AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

S. HRG. 112–590, PT. 7

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

ON

S. 3254

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2013 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE MILITARY PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR, AND FOR OTHER PURPOSES

PART 7
STRATEGIC FORCES

MARCH 14, 21, 28; APRIL 25, 2012

Printed for the use of the Committee on Armed Services

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM—Part 7 STRATEGIC FORCES

S. HRG. 112–590 PT. 7

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

ON

S. 3254

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2013 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE MILITARY PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR, AND FOR OTHER PURPOSES

PART 7
STRATEGIC FORCES

MARCH 14, 21, 28; APRIL 25, 2012

Printed for the use of the Committee on Armed Services

Available via the World Wide Web: http://www.fdsys.gov/

U.S. GOVERNMENT PRINTING OFFICE

76–543 PDF WASHINGTON : 2012

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON ARMED SERVICES

CARL LEVIN, Michigan, *Chairman*

JOSEPH I. LIEBERMAN, Connecticut
JACK REED, Rhode Island
DANIEL K. AKAKA, Hawaii
E. BENJAMIN NELSON, Nebraska
JIM WEBB, Virginia
CLAIRE McCASKILL, Missouri
MARK UDALL, Colorado
KAY R. HAGAN, North Carolina
MARK BEGICH, Alaska
JOE MANCHIN III, West Virginia
JEANNE SHAHEEN, New Hampshire
KIRSTEN E. GILLIBRAND, New York
RICHARD BLUMENTHAL, Connecticut

JOHN McCAIN, Arizona
JAMES M. INHOFE, Oklahoma
JEFF SESSIONS, Alabama
SAXBY CHAMBLISS, Georgia
ROGER F. WICKER, Mississippi
SCOTT P. BROWN, Massachusetts
ROB PORTMAN, Ohio
KELLY AYOTTE, New Hampshire
SUSAN M. COLLINS, Maine
LINDSEY GRAHAM, South Carolina
JOHN CORNYN, Texas
DAVID VITTER, Louisiana

RICHARD D. DEBOBES, *Staff Director*
ANN E. SAUER, *Minority Staff Director*

SUBCOMMITTEE ON STRATEGIC FORCES

E. BENJAMIN NELSON, Nebraska, *Chairman*

JOSEPH I. LIEBERMAN, Connecticut
JACK REED, Rhode Island
MARK UDALL, Colorado
MARK BEGICH, Alaska
JEANNE SHAHEEN, New Hampshire
KIRSTEN E. GILLIBRAND, New York

JEFF SESSIONS, Alabama
JAMES M. INHOFE, Oklahoma
ROGER F. WICKER, Mississippi
ROB PORTMAN, Ohio
JOHN CORNYN, Texas
DAVID VITTER, Louisiana

CONTENTS

CHRONOLOGICAL LIST OF WITNESSES

STRATEGIC FORCES PROGRAMS OF THE NATIONAL NUCLEAR SECURITY ADMINISTRATION AND THE DEPARTMENT OF ENERGY'S OFFICE OF ENVIRONMENTAL MANAGEMENT IN REVIEW OF THE DEPARTMENT OF ENERGY BUDGET REQUEST FOR FISCAL YEAR 2013

MARCH 14, 2012

	Page
D'Agostino, Hon. Thomas P., Ph.D., Administrator, National Nuclear Security Administration, and Under Secretary for Nuclear Security, Department of Energy	7
Donald, ADM Kirkland H., USN, Deputy Administrator for Naval Reactors and Director, Naval Nuclear Propulsion, National Nuclear Security Administration, Department of Energy	49
Cook, Hon. Donald L., Deputy Administrator for Defense Programs, National Nuclear Security Administration, Department of Energy	53
Huizenga, David G., Senior Advisor for Environmental Management, Office of Environmental Management, Department of Energy	55

MILITARY SPACE PROGRAMS

MARCH 21, 2012

Creedon, Hon. Madelyn R., Assistant Secretary of Defense for Global Strategic Affairs	95
Shelton, Gen. William L., USAF, Commander, Air Force Space Command	100
Formica, LTG Richard P., USA, Commander, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command	110
Winokur, Robert S., Director of Oceanography, Space, and Maritime Domain Awareness, Department of the Navy	117
Zangardi, Dr. John A., Deputy Assistant Secretary of the Navy for Command, Control, Communications, Computers, Intelligence, Information Operations, and Space	123
Chaplain, Cristina T. Director, Acquisition and Sourcing Management, Government Accountability Office	123

DEPARTMENT OF DEFENSE NUCLEAR FORCES AND POLICIES

MARCH 28, 2012

Creedon, Hon. Madelyn R., Assistant Secretary of Defense for Global Strategic Affairs	178
Weber, Hon. Andrew C., Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs	187
Benedict, RADM Terry J., USN, Director, Strategic Systems Programs, U.S. Navy	190

Page

Kowalski, Lt. Gen. James M., USAF, Commander, Air Force Global Strike Command, U.S. Air Force 198
Chambers, Maj. Gen. William A., USAF, Assistant Chief of Staff for Strategic Deterrence and Nuclear Integration, U.S. Air Force 202

BALLISTIC MISSILE DEFENSE POLICIES AND PROGRAMS

APRIL 25, 2012

Roberts, Bradley H., Ph.D., Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy 239
O'Reilly, LTG Patrick J., USA, Director, Missile Defense Agency 246
Formica, LTG Richard P., USA, Commander, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, and Commander, Joint Functional Component Command for Integrated Missile Defense 253
Gilmore, Hon. J. Michael Ph.D., Director, Operational Test and Evaluation, Department of Defense 259
Chaplain, Cristina T., Director, Acquisition and Sourcing Management, Government Accountability Office 263

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MARCH 14, 2012

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

STRATEGIC FORCES PROGRAMS OF THE NATIONAL NUCLEAR SECURITY ADMINISTRATION AND THE DEPARTMENT OF ENERGY'S OFFICE OF ENVIRONMENTAL MANAGEMENT IN REVIEW OF THE DEPARTMENT OF ENERGY BUDGET REQUEST FOR FISCAL YEAR 2013

The subcommittee met, pursuant to notice, at 2:36 p.m. in room SR–222, Russell Senate Office Building, Senator E. Benjamin Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Nelson and Sessions.

Majority staff member present: Jonathan S. Epstein, counsel.

Minority staff member present: Daniel A. Lerner, professional staff member.

Staff assistants present: Hannah I. Lloyd and Brian F. Sebold.

Committee members' assistants present: Ryan Ehly, assistant to Senator Nelson; Chad Kreikemeier and Lenwood Landrum, assistants to Senator Sessions; and Charles Brittingham, assistant to Senator Vitter.

OPENING STATEMENT OF SENATOR E. BENJAMIN NELSON, CHAIRMAN

Senator NELSON. Let me call today's hearing to order. Today's hearing will be on the fiscal year 2013 budget submission for the defense-related programs at the Department of Energy (DOE). We'll hear testimony from the Administrator of the National Nuclear Security Administration (NNSA), the Honorable Thomas P. D'Agostino, who maintains the safety, reliability, and military utility of our Nation's nuclear weapons. We'll also hear testimony from the Office of Environmental Management (EM), whose mission is to clean up former Cold War nuclear weapons production sites.

I want to thank our witnesses today for taking the time out of their schedules to testify on these programs, and I of course want to thank my good friend and ranking member of this committee.

We've worked so well together over the years, having traveled on congressional delegations and other opportunities to be together. I want to thank Senator Sessions for all of his help and support over the years.

In August, we passed the Budget Control Act (BCA), which set a 10-year ceiling on the defense and non-defense portions of our discretionary budget. For the Department of Defense (DOD) relative to the 2012 baseline, that translates to a $259 billion reduction in the 5-year budget window from 2013 to 2017, with a growth of about 1 percent annually.

DOD made hard decisions to meet the reductions under the act, and likewise I expect similar hard decisions have been made by NNSA and the Office of EM. This hearing will examine those decisions.

This hearing will also examine recent findings from the National Academies from a study we legislated in the fiscal year 2010 defense authorization bill on the role of NNSA in managing its laboratories. NNSA has proposed a top-line budget of $11.5 billion, a 4.9 percent increase over the enacted fiscal year 2012 levels. Within that budget, the amount to maintain and modernize our nuclear weapons increased by 5 percent to $7.6 billion, nonproliferation increased by 7.1 percent to $2.5 billion, and the amount for naval reactors increased by .8 capability to $1.1 billion.

So compared to DOD, I would say NNSA came out a winner. In terms of the commitment made as a part of the New Strategic Arms Reduction Treaty (START) debate, the budget does fall short, about 4 percent short, of the $7.9 billion as found in what we refer to as the 1251 report, which is the 10-year nuclear modernization plan required under section 1251 of the 2010 National Defense Authorization Act (NDAA).

Realistically, given that the 1251 report was submitted to Congress in November 2010, 9 months before the BCA became law, falling 4 percent short of the $7.9 billion target is reasonable, given the fiscal reality facing us today.

The same can be said for the budget of the Office of EM. Its fiscal year 2013 budget request is $5.65 billion, about 2 percent below last year's enacted level. Now, this office has some of the most challenging and pressing problems in DOE in cleaning up millions of gallons of highly radioactive wastes left behind from 50 years of nuclear weapons production.

While the top-line numbers of the NNSA look good compared to DOD, there are, however, questionable decisions in its formulation. Let me go over my five top concerns. First and foremost is the decision to defer for 5 years the construction of the replacement for the Chemistry and Metallurgy Research Replacement (CMRR) facility, building in Los Alamos, first built in 1952 with a mandate for closing it by 2019 for safety reasons. This new CMRR facility along with the Uranium Processing Facility (UPF) at the Oak Ridge Y12 plant, are the two cornerstones for a modernized nuclear weapons infrastructure.

The administration agreed to build these facilities as part of the New START debate. The new CMRR facility was to facilitate an ability to manufacture, if needed, 50 to 80 plutonium pits per year, which as recently as 2 weeks ago General Kehler of U.S. Strategic

Command (STRATCOM) stated was still a DOD requirement. Without the new CMRR facility, Dr. McMillan, the Director of Los Alamos, has flatly stated an inability to meet that requirement.

In its place, NNSA is now looking at spreading out its plutonium operations to multiple NNSA facilities across the United States, from Lawrence Livermore in California to the Savannah River Site in South Carolina, just to be able to manufacture 20 to 30 pits per year. I hope Dr. D'Agostino and Don Cook can help me understand how they came to this decision and whether they believe the proposed alternative strategy is a sound and final decision.

In this current fiscal environment, deferring anything for any length of time implies a cancellation to Congress. It just implies that. So I am pleased that NNSA is proceeding with replacing the UPF, another Manhattan era facility used for making the secondaries in our nuclear weapons, but as I understand it they're increasing its budget by $150 million. It raises the question: Why couldn't NNSA use this increase to at least begin construction of the new CMRR facility, perhaps at a slower pace, but to get the process started? Multi-year budgeting is very difficult, but it does occur within this structure.

