restoration effort required by the Settlement, especially the reintroduction of Chinook salmon. Could you please tell me what NOAA and NMFS are currently doing to support the Settlement implementation effort, what actions are proposed in fiscal year 2008 by NOAA and NMFS to further implement the Settlement, and what actions are needed, if any, to ensure that the Department of Commerce has the necessary staff and resources to fulfill its future roles and responsibilities under this major Settlement?

Answer. NMFS Southwest Regional Office has been actively involved in the Settlement since October 23, 2006. NMFS has been working closely with the Bureau of Reclamation, Fish and Wildlife Service, parties to the Settlement, and third parties on actions required to implement the Settlement. We have already provided staff to: (1) brief technical working groups and the public on fisheries, fish habitat, and Endangered Species Act compliance issues; (2) engage in all implementation-related technical and management meetings; (3) answer Congressional questions and review draft legislation; (4) provide expertise and technical support for the development of implementation-related documents; and (5) provide management and policy-level guidance to the overall Settlement and implementation processes. NMFS is working closely with the Bureau of Reclamation's Sacramento Office to secure reimbursable funding to support staff to fully implement all of our roles under the Settlement. Depending on the availability of funding for this Settlement, NMFS will continue working on the 26 items listed below in a coordinated and collaborative manner.

1. Review plans and designs for 14 major structural projects
2. Analyses, review and provide recommendations on over 500 varying flows regimes
3. Develop and review MOUs including associated budgets
4. Review numerous contracts
5. Review several Friant Dam maintenance and operational plans
6. Review several water right options
7. Develop and review recirculation, recapture, reuse, exchange or transfer of water plans and proposed modifications including monitoring
8. Review draft development and implementation water plans

9. Coordinate with 6 State agencies, 5 Federal agencies, tribes, and numerous NGOs
10. Develop and review design, engineering, and monitoring studies
11. Review potential land acquisitions and easements
12. Develop and review environmental and permitting documents
13. Undertake ESA Section 7 consultations and reinitiate consultations
14. Undertake ESA Section 10 consultations and reinitiate consultations
15. Develop and review procedural documents
16. Analyze, review, and make recommendations on: water year data; water flows data and models; riparian corridors habitat models; Chinook fall-run and spring-run and steelhead populations
17. Analyses, review, and make recommendations on: Restoration Administrator proposed actions: Technical Advisory Committee proposed activities; BOR and FWS proposed actions; CA DWR and DFG proposed actions; Secretary of the Interior proposed actions
18. Participation in numerous technical committees
19. Provide assistance to Federal and State agencies staffs
20. Review legal and procedural documents
21. Provide technical expertise and assist in the development of the restoration plans
22. Develop and execute budgets and financial plans
23. Make recommendations to Secretary of Commerce
24. Make recommendations to Secretary of the Interior
25. Develop and execute monitoring plans
26. Documentation of all activities for any future court actions

FUNDING LEVELS FOR SEVERE WEATHER RESEARCH

Question. The overall NOAA budget request for 2008 is less than 2 percent greater than that for 2006, including reductions in funding of $82 million for Oceanic and Atmospheric Research and reductions of $4 million for the National Weather Service. Given the large impacts of severe weather events on our nation's economy and the central role of climate change research in preparing our nation to adapt to the economic and ecologic impacts of climate change, can NOAA fulfill its mission at the funding levels requested in the President's budget? If not, what level of additional support is needed to properly address these challenges?

Answer. The President's fiscal year 2008 budget for NOAA requests a total of $3.8 billion, an increase of $131 million or 3.4 percent over the fiscal year 2007 President's budget. NOAA believes that the fiscal year 2008 budget request will allow NOAA to fulfill its obligations. The budget request advances mission-critical services, including work to expand meteorological prediction and extend our knowledge of climatic change.

The Office of Oceanic and Atmospheric Research (OAR) requests a total of $368.8 million in fiscal year 2008, reflecting a net increase of $20.1 million from the fiscal year 2007 President's budget and a decrease of $10.9 million from the fiscal year 2006 appropriation. The decrease from the fiscal year 2006 enacted level is due primarily to the large number of un-requested projects in 2006. Even in a tight budget year, the fiscal year 2008 budget request supports some new, cutting-edge science efforts by OAR's research programs.

The National Weather Service (NWS) requests $903.5 million in fiscal year 2008, reflecting a net increase of $21.6 million over the fiscal year 2007 President's budget as well as an increase of $55.2 million from the fiscal year 2006 enacted level. This budget request continues NWS on a path to produce and deliver forecasts that are trusted, employ cutting-edge technologies, provide services in a cost-effective manner, strive to eliminate weather-related fatalities, and improve the economic value of weather, water, and climate information. The request fully supports NWS forecast and warning operations. NOAA/NWS is committed to improving operational effectiveness and services, particularly for high-impact weather events, by taking full advantage of emerging science and technological improvements. We are committed to evolving services to best meet the changing and growing need for environmental forecasts and services. The NWS's fiscal year 2008 budget request supports efforts to upgrade the NEXRAD Radar network by implementing dual polarimetric radar. It also supports other efforts including: improved numerical modeling, data assimilation, education and outreach, training, forecaster workstation (AWIPS) upgrades, as well as efforts for future technological advances, such as phased array radar (PAR). We believe the President's fiscal year 2008 budget Request positions us to make those technical and service improvements.

QUESTIONS SUBMITTED BY SENATOR RICHARD C. SHELBY

OCEAN INITIATIVE FUNDING

Question. I am pleased to see that NOAA's 2008 budget request includes an increase of $123 million for the President's Ocean Action Plan, which is in part, related to the Joint Ocean Commission's recent reports. As you know, the Senate has been working with the Commission to receive specific, real-world guidance on how to improve ocean research and education. NOAA's increase is a step in the right direction, but based on the Commission's recommendations, the Nation still have a long way to go. Admiral, I know you are well aware of the Joint Ocean Commission's recent reports, and I know you strive to better our nation's ocean research activities. How can the Senate help you to ensure that this trend on funding increases and program advancements continues?

Answer. As you are aware, the fiscal year 2008 President's budget request includes $123 million in direct support of the President's Ocean Action Plan. To continue this positive trend in NOAA's ocean programs, please support the President's budget; specifically those items that support the Ocean Action Plan. We thank you and your colleagues for your continued support of NOAA's ocean programs, and ask that you continue to be leaders on ocean and coastal issues on a national level.

NOAA CORPS REAUTHORIZATION

Question. Admiral, the Committee supports NOAA Commissioned Officer Corps and the valuable expertise they lend to NOAA's field operations and homeland security activities. The Committee understands that the NOAA Corps authorization, which regulates the size of the Corps, has expired. When can Congress expect the NOAA Corps legislation package to be cleared by NOAA?

Answer. NOAA is interested in reauthorizing the NOAA Corps and we look forward to working with the Committee on this important legislation. Efforts to consider and possible develop a NOAA Corps legislation package are currently underway.

SUBCOMMITTEE RECESS

Senator MIKULSKI. If there is nothing further, the subcommittee will stand in recess.

[Whereupon, at 11:41 p.m., Thursday, March 8, the subcommittee was recessed, to reconvene subject to the call of the Chair.]