Second, I understand that the Nuclear Weapons Council (NWC) has given approval to begin the engineering for overhauling the B61 gravity bomb and I'm eager to hear what NNSA believes are the major costs and hurdles they face going forward in combining several variants of this weapon system into one, which ultimately, as we know, can save costs in its maintenance.

Third, in order to find funds for the B61 program, NNSA has slowed down its production of reworked W76 warheads that the Navy uses in its *Ohio*-class submarines. In a later hearing, I hope to explore the implications of this slowdown with the Navy, but I'm concerned whether it's disrupting the fleet's overhaul schedule of when the boats come to home port for installing the rebuilt warheads and whether the Navy will suffer increased costs and have a risk related to that as a result.

Fourth, DOD tells us they're delaying the schedule of the replacement for the *Ohio*-class submarines by 2 years, with first construction starting in 2021. This slip has caused a decrease in the research funds for its reactor by about $31 million in fiscal year 2013. So I would like to know from Admiral Donald what is the impact of this decrease and what is your concern on this trend, particularly in fiscal year 2014 and beyond?

Fifth, there are concerns about NNSA governance. The National Academy of Sciences released report that we referred to, mandated in the 2010 NDAA, which commented that "the relationship between NNSA and its national security laboratories is becoming dysfunctional." NNSA was created in the 1999 NDAA to give the weapons program independence, but the original intent of a standalone agency only reporting to the Secretary of Energy now seems lost.

So when you look at the DOE organization chart, it still resides within the DOE bureaucracy. I'd like to know from Dr. D'Agostino what his response to the report's findings might be and what we in Congress can do to help carry out your mission.

Finally, not to let you off the hook—and I'm going to butcher the word, the name; "Hue-ZIN-gah," am I close?

Mr. HUIZENGA. Yes.

Senator NELSON. Huizenga. I don't want to let you off the hook entirely here. The Hanford waste treatment plant had the honor in January of making the front page of USA Today, as we all know, with large cost overruns, up to a billion dollars over the life of the plant, which is currently budgeted at $12 billion and will begin operations in 2019.

The original cost was $5.7 billion, with operations to begin in 2011. This is the largest and most technically complex project in DOE, with a mission to retrieve and solidify into glass logs 53 million gallons of highly radioactive sludge and liquid waste residing in 177 underground tanks at the Hanford site. 144 of the tanks are just one layer of carbon steel, instead of the double-shell construction used today to contain leakage.

These tanks reside 7 to 12 miles from the Columbia River, which runs the length of the border between Oregon and Washington, where about 1.5 million people reside. So I'd like to know what action you have undertaken since August 2011, that review to reduce technical risk in the treatment facility and what efforts are there to resolve workers' concerns about safety and engineering design.

With that long opening, let me now turn to my good friend, Senator Sessions, for any opening remarks that he might like to make.

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS. Thank you, Chairman Nelson. It's been such a great pleasure to work with you on this subcommittee. Your knowledge and experience and judgment on these matters are invaluable to us, and I really value your judgment.

I share some of the concerns that you've raised. We do have responsibility to our constituents to challenge the proposals that are before us to make sure every dollar that we spend is wisely spent. I've been somewhat uneasy for a number of years about some of the nuclear programs that NNSA has been involved in, and we'll continue to raise those as time goes by.

Over the past few years, this subcommittee has heard testimony from countless experts who have unanimously recognized the critical need for modernizing our nuclear weapons complex. We have to do that. Unfortunately and counter to the bipartisan progress that we have made thus far, NNSA's fiscal year 2013 budget undermines that progress and the agreements that were reached, it seems, and jeopardizes the future viability of the nuclear weapons complex.

This budget incorrectly suggests that the recapitalization of our nuclear weapons complex is unaffordable and suggests that we as a Nation cannot afford to modernize in a way that assures confidence, confidence in competent stewardship.

I disagree with that. Despite our need for fiscal austerity—and there is a need—shortchanging nuclear modernization at a time when we face threats and uncertainty ahead, and they even grow, is simply not acceptable. We must continue to pursue the robust modernization the experts, such as the bipartisan Strategic Posture Commission, have testified has been critical to the recapitalization,

recapitalizing a vanishing intellectual base and crumbling infrastructure.

It has been only 1 year since the ratification of New START and the President has already failed to honor the commitments in this budget that he made at that time. I don't know exactly what the amount of money we need, but the amount that was committed is not provided for in this budget. Senator Kyl, who worked so hard on that, is deeply disappointed.

I'm prepared to hear testimony that some of the things could be done for less money, but I'm not prepared to concede that we should in any way reduce our plans to modernize our nuclear weapons.

So when first proposed in 2010, both Congress and the administration agreed that the 10-year nuclear modernization plan was a matter of national importance and, even with our dismal fiscal outlook and overwhelming consensus, concluded that fully funding a comprehensive modernization plan was essential for the future. Vice President Biden wrote in the Wall Street Journal in January 2010: "Over the next 5 years, we need to boost funding for these important activities by more than $5 billion. Even in a time of tough budget decisions, these are investments we must make for our security."

This plan and these budget decisions were the result of a lot of study and some bipartisan agreements. They had the full support of DOD, which even in the face of significant cuts to DOD was to contribute over $7 billion to NNSA.

As the ranking member of the Senate Budget Committee, I'm acutely aware of the fiscal challenges that face us. I appreciate that NNSA is looking for ways to do more with less. I certainly celebrate that. However, the decision to ignore critical DOD requirements and to defer the facility at Los Alamos construction and repair, while also increasing funding for the multi-billion dollar facility at Y12, is something I'm not comfortable with at this point.

It perpetuates the status quo mentality that everything nuclear has to be exceedingly expensive. Some things do, some things don't. I believe there are smarter and less onerous ways to affordably recapitalize the nuclear weapons complex and I'm disappointed not to see any serious proposals for addressing the out-of-control risk aversion that has ballooned costs.

The NNSA budget favors short-term cost avoidance over strategy and is based on a number of assumptions that are contrary to the national security of the United States and its allies. The budget neglects a standing DOD requirement for a capability to manufacture between 50 and 80 pits per year and recklessly presumes that future life extension program (LEP) plans will be allowed to cannibalize the pits of weapons currently held in strategic reserve. While the reuse of pits may be an attractive option, the studies to support its long-term feasibility have not taken place. Furthermore and most telling, these decisions are not supported by STRATCOM.

The budget underscores a growing disconnect between DOD and NNSA. A number of the fiscal year 2013 budget cuts have prompted our military leadership to question and raise concerns about NNSA's ability to meet DOD requirements. NNSA's mission is not just to produce a product; it's to serve a customer, and the cus-

tomer are the people charged with the defense of the United States of America. So I'm uneasy if the customer is not happy.

NNSA's decisions to ignore Navy requirements and delay the life extension of the W76 warhead is yet another example.

Finally, the lack of a 5-year budget plan has instilled a level of uncertainty the 10-year modernization plan and over $7 billion in DOD resources were determined to fix and to prevent.

Every agency is facing unprecedented budget pressures. We are facing unprecedented budget pressures. We really are. We do not have the money to do everything that we need to do for this country. Congress does not fully understand it. I'm not sure it's understood down to the depths of all of our agencies, including DOE and DOD. It's just serious. We don't have the money. That's what Admiral Mullen meant when he said the debt is the greatest threat to our national security. It could cause us to make bad decisions with regard to how we defend this country.

Every agency is facing challenges. However, DOD was able to maintain its commitment to modernizing the triad of delivery vehicles with minimal change. NNSA's decision to abandon cornerstone efforts at the CMRR facility at Los Alamos is troubling. Further, misplaced priorities like a nearly half a billion dollar increase to the $5.5 billion request for EM are unacceptable, given DOE's inability to meet critical national security requirements. So maybe I'm wrong about that. I'd like to hear that explained. That's the way our staff calculates an additional request for $500 million.

The lack of leadership demonstrated in this request is indicative of the White House attempting to undermine the long-term requirements in the agreement that was reached as part of the START Treaty, I am afraid. I know we're short money, but a serious agreement was made as part of that treaty to ensure that we modernize our nuclear weapons. That's something that most of us, I thought virtually all of us, had agreed to, and we're seeing a major retreat from that in this budget.

The threat, uncertainty, and risk of the international environment is growing and more nuclear power is coming on line. The budget before us for NNSA, with misguided cuts, seems to exacerbate the risk. The fiscal problem before us will not be solved by degrading our ability to maintain a safe, secure, and reliable nuclear stockpile.

Mr. Chairman, thank you for letting me express some concerns. I hope I have overstated the problem, and we'll give our witnesses a chance to explain.

Senator NELSON. You certainly didn't candy-coat your opening statement. So we appreciate your candor. Thank you very much.

At this point, I would like to submit for the record the opening statement of my colleague and a member of this subcommittee, Senator Lieberman.

[The prepared statement of Senator Lieberman follows:]

PREPARED STATEMENT BY SENATOR JOSEPH I. LIEBERMAN

As I have expressed throughout the course of the Senate Armed Services Committee's hearings in relation to the fiscal year 2013 defense authorization, I am deeply concerned about the reductions to our forces and deferment of crucial modernization programs caused by the constrained budget. We are pursuing these cuts to our national defense without sufficient reference to the continuing threats and challenges

we face across the globe. I believe we need to consider steps in the fiscal year 2013 authorization process to mitigate the risks posed to our national security by these budget cuts.

Our nuclear deterrent remains one of the most crucial aspects of our national defense. We may aspire to a more secure and peaceful world free of nuclear weapons but we must live in today's world where nuclear weapons are an unfortunate requirement for preserving the security of our country. As long as that is the case, the United States must maintain a credible deterrent capability. That requires investments in modernization of our nuclear weapons which have already been deferred for much of the past two decades. This budget envisions further delays to key elements of the modernization strategy, including a 2-year life extension of the B–61 gravity bomb, fielding of the Navy's refurbished W–76 warhead, and a minimum of a 5-year determent of the construction of the Chemistry and Metallurgy Research Replacement Nuclear Facility (CMRR–NF) at Los Alamos National Laboratory. These delays, particularly to the CMRR–NF, raise serious questions about our ability to develop and sustain the deterrent force envisioned in the 2010 Nuclear Posture Review. I hope we can work together to identify ways to provide more funding to NNSA Weapons Activities to change some of the decisions presented here.

Senator NELSON. Mr. D'Agostino, the floor is now yours. Thank you.

STATEMENT OF HON. THOMAS P. D'AGOSTINO, PH.D., ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION, AND UNDER SECRETARY FOR NUCLEAR SECURITY, DEPARTMENT OF ENERGY

Mr. D'AGOSTINO. Thank you, Mr. Chairman. Chairman Nelson, Ranking Member Sessions. Good afternoon and thank you for having me here to discuss the President's fiscal year 2013 budget request. Your ongoing support for the men and women of DOE and NNSA and the work that we do really help us keep American people safe, help protect our allies, and it really has enhanced global security.

In February, President Obama released his budget for 2013. Due in part to the constraints established by the BCA, this is a time to precisely target our investments. I want to assure you that NNSA and EM are being thoughtful, pragmatic, and efficient in how we complete our missions. We have continuously improved the way we operate and we're committed to doing our part in this constrained budget environment.

I also want to acknowledge that this is the first time I've come before you with more than NNSA to discuss. In an effort to maximize the accomplishments of mission-critical projects and organize needs more closely with DOE resources, EM and the Office of Legacy Management (LM) were aligned under my office last August, August 2011. It's been less than a year since the realignment and we're already seeing tangible benefits from working in a more thoughtful and coordinated way.

Still, NNSA and EM have separate budget requests and I'll talk about both here today. I know that both Don Cook and Admiral Donald from NNSA and Dave Huizenga from EM are testifying after I do, but I want to briefly discuss the President's 2013 request.

For NNSA, the President's request is $11.5 billion, an increase of $536 million over the fiscal year 2012 appropriation. The request reaffirms our commitment to building a 21st century nuclear security enterprise through innovative approaches to some of our greatest nuclear security challenges and key investments in our infra-

structure. As Dr. Cook will detail for you, we're continuing our critical work to maintain the Nation's nuclear stockpile and ensuring that as long as nuclear weapons exist they are safe, secure, and effective.

The request provides $7.58 billion for the weapons activity account to implement the President's strategy in coordination with our partners in DOD.

We're also here this morning to discuss the President's budget request for NNSA's naval reactors program, as Admiral Donald will detail for you shortly. NNSA has helped American sailors reach destinations across the globe safely and reliably for decades and the $1.1 billion 2013 request will support the effort on the *Ohio*-class submarine replacement and modernize key elements of our infrastructure. I'll leave it to Admiral Donald to expand on that, but support for the President's request is key to our ability to support the nuclear Navy.

EM's budget request of $5.65 billion enables the continued safe cleanup of environmental legacy brought out from 5 decades of nuclear weapons development and government-sponsored nuclear energy research. EM's cleanup priorities are based on risk, while continuing to meet the regulatory compliance commitments. Completing cleanup protects human health and the environment of communities surrounding our cities and sites—excuse me—surrounding sites, and enables other crucial DOE missions to continue.

By reducing the cleanup footprint, EM is lowering the cost of security, lowering costs of surveillance, infrastructure, and overhead activities that would otherwise continue for decades.

A core value of EM is safety, which is incorporated into every aspect of the EM program, and the EM program has maintained a strong safety record, continually striving for a workplace free of accidents or incidents, and promotes a robust safety culture throughout our enterprise.

NNSA, EM, and the Office of LM have many uniquely different challenges and each remains and operates separately. However, they also have some similar challenges and EM and LM's realignment under my role as the Under Secretary for Nuclear Security has allowed us to capitalize on the expertise that exists between the various programs in this portfolio, in areas such as project management, nuclear materials, and waste, nuclear safety and security. We've already seen the benefits of this realignment.

For example, at the Savannah River Site, EM and NNSA are working very closely together to fully utilize the H Canyon Facility and support multiple missions, including converting about 3.7 metric tons of plutonium into suitable feed for NNSA's Mixed Oxide (MOX) Fuel Fabrication Facility, removing contaminants in the plutonium to make it amenable for use as MOX feed, and reducing the amount of plutonium that EM needs to package and send to the Waste Isolation Pilot Plant (WIPP) for disposal. These activities will occur in addition to EM utilizing H Canyon to disposition spent nuclear fuel in H Canyon that is not suitable for extended storage in the L Basin.

At Oak Ridge, we're working together across our programs in order to accelerate the transfer of certain components of the ura-

nium-233 inventory at the Oak Ridge National Laboratory that are valuable for national security applications from EM to NNSA. The transfer of this material will support ongoing NNSA missions related to safety, nuclear emergency response, and special nuclear material measurement and detection. This initiative will result in significant cost savings to the EM program and enable EM to move forward on cleanup of nuclear facilities.

EM has also established a partnership with NNSA to build upon the success in NNSA with the supply chain management center, in other words managing the way we procure our components and commodity products by leveraging our buying power across the combined EM and NNSA complexes for commonly used goods and services with the objective of realizing cost savings for the EM program similar to the cost savings achieved in NNSA. These cost savings have well exceeded the $300 million mark.

In addition, NNSA is also working closely with LM to benchmark long-term surveillance and maintenance costs. Large closed sites with ongoing groundwater issues such as Fernault, Rocky Flats, Weldon Springs, Tuba City, and Mound may have post-closure requirements similar to some of the Savannah River Site facilities. So we're learning from each other by comparing scope and costs to refine our estimates.

I'm proud of what we've been able to accomplish so far and I'm excited about what we'll accomplish next. We're dedicated to achieving the President's nuclear security objectives, continuously improving the way we do business, and doing our part in this tough fiscal environment.

Thank you again for having me today and I'll be happy to answer any questions that you may have.

[The prepared statement of Mr. D'Agostino follows:]

PREPARED STATEMENT BY HON. THOMAS P. D'AGOSTINO

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, members of the subcommittee, good morning and thank you for having me here to discuss the President's fiscal year 2013 budget request. Your ongoing support for the men and women of the Department of Energy and the work they do, and your bi-partisan leadership on some of the most challenging national security issues of our time, has helped keep the American people safe, helped protect our allies, and enhanced global security.

Earlier this month, President Obama released his budget for fiscal year 2013. Due in part to the constraints established by the Budget Control Act, this is a time to precisely target our investments. I want to assure you that the National Nuclear Security Administration (NNSA) and the Office of Environmental Management (EM) are being thoughtful, pragmatic, and efficient in how we complete our missions.

IMPROVING THROUGH REALIGNMENT

First, I want to acknowledge that this is the first time I have come before you with more than NNSA to discuss. In an effort to maximize the accomplishments of mission-critical projects and organize needs more closely with DOE's resources, EM and the Office of Legacy Management (LM) were aligned under my office in August 2011.

NNSA and each office have uniquely different challenges, and each remains and operates separately. However, they also have some similar challenges, and EM and LM's realignment under my role as the Under Secretary for Nuclear Security has allowed us to capitalize on the expertise that exists between the various programs in this portfolio in areas such as project management, nuclear materials and waste,

and nuclear safety and security. We have already seen the benefits from this realignment.

At Savannah River Site, EM and NNSA are working closely together to utilize the H–Canyon facility and support multiple missions including: converting about 3.7 metric tons of plutonium into suitable feed for NNSA's Mixed Oxide Fuel (MOX) Fabrication Facility; removing contaminants in the plutonium to make it amenable for use as MOX feed; and reducing the amount of plutonium that EM needs to package and send to the Waste Isolation Pilot Plant for disposal. These activities will occur in addition to EM utilizing H–Canyon to disposition spent (used) nuclear fuel in H–Canyon that is not suitable for extended storage in L–Basin.

At Oak Ridge, we are working together to accelerate the transfer of certain components of the Uranium-233 inventory at Oak Ridge National Laboratory that are valuable for national security applications from EM to NNSA. The transfer of this material will support ongoing NNSA missions related to safety, nuclear emergency response, and special nuclear material measurement and detection. This initiative will result in cost savings for the EM program and enable EM to move forward on cleanup of nuclear facilities.

EM has established a partnership with NNSA to build upon their success with the Supply Chain Management Center, leveraging buying power across the combined EM and NNSA complexes for commonly used goods and services with the objective of realizing cost savings for the EM program similar to those NNSA has achieved.

In addition, NNSA is also working closely with LM to benchmark long-term surveillance and maintenance costs. Large closed sites with ongoing groundwater issues, such as Fernald, Rocky Flats, Weldon Spring, Tuba City, and Mound, may have post-closure requirements similar to some of the Savannah River facilities, so we are learning from each other by comparing scope and cost to refine our estimates.

It has been less than a year since the realignment, and we are already seeing tangible benefits from working in a more thoughtful, coordinated way. Still, NNSA and EM have separate budget requests, and I'll talk about both here today.

NNSA: ACHIEVING THE PRESIDENT'S NUCLEAR SECURITY OBJECTIVES, SHAPING THE FUTURE

In April 2009 in Prague, President Obama shared his vision for a world without nuclear weapons, free from the threat of nuclear terrorism, and united in our approach toward shared nuclear security goals. The President's fiscal year 2013 request for NNSA is $11.5 billion, an increase of $536 million, or 4.9 percent, over the fiscal year 2012 appropriation. The request reaffirms the national commitment to his vision, applying world-class science that addresses our Nation's greatest nuclear security challenges and building NNSA's 21st century nuclear security enterprise through key investments in our people and infrastructure, including the revitalization of our existing facilities.

We are doing this in a number of key ways. We are continuing our critical work to maintain the Nation's nuclear stockpile, and ensuring that, as long as nuclear weapons exist, the stockpile is safe, secure, and effective. The fiscal year 2013 budget provides $7.58 billion for our Weapons Activities account, an increase of 5 percent over fiscal year 2012, to implement the President's strategy in coordination with our partners at the Department of Defense.

The President continues to support our life extension programs (LEP) including funding for B61–12 activities in response to the Nuclear Weapons Council's (NWC) anticipated approval and entry into Phase 6.3 Development Engineering. He has also requested increased funding for our Stockpile Systems to support the W78 and W88 life extension study, which I discussed with you last year.

The President's budget also reflects his commitment to completing key dismantlements, with $51.3 million requested in fiscal year 2013 to continue reducing the number of legacy nuclear weapons retired from the stockpile. NNSA has previously committed to completing the dismantlement of all warheads retired as of fiscal year 2009 by fiscal year 2022, and we continue to be on a path to do that. In fact, in fiscal year 2011, NNSA completed the dismantlement of the last B53 nuclear bomb, one of the largest ever built, ahead of schedule and under budget. We also eliminated the last components of the W70 warhead which was originally in the U.S. Army's arsenal.

Our request for investments in the science, technology, and engineering that support NNSA's missions will ensure that our national security laboratories continue to lead the world in advanced scientific capabilities. $150.6 million is requested for our engineering campaign, which reflects the need for validation-related testing and

surety options required for current and future refurbishments; $350.1 million is requested for our science campaign, expanding and refining our experiments and capabilities, which coupled to simulation, improves our confidence in and broadens the national security application of our predictive capabilities; and $460 million is requested for our inertial confinement fusion and high yield campaign, to operate NNSA's suite of world-leading high energy density facilities—National Ignition Facility (NIF), Omega, and Z—to support stockpile stewardship in a safe and secure manner.

The Advanced Simulation and Computing campaign's request of $600 million is requested for the continued improvement of full system calculations and metric suites that are essential to annual assessments and also to future stockpile changes. Our capabilities directly impact our stockpile by generating incredibly sophisticated models against which we can validate our nuclear weapons codes. Not only has supercomputing helped us solve some existing questions such as energy balance, it also allows us to plan for issues that impact the future health of our deterrent: aging, component lifetimes, and new models for abnormal and hostile environment certification. Supercomputing is critical for LEPs and stockpile modernization: the implementation of various concepts such as reuse and enhanced multipoint safety are only possible with the power of ASC platforms.

For over a decade, NNSA has been building the science, technology, and engineering tools and capabilities needed to take care of the stockpile. We are now entering a time when we will fully utilize these analytical tools and capabilities towards the mission of maintaining a safe, secure, and effective stockpile and performing the necessary life extension work. These capabilities also provide the critical base for nonproliferation and counterterrorism work, allowing us to apply our investments to the full scope of our mission.

To support our stockpile and to continue producing the world-class capabilities we need to modernize our Cold War-era facilities and maintain the Nation's expertise in uranium processing and plutonium research. This budget includes $2.24 billion to maintain our infrastructure, and execute our construction projects.

The President also requests support for infrastructure improvements necessary to maintain the stockpile well into the future. Major efforts include extending the life of enduring facilities needed for Directed Stockpile Work (DSW) and ST&E program requirements, construction of the Uranium Processing Facility at Y–12, and construction of the TRU Waste Facility at Los Alamos National Laboratory. Funding will also provide for the start of construction of the Electrical Infrastructure Upgrades project at Lawrence Livermore and Los Alamos National Laboratories, and continued construction activities for various projects at Los Alamos and Sandia National Laboratories, the Y–12 National Security Complex, and Pantex. The budget request also includes the resources we need to ensure a comprehensive physical and cyber security posture that provides strong security to support NNSA missions—protecting our nuclear materials, facilities, and information.

However, our nuclear deterrent is only one part of NNSA's mission. Our nonproliferation programs perform an equally critical function. One of our most important missions has been to support the administration's commitment to secure the most vulnerable nuclear material across the globe in 4 years. Our accomplishments in securing plutonium and highly enriched uranium around the world have made it significantly more difficult to acquire and traffic the materials required to make an improvised nuclear device, and I am proud to say that we are on track to meet our goals to remove or dispose of 4,353 kilograms of highly enriched uranium and plutonium in foreign countries, and equip approximately 229 buildings containing weapons-usable material with state-of-the-art security upgrades.

The Defense Nuclear Nonproliferation budget request provides the $2.46 billion to continue these and other critical nonproliferation and nuclear security efforts. Our continued focus on innovative and ambitious nonproliferation and nuclear security efforts is vital. The threat is not gone, and the consequences of nuclear terrorism and state proliferation would be devastating. Detonation of a nuclear device anywhere in the world would lead to significant loss of life, and overwhelming economic, political, and psychological consequences. We must remain committed to reducing the risk of nuclear terrorism and state-based proliferation.

The fiscal year 2013 budget request also gives us the resources we need to maintain our one-of-a-kind emergency response capabilities, which allow us to respond to a nuclear or radiological incidents anywhere in the world. In fiscal year 2011, we were able to assist the U.S. military, military families, and the Japanese people by deploying our unique emergency response assets in the aftermath of devastating tsunami that affected the Fukushima Daiichi Nuclear Power Plant.

In response to the President's concern regarding the threat of nuclear terrorism, which is also a key goal within the 2010 Nuclear Posture Review, we have estab-

lished a new organization that is now the focal point for all counterterrorism and counter proliferation activities within NNSA. This organization, the Office of Counterterrorism and Counterproliferation, not only provides unique technical contributions based on NNSA's core nuclear science and technology expertise, but also is designed to coordinate all nuclear counterterrorism, counterproliferation, and post-detonation nuclear forensics related efforts without drastic restructuring.

In addition, NNSA's Naval Reactors program directly supports all aspects of the U.S. Navy's nuclear fleet, which encompasses the Navy's submarines and aircraft carriers, over 40 percent of the U.S. Navy's major combatants. Currently, the nuclear fleet is composed of 54 attack submarines, 14 ballistic missile submarines, 4 guided missile submarines, and 11 aircraft carriers. Over 8,300 nuclear-trained Navy personnel safely operate the propulsion plants on these ships all over the world, and their consistent forward presence protects our national interests. Our $1.1 billion fiscal year 2013 request will support the refueling overhaul for the S8G Land-based Prototype reactor, the design of the *Ohio* Replacement reactor plant, and recapitalization of our naval spent nuclear fuel infrastructure.

Each of the projects is critical to fulfillment of the Navy's longer term needs. The S8G Land-based Prototype Refueling Overhaul reactor plant has served Naval Reactors' needs for research, development, and training since 1978, and the reactor provides a cost-effective testing platform for new technologies and components before they are introduced. To continue vital research capabilities, as well as train sufficient operators to man the Fleet, the S8G Land-based Prototype Refueling Overhaul must begin in 2018. The *Ohio* Replacement reactor plant design continues and the fiscal year 2013 requested amount supports continuing this work to meet the Navy's revised schedule and procurement of reactor plant components in 2019 (to support a 2021 lead-ship procurement). We need to recapitalize its naval spent fuel infrastructure in a cost-effective way that does not impede the refueling of active ships and their return to operations. The existing facility is more than 50 years old, and was never designed for its current primary mission of packaging naval spent nuclear fuel for permanent dry storage.

Finally, $411 million is requested for NNSA's Office of the Administrator account. This funds Federal personnel and provides for resources necessary to plan, manage, and oversee the operation of NNSA missions which strengthen U.S. security.

NNSA: DOING OUR PART

We are committed to being responsible stewards of taxpayer dollars. We have taken steps to ensure that we are building a capabilities-based enterprise focused on needs and solutions. We view this constrained budget environment as an additional incentive to ask ourselves how we can re-think the way we are operating, how we can innovate, and how we can get better.

For example, in close consultation with our national laboratories and national security sites, we are adjusting our plutonium strategy by deferring for at least 5 years construction of the Chemistry and Metallurgy Research Replacement Nuclear Facility (CMRR–NF) project at Los Alamos National Laboratory and focusing instead on how we can meet our plutonium needs on an interim basis by using the capabilities and expertise found at existing facilities. Utilizing existing facilities will allow us to meet anticipated near term requirements for plutonium operations while focusing on other key modernization projects. Deferring CMRR–NF will have an estimated cost avoidance from 2013 to 2017 that totals approximately $1.8 billion, which will help offset the costs of other priorities such as Weapons Lifetime Extension programs and other infrastructure needs.

We have also updated our strategy to stop the spread of dangerous nuclear material as we meet the President's 4-year lockdown goal. We have developed an innovative approach to scientist engagement tailored for an age when knowledge spreads effortlessly through Google, Facebook, and Twitter.

We are not resting on old ideas to solve tomorrow's problems—we're shaping the future of nuclear security, and we're doing it in a fiscally responsible way. However, I want to stress that as we make adjustments and look toward the future, our plans are based on the fiscal year 2013 budget request, which give us the resources we need to carry out our mission. Budget uncertainty adds cost and complexity to how we achieve our goals. You have been supportive of our efforts in the past, I ask again for your help in providing the stability we need to do our jobs efficiently and effectively.

NNSA: CONTINUOUSLY IMPROVING

I would like to acknowledge that I have come before you in the past and talked at length about how NNSA has been working to change the way we do business.

I am proud of the work the men and women of our NNSA have done to come together and operate as one. We are defining ourselves as a fully integrated enterprise that operates efficiently, is organized to succeed, that performs our work seamlessly, and speaks with one voice.

We are improving everywhere, from our governance model to our network infrastructure, from our contracting processes to leadership and development programs. We are improving business processes by implementing the ISO 9001 standard, looking toward the future through a workforce analysis, and improving efficiency through consolidated contracts.

We are continuously improving so we are able to do the work the American people need us to do, in a time when everyone is looking to do more with less. We are positioning ourselves for the next decade by making big decisions focused on the future.

For example, after more than 2 years of analysis and outside reviews, we released an RFP for the combined management of the Y–12 National Security Complex and Pantex Plant, with an option for phase-in of Tritium Operations performed at the Savannah River Site. Combining contracts and site offices will allow us to improve performance, reduce the cost of work, and operate as an integrated enterprise. We also decided to compete the contract for management and operation of Sandia National Laboratories, a move designed to find meaningful improvement in performance and reduce cost for taxpayers.

We have taken other significant steps to continue improving, from top-to-bottom. We created an Acquisition and Project Management organization to help institutionalize our commitment to improving the way we do business. This move will improve the quality of our work while keeping our projects on time and on budget.

We awarded a Blanket Purchasing Agreement for Enterprise Construction Management Services. The BPA will standardize our approach to project management across the enterprise and provide subject matter experts to provide independent analysis and advice related to the design and construction of facilities.

Importantly, we have institutionalized a culture of safety. Through a unique series of Biennial Reviews, including reviews at Headquarters, we have improved nuclear safety across our Nuclear Security Enterprise. We have provided objective, value-added information to managers that ensure our nuclear safety oversight is consistent and effective. Since the reviews began in 2005, we have seen continuous improvement at every site.

ENVIRONMENTAL MANAGEMENT

The Senior Advisor for the Office of Environmental Management will provide more detail to you through separate testimony, but I want to note that EM's fiscal year 2013 budget request of $5.65 billion enables the continued safe cleanup of the environmental legacy brought about from five decades of nuclear weapons development and government-sponsored nuclear energy research. EM's cleanup priorities are based on risk while continuing to meet regulatory compliance commitments. Completing cleanup protects human health and the environment of the communities surrounding our sites and enables other crucial DOE missions to continue. By reducing the cleanup footprint, EM is lowering the cost of security, surveillance, infrastructure, and overhead activities that would otherwise continue for years to come. A core value of EM is safety, which is incorporated into every aspect of the EM program. EM has maintained a strong safety record, continuously strives for a workplace free of accidents or incidents, and promotes a robust safety culture throughout the complex.

CONCLUSION

Our mission is vital, and your past support has been key in helping us accomplish it. The fiscal year 2013 budget reflects our commitment to keeping the American people safe while continuously improving and doing our part in a time of fiscal austerity. We are looking toward the future and building an organization that is aligned to succeed. I look forward to working with each of you to help us do that. Thank you.

National Nuclear Security Administration

Appropriation and Program Summary Tables
Outyear Appropriation Summary Tables

FY 2013 BUDGET TABLES

National Nuclear Security Administration
Overview
Appropriation Summary [a b]

	(dollars in thousands)						
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
Office of the Administrator							
Program Direction	398,993	410,000	411,279	418,742	426,599	434,848	444,276
Rescission of Prior Year Balances	-5,700	0	0	0	0	0	0
Total, Office of the Administrator	393,293	410,000	411,279	418,742	426,599	434,848	444,276
Weapons Activities Appropriation							
Defense Programs							
Directed Stockpile Work	1,905,078	1,873,694	2,088,274				
Science Campaign	366,167	332,958	350,104				
Engineering Campaign	142,010	142,636	150,571				
Inertial Confinement Fusion Ignition and High Yield Campaign	478,105	474,812	460,000				
Advanced Simulation and Computing Campaign	613,620	618,076	600,000				
Readiness Campaign	91,695	128,406	130,095				
Readiness in Technical Base and Facilities	1,842,519	2,004,785	2,239,828				
Secure Transportation Asset	251,806	242,802	219,361				
Total, Defense Programs	5,691,000	5,818,169	6,238,233				
Nuclear Counterterrorism Incident Response	232,503	220,969	247,552				
Facilities and Infrastructure Recapitalization Program	93,574	96,120	0				
Site Stewardship	104,727	78,581	90,001				
Safeguards and Security							
Defense Nuclear Security	717,722	695,679	0				
Cyber Security	124,231	126,370	0				
Subtotal, Safeguards and Security	841,953	822,049	0				
Defense Nuclear Security	0	0	643,285				
NNSA CIO Activities	0	0	155,022				
Science, Technology and Engineering Capability	19,794	0	0				
National Security Applications	0	10,000	18,248				
Legacy Contractor Pensions	0	168,232	185,000				
Use of Prior Year Balances	-67,776	0	0				
Rescission of Prior Year Balances	-50,000	0	0				
Total, Weapons Activities	6,865,775	7,214,120	7,577,341	7,613,033	7,755,866	7,905,841	8,077,242
Defense Nuclear Nonproliferation							
Nonproliferation and Verification Research and Development	355,407	354,150	548,186	412,622	420,344	428,417	437,719
Nonproliferation and International Security	147,494	153,594	150,119	156,363	167,070	173,718	177,490
International Nuclear Materials Protection and Cooperation	578,633	569,927	311,000	282,628	288,026	293,870	300,171
Fissile Materials Disposition	802,198	685,386	921,305	950,000	960,000	975,000	996,170
Global Threat Reduction Initiative	444,689	498,000	466,021	485,775	494,866	504,371	515,322
Legacy Contractor Pensions	0	55,823	62,000	63,138	64,320	65,555	66,978
Use of Prior Year Balances	-2,050	0	0	0	0	0	0
Rescission of Prior Year Balances	-45,000	-21,000	0	0	0	0	0
Total, Defense Nuclear Nonproliferation	2,281,371	2,295,880	2,458,631	2,350,526	2,394,626	2,440,931	2,493,850
Naval Reactors							
Naval Reactors	986,526	1,080,000	1,088,635	1,108,391	1,129,186	1,151,021	1,175,975
Rescission of Prior Year Balances	-1,000	0	0	0	0	0	0
Total, Naval Reactors	985,526	1,080,000	1,088,635	1,108,391	1,129,186	1,151,021	1,175,975
Total, NNSA	10,525,965	11,000,000	11,535,886	11,490,692	11,706,277	11,932,641	12,191,343

[a] The annual totals include an allocation to NNSA from the Department of Defense. The amounts included are $677,076 in FY 2014; $712,344 in FY 2015; $766,924 in FY 2016; and $781,204 in FY 2017.

[b] FY 2012 Enacted reflects a rescission of $27,300 associated with savings from the contractor pay freeze. Of the $27,300, $19,877 was rescinded from Weapons Activities and $7,423 was rescinded from Defense Nuclear Nonproliferation.

NNSA Future-Years Nuclear Security Program[3]

(Dollars in Thousands)

	FY 2013 Request	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
NNSA					
Office of the Administrator	411,279	418,742	426,599	434,848	444,276
Weapons Activities	7,577,341	7,613,033	7,755,866	7,905,841	8,077,242
Defense Nuclear Nonproliferation	2,458,631	2,350,526	2,394,626	2,440,931	2,493,850
Naval Reactors	1,088,635	1,108,391	1,129,186	1,151,021	1,175,975
Total, NNSA	**11,535,886**	**11,490,692**	**11,706,277**	**11,932,641**	**12,191,343**

[3] The annual totals include an allocation to NNSA from the Department of Defense. The amounts included are $677,076 in FY 2014; $712,344 in FY 2015; $766,924 in FY 2016; and $781,204 in FY 2017.

Office of the Administrator

Overview
Appropriation Summary by Program

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Office of the Administrator			
NNSA Program Direction			
Salaries and Benefits	282,967	301,995	304,474
Travel	16,536	15,500	15,500
Support Services	22,445	20,500	20,500
Other Related Expenses	77,045	72,005	70,805
Subtotal, Office of the Administrator	**398,993**	**410,000**	**411,279**
Rescission of Prior Year Balances	-5,700	0	0
Total, Office of the Administrator	**393,293**	**410,000**	**411,279**

Outyear Appropriation Summary by Program

	(Dollars in Thousands)			
	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
Office of the Administrator				
NNSA Program Direction				
Salaries and Benefits	311,937	319,794	328,043	337,471
Travel	15,500	15,500	15,500	15,500
Support Services	20,500	20,500	20,500	20,500
Other Related Expenses	70,805	70,805	70,805	70,805
Total, Office of the Administrator	**418,742**	**426,599**	**434,848**	**444,276**

Weapons Activities

Overview
Appropriation Summary by Program

	(dollars in thousands)		
	FY 2011 Current	FY 2012 Enacted [a]	FY 2013 Request
Weapons Activities			
Directed Stockpile Work	1,905,078	1,873,694	2,088,274
Science Campaign	366,167	332,958	350,104
Engineering Campaign	142,010	142,636	150,571
Inertial Confinement Fusion Ignition and High Yield Campaign	478,105	474,812	460,000
Advanced Simulation and Computing Campaign	613,620	618,076	600,000
Readiness Campaign	91,695	128,406	130,095
Readiness in Technical Base and Facilities	1,842,519	2,004,785	2,239,828
Secure Transportation Asset	251,806	242,802	219,361
Nuclear Counterterrorism Incident Response	232,503	220,969	247,552
Facilities and Infrastructure Recapitalization Program	93,574	96,120	0
Site Stewardship	104,727	78,581	90,001
Defense Nuclear Security	717,722	695,679	643,285
Cyber Security	124,231	126,370	0
NNSA CIO Activities	0	0	155,022
Science, Technology and Engineering Capability	19,794	0	0
National Security Applications	0	10,000	18,248
Legacy Contractor Pensions	0	168,232	185,000
Subtotal Weapons Activities	**6,983,551**	**7,214,120**	**7,577,341**
Use of Prior Year Balances	-67,776	0	0
Rescission of Prior Year Balances	-50,000	0	0
Total, Weapons Activities	**6,865,775**	**7,214,120**	**7,577,341**

Out-Year Appropriation Summary by Program

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Directed Stockpile Work

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Directed Stockpile Work			
Life Extension Programs	248,357	479,098	543,931
Stockpile Systems	651,333	486,123	590,409
Weapons Dismantlement and Disposition	57,968	56,591	51,265
Stockpile Services	947,420	851,882	902,669
Total, Directed Stockpile Work	**1,905,078**	**1,873,694**	**2,088,274**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Science Campaign

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Total, Science Campaign	**366,167**	**332,958**	**350,104**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Engineering Campaign

Funding Profile by Subprogram and Activity

	(dollars in thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Total, Engineering Campaign	**142,010**	**142,636**	**150,571**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Inertial Confinement Fusion Ignition and High Yield Campaign

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Total, Inertial Confinement Fusion and High Yield Campaign	**478,105**	**474,812**	**460,000**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Advanced Simulation and Computing Campaign

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Total, Advanced Simulation and Computing Campaign	**613,620**	**618,076**	**600,000**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Readiness Campaign

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Total, Readiness Campaign	**91,695**	**128,406**	**130,095**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Readiness in Technical Base and Facilities

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Readiness in Technical Base and Facilities			
Operations of Facilities	1,255,307	1,281,847	1,419,403
Program Readiness	69,736	73,962	0
Material Recycle and Recovery	77,493	77,780	0
Containers	27,820	28,892	0
Storage	23,945	31,196	0
Nuclear Operations Capability Support	0	0	203,346
Science Technology and Engineering Support	0	0	166,945
Subtotal, Operations and Maintenance	**1,454,301**	**1,493,677**	**1,789,694**
Construction	388,218	511,108	450,134
Total, Readiness in Technical Base and Facilities	**1,842,519**	**2,004,785**	**2,239,828**

Out-Year Funding Schedule by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Secure Transportation Asset

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Secure Transportation Asset (STA)			
Operations and Equipment	156,877	144,800	114,965
Program Direction	94,929	98,002	104,396
Total, Secure Transportation Asset	**251,806**	**242,802**	**219,361**

Secure Transportation Asset - Operations and Equipment

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Operations and Equipment			
Mission Capacity	83,718	84,376	56,458
Security Safety Capability	34,670	19,986	22,457
Infrastructure and C5 Systems	28,867	29,449	24,199
Program Management	9,622	10,989	11,851
Total, Operations and Equipment	**156,877**	**144,800**	**114,965**

Secure Transportation Asset - Program Direction

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Program Direction			
Salaries and Benefits	79,644	82,613	84,878
Travel	8,334	7,758	7,216
Other Related Expenses	6,951	7,631	12,302
Total, Program Direction	**94,929**	**98,002**	**104,396**
Total Full Time Equivalents	**637**	**622**	**639**

Out Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Nuclear Counterterrorism Incident Response

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Nuclear Counterterrorism Incident Response (Homeland Security) [a]			
Emergency Response (Homeland Security) [a]	135,429	136,185	150,043
National Technical Nuclear Forensics (Homeland Security) [a]	11,446	11,589	11,694
Emergency Management (Homeland Security) [a]	7,494	7,153	6,629
Operations Support (Homeland Security) [a]	8,488	8,691	8,799
International Emergency Management and Cooperation	6,986	7,129	7,139
Nuclear Counterterrorism (Homeland Security) [a]	62,660	50,222	63,248
Total, Nuclear Counterterrorism Incident Response	**232,503**	**220,969**	**247,552**

Out-Year Target Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

[4] Office of Management and Budget (OMB) Homeland Security designation.

Facilities and Infrastructure Recapitalization Program

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Facilities and Infrastructure Recapitalization Program			
Operations and Maintenance (O&M)			
Recapitalization	77,160	81,720	0
Infrastructure Planning	6,494	9,400	0
Facility Disposition	9,920	5,000	0
Total, O&M Facilities and Infrastructure Recapitalization Program	**93,574**	**96,120**	**0**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Site Stewardship

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Site Stewardship			
Operations and Maintenance			
Environmental Projects and Operations	41,970	45,191	46,978
Energy Modernization and Investment Program	6,618	0	10,262
Nuclear Materials Integration	41,169	33,390	18,963
Corporate Project Management	0	0	13,798
Total, Operations and Maintenance	**89,757**	**78,581**	**90,001**
Construction	**14,970**	**0**	**0**
Total, Site Stewardship	**104,727**	**78,581**	**90,001**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Defense Nuclear Security

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Defense Nuclear Security			
Operations and Maintenance (Homeland Security)			
Protective Forces	414,166	418,758	341,676
Physical Security Systems	73,794	82,783	98,267
Information Security	25,943	30,117	34,237
Personnel Security	30,913	37,285	37,781
Materials Control and Accountability	35,602	34,592	34,484
Program Management	78,183	75,595	96,840
Technology Deployment, Physical Security	7,225	4,797	0
Total, Operations and Maintenance (Homeland Security)	**665,826**	**683,927**	**643,285**
Construction (Homeland Security)	51,896	11,752	0
Total, Defense Nuclear Security	**717,722**	**695,679**	**643,285**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Cyber Security

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Cyber Security (Homeland Security)			
Infrastructure Program	97,735	107,374	0
Enterprise Secure Computing	21,500	14,000	0
Technology Application Development	4,996	4,996	0
Total, Cyber Security	**124,231**	**126,370**	**0**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

NNSA CIO Activities

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
NNSA CIO Activities			
Cyber Security (Homeland Security)			
Infrastructure Program	0	0	111,022
Technology Application Development [a]	0	0	0
Enterprise Secure Computing (Homeland Security)	0	0	14,000
Federal Unclassified Information Technology	0	0	30,000
Total, NNSA CIO Activities	**0**	**0**	**155,022**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

[5] In FY 2011 and FY 2012 Technology Application Development is reflected in the Cyber Security program. In FY 2013 funds supporting Technology Application Development were realigned to infrastructure for higher priority requirements. Technology Application initiatives are to be supported in the outyears.

National Security Applications

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Total, National Security Applications	**0**	**10,000**	**18,248**
Total, Science, Technology and Engineering Capability	**19,794**	**0**	**0**

Out-Year Funding Profile by Subprogram and Activity

The outyear numbers for Weapons Activities do not reflect programmatic requirements. Rather, they are an extrapolation of the FY 2013 request based on rates of inflation in the Budget Control Act of 2011. The Administration will develop outyear funding levels based on actual programmatic requirements at a later date.

Defense Nuclear Nonproliferation

Overview
Appropriation Summary by Program

	(dollars in thousands)		
	FY 2011 Current	FY 2012 Enacted [a]	FY 2013 Request
Defense Nuclear Nonproliferation			
Nonproliferation and Verification Research and Development	355,407	354,150	548,186
SBIR/STTR [Non-Add]	[5,579]	[6,245]	[11,727]
Nonproliferation and International Security	147,494	153,594	150,119
International Nuclear Materials Protection and Cooperation [b]	578,633	569,927	311,000
Fissile Materials Disposition	802,198	685,386	921,305
Global Threat Reduction Initiative [b]	444,689	498,000	466,021
Legacy Contractor Pensions	0	55,823	62,000
Subtotal of Defense Nuclear Nonproliferation	**2,328,421**	**2,316,880**	**2,458,631**
Use of Prior Year Balances	-2,050	0	0
Rescission of Prior Year Balances	-45,000	-21,000	0
Total, Defense Nuclear Nonproliferation	**2,281,371**	**2,295,880**	**2,458,631**

Out-Year Appropriation Summary by Program

	(dollars in thousands)			
	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
Defense Nuclear Nonproliferation				
Nonproliferation and Verification Research and Development	412,622	420,344	428,417	437,719
Nonproliferation and International Security	156,363	167,070	173,718	177,490
International Nuclear Materials Protection and Cooperation [b]	282,628	288,026	293,870	300,171
Fissile Materials Disposition	950,000	960,000	975,000	996,170
Global Threat Reduction Initiative [b]	485,775	494,866	504,371	515,322
Legacy Contractor Pensions	63,138	64,320	65,555	66,978
Total, Defense Nuclear Nonproliferation	**2,350,526**	**2,394,626**	**2,440,931**	**2,493,850**

[6] FY 2012 Enacted reflects rescission of $7.4 million associated with savings from the contractor pay freeze.

[7] FY 2011 total includes international contributions for INMP&C of $300,000 from South Korea, $117,000 from the United Kingdom of Great Britain, $512,076 from Norway, $540,602 from New Zealand, and $5,169,026 from Canada. International
contributions for GTRI include $8,207,791 from Canada, and $499,970 from the Netherlands.

Nonproliferation and Verification Research and Development

Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Nonproliferation and Verification Research and Development			
Proliferation Detection (PD)	229,427	222,150	240,536
Homeland Security-Related Proliferation Detection [Non-Add]	[50,000]	[50,000]	[50,000]
Nuclear Detonation Detection (NDD)	125,980	132,000	157,650
Domestic Uranium Enrichment RD&D	0	0	150,000
SBIR/STTR [a] [Non-Add]	0	[6,245]	[11,727]
Total, Nonproliferation and Verification R&D	**355,407**	**354,150**	**548,186**

Out-Year Funding Profile by Subprogram and Activity

	(Dollars in Thousands)			
	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
Nonproliferation and Verification Research and Development				
Proliferation Detection (PD)	248,312	252,955	257,790	263,369
Homeland Security-Related Proliferation Detection [Non-Add]	[50,000]	[50,000]	[50,000]	[50,000]
Nuclear Detonation Detection (NDD)	164,310	167,389	170,627	174,350
Domestic Uranium Enrichment RD&D	0	0	0	0
SBIR/STTR [Non-Add]	[8,446]	[8,941]	[9,598]	[10,461]
Total, Nonproliferation and Verification R&D	**412,622**	**420,344**	**428,417**	**437,719**

[a] FY 2011 current appropriation reflects the $5,579 thousand transferred out of the DNN appropriation for SBIR/STTR.

Nonproliferation and International Security
Funding Profile by Subprogram and Activity[9]

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Nonproliferation and International Security			
Dismantlement and Transparency	49,207	0	0
Global Security Engagement and Cooperation	47,289	0	0
International Regimes and Agreements	39,824	0	0
Treaties and Agreements	11,174	0	0
Nuclear Safeguards and Security	0	54,897	54,723
Nuclear Controls	0	47,444	45,420
Nuclear Verification	0	39,969	40,566
Nonproliferation Policy	0	11,284	9,410
Total, Nonproliferaiton and International Security	**147,494**	**153,594**	**150,119**

Out-Year Funding Profile by Subprogram and Activity

	(Dollars in Thousands)			
	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
Nonproliferation and International Security				
Dismantlement and Transparency	0	0	0	0
Global Security Engagement and Cooperation	0	0	0	0
International Regimes and Agreements	0	0	0	0
Treaties and Agreements	0	0	0	0
Nuclear Safeguards and Security	56,999	60,902	63,326	64,701
Nuclear Controls	47,309	50,549	52,560	53,701
Nuclear Verification	42,253	45,147	46,943	47,962
Nonproliferation Policy	9,802	10,472	10,889	11,126
Total, Nonproliferaiton and International Security	**156,363**	**167,070**	**173,718**	**177,490**

[9] The Nonproliferation and International Security Program implemented a budget structure change starting in FY 2012. The structure change created a more efficient and clearer program organization with activities aligned along functional lines that reflect U.S. nonproliferation priorities and initiatives. The new structure depicts more clearly the alignment of people,
technology, and resources to meet and implement nuclear nonproliferation objectives.

International Nuclear Materials Protection and Cooperation
Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
International Nuclear Materials Protection and Cooperation			
Navy Complex	34,332	33,664	39,860
Strategic Rocket Forces/12th Main Directorate	51,359	59,105	8,300
Weapons Material Protection [a]	93,318	80,735	46,975
Civilian Nuclear Sites	53,027	59,117	60,092
Material Consolidation and Conversion	13,867	14,306	17,000
National Infrastructure and Sustainability Program [b]	60,928	60,928	46,199
Second Line of Defense	265,163	262,072	92,574
International Contributions [c]	6,639	0	0
Total, International Nuclear Materials Protection and Cooperation	**578,633**	**569,927**	**311,000**

Out-Year Funding Profile by Subprogram and Activity

	(Dollars in Thousands)			
	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
International Nuclear Materials Protection and Cooperation				
Navy Complex	39,742	39,767	39,843	39,823
Strategic Rocket Forces/12th Main Directorate	14,300	14,300	14,300	14,300
Weapons Material Protection [a]	54,857	54,882	54,958	54,938
Civilian Nuclear Sites	59,972	59,997	60,074	60,053
Material Consolidation and Conversion	20,000	20,000	20,000	20,000
National Infrastructure and Sustainability Program [b]	46,081	46,106	46,182	46,162
Second Line of Defense	47,676	52,974	58,513	64,895
Total, International Nuclear Materials Protection and Cooperation	**282,628**	**288,026**	**293,870**	**300,171**

[a] Weapons Material Protection was formerly known as Rosatom Weapons Complex.

[b] National Infrastructure and Sustainability was formerly known as National Programs and Sustainability.

[c] FY 2011 total includes international contributions of $300,000 from South Korea, $117,000 from the United Kingdom of Great Britain, $512,076 from Norway, $540,602 from New Zealand, and $5,169,026 from Canada.

Fissile Materials Disposition
Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Fissile Materials Disposition			
U.S. Surplus Fissile Materials Disposition			
Operations and Maintenance (O&M)			
U.S. Plutonium Disposition	200,400	205,632	498,979
U.S. Uranium Disposition	25,985	26,000	29,736
Subtotal, O&M	**226,385**	**231,632**	**528,715**
Construction	575,788	452,754	388,802
Total, U.S. Surplus Fissile Materials Disposition	**802,173**	**684,386**	**917,517**
Russian Surplus Fissile Materials Disposition			
Russian Materials Disposition	25	1,000	3,788
Total, Fissile Materials Disposition	**802,198**	**685,386**	**921,305**

Out-Year Funding Profile by Subprogram and Activity

	(Dollars in Thousands)			
	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
Fissile Materials Disposition				
U.S. Surplus Fissile Materials Disposition				
Operations and Maintenance (O&M)				
U.S. Plutonium Disposition	793,506	908,906	930,967	957,881
U.S. Uranium Disposition	30,058	33,546	33,453	30,514
Subtotal, O&M	**823,564**	**942,452**	**964,420**	**988,395**
Construction	118,661	9,773	2,805	0
Total, U.S. Surplus Fissile Materials Disposition	**942,225**	**952,225**	**967,225**	**988,395**
Russian Surplus Fissile Materials Disposition				
Russian Materials Disposition	7,775	7,775	7,775	7,775
Total, Fissile Materials Disposition	**950,000**	**960,000**	**975,000**	**996,170**

Global Threat Reduction Initiative (GTRI)
Funding Profile by Subprogram and Activity

	(Dollars in Thousands)		
	FY 2011 Current	FY 2012 Enacted	FY 2013 Request
Global Threat Reduction Initiative			
Highly Enriched Uranium (HEU) Reactor Conversion	**100,968**	**148,269**	**161,000**
Nuclear and Radiological Material Removal			
Russian-Origin Nuclear Material Removal	159,031	147,000	102,000
U.S.-Origin Nuclear Material Removal	4,420	9,000	5,000
Gap Nuclear Material Removal	9,289	45,731	61,000
Emerging Threats Nuclear Material Removal	8,768	5,000	5,000
International Radiological Material Removal	20,660	20,000	8,000
Domestic Radiological Material Removal (Homeland Security) [a]	19,128	20,000	19,000
Subtotal, Nuclear and Radiological Material Removal	**221,296**	**246,731**	**200,000**
Nuclear and Radiological Material Protection			
BN-350 Nuclear Material Protection	1,840	2,000	0
International Material Protection	46,573	50,000	50,000
Domestic Material Protection (Homeland Security) [a]	65,304	51,000	55,021
Subtotal, Nuclear and Radiological Material Protection	**113,717**	**103,000**	**105,021**
International Contributions [b]	**8,708**	**0**	**0**
Total, Global Threat Reduction Initiative	**444,689**	**498,000**	**466,021**

[11] Office of Management and Budget (OMB) Homeland Security designation.

[b] International contributions for GTRI include $8,207,791 from Canada, and $499,970 from the Netherlands.

Out-Year Funding Profile by Subprogram and Activity

	(Dollars in Thousands)			
	FY 2014 Request	FY 2015 Request	FY 2016 Request	FY 2017 Request
Global Threat Reduction Initiative				
Highly Enriched Uranium (HEU) Reactor Conversion	**177,000**	**183,000**	**185,000**	**195,000**
Nuclear and Radiological Material Removal				
Russian-Origin Nuclear Material Removal	100,000	100,000	100,000	95,000
U.S.-Origin Nuclear Material Removal	5,000	5,000	6,000	8,000
Gap Nuclear Material Removal	45,000	30,000	20,000	15,000
Emerging Threats Nuclear Material Removal	5,000	5,000	5,000	5,000
International Radiological Material Removal	20,000	20,000	20,000	20,000
Domestic Radiological Material Removal (Homeland Security) [a]	20,000	20,000	20,000	20,000
Subtotal, Nuclear and Radiological Material Removal	**195,000**	**180,000**	**171,000**	**163,000**
Nuclear and Radiological Material Protection				
BN-350 Nuclear Material Protection	0	0	0	0
International Material Protection	52,000	60,000	68,000	73,000
Domestic Material Protection (Homeland Security) [a]	61,775	71,866	80,371	84,322
Subtotal, Nuclear and Radiological Material Protection	**113,775**	**131,866**	**148,371**	**157,322**
Total, Global Threat Reduction Initiative	**485,775**	**494,866**	**504,371**	**515,322**

Naval Reactors
Overview
Appropriation Summary by Program

	(dollars in thousands)		
	FY 2011 Current	FY 2012 Enacted [a]	FY 2013 Request [b]
Naval Reactors			
Naval Reactors Operations and Maintenance (O&M)	914,071	0	0
Naval Reactors Operations and Infrastructure	0	358,300	366,961
Naval Reactors Development	0	421,000	418,072
S8G Protype Refueling	0	99,500	121,100
OHIO Replacement Reactor Systems Development	0	121,300	89,700
Total, Naval Reactors O&M	914,071	1,000,100	995,833
Program Direction	39,920	40,000	43,212
Construction	32,535	39,900	49,590
Subtotal, Naval Reactors	**986,526**	**1,080,000**	**1,088,635**
Rescission of Prior Year Balances	-1,000	0	0
Total, Naval Reactors	**985,526**	**1,080,000**	**1,088,635**

Out-Year Appropriation Summary by Program

	(dollars in thousands)			
	FY 2014 Projection[b]	FY 2015 Projection[b]	FY 2016 Projection	FY 2017 Projection
Naval Reactors				
Naval Reactors Operations and Infrastructure	384,365	377,814	383,719	396,283
Naval Reactors Development	434,306	426,245	432,449	446,609
S8G Prototype Refueling[c]	123,327	125,522	127,760	130,054
OHIO Replacement Reactor Systems Development[c]	91,350	92,975	94,634	96,333
Program Direction	49,670	52,400	54,159	56,096
Construction	25,373	54,230	58,300	50,600
Total, Naval Reactors	**1,108,391**	**1,129,186**	**1,151,021**	**1,175,975**

[a] The Conference Report of H.R. 2055 Military Construction and Veterans Affairs, and Related Agencies Appropriations Act, 2012 establishing new funding controls for Naval Reactors: Naval Reactors Operations and Infrastructure, Naval Reactors Development, S8G Prototype Refueling, and OHIO Replacement Reactor Systems Development.

[b] FY 2013, FY 2014 and FY 2015 includes an allocation to Naval Reactors from the Department of Defense's (DoD) Research, Development, Testing and Evaluation (RDT&E) account entitled "NNSA PROGRAM SUPPORT". The amounts included for Naval Reactors from this DoD account are FY 2013 $5.8 million; FY 2014, $2.0 million; and FY 2015, $0.9 million.

[c] Due to the Budget Control Act of 2011 the outyear funding for S8G Prototype Refueling and OHIO Replacement Reactor Systems Development is under review and will be updated at a later date.

Senator NELSON. The fiscal year 2013 budget submission, as I indicated in my opening statement, for the weapons program, didn't contain a 5-year projection, and in some cases where it did, such as for naval reactors or nonproliferation, it simply indexed out the out-years—indexed the out-years by inflation, making it impossible to satisfy the modernization report which was required under section 1043 of last year's defense authorization. Can you give us some idea of how this happened or how this would be consistent with what we were seeking a year ago?

Mr. D'AGOSTINO. Absolutely. The fiscal year 2012 appropriation came through in December of last year, just basically a month before budgets were to be locked down. That, in addition to what we've discussed already in our statements about the BCA out-year

commitments, put us in a situation that is documented in the President's budget itself, that the out-year numbers in essence are a placeholder to reflect essentially the limits imposed by the BCA, giving us time to work with our DOD partners in order to work on the details of the out-years, the details of the out-years associated with making sure that we can fully support the LEPs as we've laid out and requested in this budget, making sure that we can follow through on our commitments on infrastructure improvements for both UPF, the High Explosive Pressing Facility, and continue to do our plutonium capabilities.

The details of how the out-years will look is being worked on. We have a joint team with DOD to look at this, and there's a lot of concern, of course. I know, I recognize that both Departments, the NNSA and DOD having some challenges. Of course, we have challenges. We have a very significant fiscal environment and we have a tremendous amount of work to do. But that's why we're working together on the same team in order to make sure that these out-years are well-identified and laid out.

We expect to have an update to what's now called the 1043 report, essentially which lays out those out-years. We expect to have that update report done jointly by DOD and NNSA later this year.

Senator NELSON. When you say later, do you have some idea about how much later?

Mr. D'AGOSTINO. I know the teams are working to get essentially agreement some time this summer. The question would be exactly how much detail we put into it. We want the detail because, of course, we need it to get that fiscal year 2014 budget built. That's the key budget and out-years that we want to make sure that we're all on the same page. We're together on fiscal year 2013. We're working the out-years together and we want to get this completed because we know we have a commitment to Congress in order to give you the 1043 report.

Senator NELSON. In the report, you're deferring the construction of the CMRR facility, which is a key tenet of the commitment to the Senate and Congress during the New START debate. You're adding $150 million to the budget for UPF instead. My understanding is it may cost $500 million over 5 years for such a deferral, and the director of Los Alamos has flatly stated that he cannot meet the DOD requirement for 50 to 80 plutonium pits per year. But yet you're proposing instead to ship plutonium all across the United States as an alternative.

Just how committed—how committed can we feel to this alternate plutonium strategy if during the course of congressional investigation it's determined that it's just too costly and makes no practical sense to engage in it? Once the cost is known, it could very easily exceed the capabilities to cover it.

Mr. D'AGOSTINO. We're deeply committed to ensuring that the Nation has the plutonium capability it needs to do the job, do the job to support the nuclear weapons stockpile, do the job in order to do the nuclear forensics for emergency response, and do the job that we know needs to happen in order to satisfy our nuclear nonproliferation work.

We do have capabilities in our enterprise. We have capabilities, significant capabilities, at Los Alamos. We have capabilities at Ne-

vada at the Device Assembly Facility, and we have capabilities at Lawrence Livermore. What we plan on doing is making full use of these capabilities. We expect the deferral for 5 years of the CMRR Nuclear Facility Project, not the cancellation but the deferral, to defer $1.3 billion of liability on the government while we fully utilize the capabilities that we have.

There are a couple of things that have changed from last year that I think are important to point out, because I do—it's very fair to ask the question, what's changed in the last year and why would we go about making this change since it was, as mentioned. A couple of things have changed. First of all, we now are implementing what is known as modern dose conversion factors into the safety basis analysis in our enterprise. What that allows us to do is use modern, agreed-upon international standards for safety basis calculations. This in effect has allowed us to fully utilize the existing brand-new building that you have authorized and has been appropriated and we have done, which is the CMRR Radiological Facility.

This just one simple change of using international standards, using modern international standards, has allowed us to significantly increase the amount of work we can actually do in a building that's brand new, that was just built for plutonium.

The second thing that's changed dramatically since last year is the laboratory has just done a marvelous job in reducing the amount of material inside the PF4, which is the roughly 25-year-old plutonium facility that exists. By reducing the amount of material significantly, this allows us to essentially—this was one of the key elements of the nuclear facility, to build a very large plutonium vault. The need and the pressure to build that very large plutonium vault has decreased. We still need a modern plutonium vault, but what we can do is really take advantage of the existing vault that the Nation has right now.

Both of these changes, along with the fact that we have now new insight into our fiscal year 2012 appropriation, which is over $400 million less than what we needed to do the job, and we have the BCA out-year limitations which put additional pressure, caused us to look, take a fresh new look at how we do business, not just programmatically, but also internally on how we do business.

I recognize you may have more questions on that, so I'll stop.

Senator NELSON. My time has expired, but was the decision to try to find more effective ways of space utilization driven by trying to control costs or was it just on its face making sense to utilize the space better? Sometimes the costs can drive it. What we don't want to see is costs driving us into a less than excellent way of handling this project.

Mr. D'AGOSTINO. Absolutely, Mr. Chairman. It's driven by a couple of things. Primarily it's driven by our recognition with DOD that we have a tremendous amount of real work that we have to do on the stockpile. That's number one. Given the fact that we have this tremendous pressure on us, it has caused us to look at all of our business lines with increased scrutiny. That's my obligation to you, sir, and it's my obligation to the taxpayers, it's my obligation to the Secretary and the President, to go look at these things in a way that makes sure that we are capitalizing on what we cur-

rently have from a capabilities standpoint—that's the most important thing, having a plutonium capability to take care of the stockpile. I am convinced—and Don Cook can describe the work that he's specifically doing with the laboratory—that it's important to continue the work on the stockpile itself, particularly the life extension on the B61 bomb and the studies in order to get these things done, instead of just saying that we would build a large facility.

We want to exercise our scientists and engineers at our laboratories. It's like exercise, it's good, it's good for our brain and our brains are at the laboratories where they do the work for us.

Senator NELSON. Okay, thank you.

Senator Sessions.

Senator SESSIONS. Thank you.

I would just say if you can make a proposal that shows that you can do the work without a multi-billion dollar new building, I'd be interested in hearing it. Perhaps you could. Everybody would like a new building and sometimes you really could use one. Sometimes you could use one, but you can't afford one.

But we do have a mission we can't afford to miss, the mission of modernizing our nuclear facilities.

Mr. D'Agostino, how many facilities are there directly involved in the nuclear manufacture and modernization effort?

Mr. D'AGOSTINO. I want to make sure I understand your question correctly, Senator Sessions.

Senator SESSIONS. You can define it as you'd like maybe.

Mr. D'AGOSTINO. Okay.

Senator SESSIONS. What do you think would be relevant to my question?

Mr. D'AGOSTINO. I think we have a real concern on uranium production and manufacture.

Senator SESSIONS. I just asked how many are there.

Mr. D'AGOSTINO. Oh, how many facilities are there involved?

Senator SESSIONS. Yes.

Mr. D'AGOSTINO. In order to take care of our stockpile?

Senator SESSIONS. Right.

Mr. D'AGOSTINO. Hundreds of facilities, sir.

Senator SESSIONS. What about the manufacture and maintenance of them, the core labs and all that are involved? You can see where I'm going. My question is, we're having a base realignment and closure (BRAC). Probably we're looking at another BRAC, and I'm wondering if there could be savings from some consolidation for efficiency purposes in our historic operations.

Mr. D'AGOSTINO. We've looked at this question. I think it's a great question to ask, and I'll give you the insight of the analysis we have done over the last couple of years here.

Senator SESSIONS. Briefly.

Mr. D'AGOSTINO. Okay, absolutely. The most important thing for us is to maintain capabilities in all the disciplines that we need to take care of the assessment of the stockpile. So we look at where all of those capabilities exist around our whole enterprise, and we've consolidated those particular capabilities. So we've BRAC'ed along not geographic bounds, but BRAC'ed along functional areas.

So we've decided that it's better to have one area in the country to do uranium work, one area in the country where we press large

sizes of high explosives, one area in the country where we do environmental testing on our stockpile itself. What that's allowed us to do is consolidate nuclear material, save money on security costs, and focus our investments so that we don't at the same time we're building a high explosive press at the Pantex facility, we don't rebuild the high explosive pressing capability that exists at Los Alamos, that existed for many decades during the Cold War.

So we are BRAC'ing along these functional areas: high explosives, uranium, plutonium.

Senator SESSIONS. You're doing that as you would like to reorganize, whereas in BRAC an independent commission ultimately tells DOD or recommends to Congress how to do that, and of course takes inputs from the agency, the department that's affected.

With regard to the current situation, you don't disagree, do you, that the budget you have does not meet the necessary DOD requirements?

Mr. D'AGOSTINO. I agree that the budget that we have before us meets the needs that we've laid out and with DOD on working on the B61, taking care of the W78 and the W76 warheads.

Senator SESSIONS. But they're not hampered—they don't believe that it fully meets their requirements, isn't that correct?

Mr. D'AGOSTINO. It depends on who the "they" are, sir.

Senator SESSIONS. Your customer is the one you need to keep happy.

Mr. D'AGOSTINO. Absolutely.

Senator SESSIONS. So do you dispute that? As presently configured, the amount of money and the plans that you have to spend it don't meet the requirements that DOD has said they need to be met.

Mr. D'AGOSTINO. The NWC, which represents the strategic commander, represents the Under Secretary for Acquisition, Technology, and Logistics in DOD, the Under Secretary for Policy, and the Chairman and Vice Chairman of the Joint Chiefs of Staff, agree that the President's budget that we've submitted addresses what needs to be done, and—I have to add the "and" here because I think it's an important piece of this—and that DOE and DOD need to work together, which we are doing, to study the out-year concerns and making sure that we get the out-years right.

Those are the requirements that we have before us and this budget actually does that.

Senator SESSIONS. Is it true that this budget would result in a 2-year delay of the B61 LEP, moving the first production unit from 2017 to 2019?

Just yes or no? Does it do that? 2017 is what DOD said they needed, did they not?

Mr. D'AGOSTINO. No, DOD supports the fiscal year 2013 budget, which says 2019.

Senator SESSIONS. Is it true that this budget would delay the completion of the W76 LEP by 4 years and that the Navy in response has publicly expressed concern over that?

Mr. D'AGOSTINO. It's true that this budget accurately shows that we have an adjustment in our W76 production rate in order to meet the Navy's operational requirements. I don't keep track of what every Navy person says publicly, but I'm former Navy, so I

believe I can say that. But at the same time, we have a program and budget that is supported by the NWC.

Senator SESSIONS. When you get to the last lick and the things are up before them and they have to sign off sometimes, I'm not sure that it's a matter of anything other than basically no choice.

Is it true that this budget would delay the previously agreed to schedule for the W78–88 LEP by 3 years to 2023?

Mr. D'AGOSTINO. It's true that the budget that we have before us causes us to relook at the W78 cycle. These three items, the W78–88 study, the W76 production rate specifically, and the out-years associated with that are a part of the study that we're doing with DOD on our out-year program.

Senator SESSIONS. Is it true that the budget did not provide the resources necessary to meet the DOD requirement for developing a pit production capacity and capability of up to a minimum of 50 to 80 pits per year in 2022?

Mr. D'AGOSTINO. This budget proposes a deferral of the CMRR, which is a 5-year deferral of the 50 to 80 requirement that you mention.

Senator SESSIONS. That would be to 2027 from 2022?

Mr. D'AGOSTINO. The deferral has to do with the CMRR, would have to do, depending on when the CMRR Nuclear Facility starts construction.

Senator SESSIONS. According to the OMB budget tables, over the next 10 years DOD will transfer $7.1 billion in budget authority to NNSA in support of the memorandum of agreement that was signed in May 2010 dealing with stockpile modernization and the CMRR. Given that the NNSA budget no longer meets the terms of the DOD–DOE agreement, does NNSA intend to return the money back to DOD?

Mr. D'AGOSTINO. Given the fact that we've received significantly less appropriation by Congress in fiscal year 2012, over $400 million, it's very difficult to recover from that kind of an adjustment.

Senator SESSIONS. You've told us these cuts, you're okay with them, everybody's fine, there's no problem with these cuts.

Mr. D'AGOSTINO. Senator, I said we have significant——

Senator SESSIONS. I'm showing you that you're delaying the plans significantly in critical function after critical function. You say everything's okay, everybody signed off on it. But we had an agreement at the time the START thing was done. Senator Kyl executed it. I don't think it's being met. I think it's being missed, and we need to have a conversation that's connected to reality.

The reality is that things have slipped significantly from what we thought we were heading toward. Isn't that true?

Mr. D'AGOSTINO. Senator, with great respect, the reality also is true that NNSA was appropriated more than $400 million less than what we needed to do the job, and that you cannot jump back on the saddle. The President has been very clear for the last 2 years in this commitment. We've put forth and requested 10 percent increases to this particular program. The message we get back is that the environment doesn't exist to support that kind of an increase. We've gotten 5 percent increases consistently. Therefore it has caused us to relook at this program. That's the reality, unfortunately, that I see from my end. As a result of that, I want to take—

we're taking a clean look, not at the program requirements—we are not backing down on the LEP, we are not backing down on a very significant operationally needed infrastructure requirement on uranium processing. These are absolutely critical. In my view, this is about what does it take to get the job done to meet the DOD requirements.

We are working very closely with DOD. I recognize that our departments, both DOE and DOD, are large departments, but we're working very closely at the core center to evaluate the out years situation. We want to solve this problem. We know we can solve this problem. It will require us to look at governance changes, of which I have—there are many things we can do in the governance area, and I can describe some of them.

But that's what we have to do. We have to figure out how to address and meet the Nation's needs, and I'm committed to that, for nuclear security——

Senator SESSIONS. My time is up, but we're all committed, but we need to understand that the funding is not followed through to maintain the goals that we'd set. We might as well be honest about that and put it out here.

I'm saying that if DOE were run by private business I believe you'd be running more efficiently. That's just my opinion. I don't know how many buildings we'd have to build. I don't know how many different facilities we'd have to keep out there to keep politicians happy. We all like it in our neighborhood. I'm an offender, too.

But we're at a crisis. We're running out of money and we need to do this as a core function of government. I do hope that as we go forward somehow we can get DOD and DOE together, make this occur with the least possible cost.

Thank you, Mr. Chairman.

Senator NELSON. Thank you.

Let me ask the question this way. Is it your opinion that, even though you're now walking away from, let's say, new construction, that what you're doing will not adversely impact the core function that we have of dealing with our nuclear warheads and the other structural requirements for those?

In other words, I thought we were going to have to have a new building because it was going to take the new building as a new—as something that is required to meet those functions. Now, I'm certainly not going to criticize you for finding other ways of doing it. As a matter of fact, I praise somebody that finds a cheaper way of doing the same thing to get the same result. But I think what the fear is that we don't get the same result here because we don't have enough money in the budget and we're patching rather than building. I don't know. That's the concern I think my colleague has and, frankly, I have it, too.

Mr. D'AGOSTINO. Mr. Chairman, there's a term called "risk management" that we use. Sometimes we throw it around blandly, if you will. But this is something we looked at very closely. Dr. Cook has worked with the laboratory on this idea of deferral of the CMRR, about looking at what capabilities exist across our enterprise in order to ensure that we are accepting the right amount of risk in order to meet the Nation's needs.

We're confident that a 5-year deferral is not going to impact our ability to take care of our stockpile. It will continue in our ability to do the material characterization and analytical chemistry work that we need to do to take care of the stockpile. The Nation will need ultimately a replacement capability because we have a 30-year-old facility right next door that's part of our manufacturing facility, we have a 50, close to 60-year-old facility that's doing the material characterization and analytical chemistry work that we have right now. But we're going to get out of that 60-year-old facility and we're going to use the new part of CMRR that's actually built and done, with the changes that I have personally signed up to on using these modern safety codes, in order to allow us to ramp up the amount of work that actually can happen in this radiological facility.

That change alone has meant a lot to both laboratory directors, because they now know that they're in the business; they can do more with the facilities that they have this year and out in the future than they could have done last year. That buys down a lot of the risk.

Senator NELSON. Let's see. The fiscal year 2010 defense bill asked the National Academy of Sciences to examine how effectively NNSA was managing the quality of science and engineering at the national laboratories. I know you're familiar with this report and its findings. In the second report to Congress on the organization and operation of NNSA, dated February 25, 2002, Administrator Gordon laid out a very basic principle on the NNSA governance, stating: "Federal employees, with contractor input, will establish broad program objectives and goals. Contractors, in consultation with Federal employees, will be given the flexibility to execute programs efficiently and will be held accountable for meeting those goals and objectives."

He further went on to say: "NNSA will develop and implement a simpler, less adversarial contracting model that capitalizes on private sector expertise and experience of its contractors, while simultaneously increasing the accountability, with high performance and responsiveness."

Now, the 2002 report sounds like today. Do you think that NNSA today is meeting those original goals laid out by Administrator Gordon?

Mr. D'AGOSTINO. We've met some of them. We haven't met all of them, and our commitment is to meet all of those particular goals. If I could talk about, just for a second about the National Academy of Sciences report. One of the first recommendations of the report had to do with it reaffirmed essentially our vision to take a look at these, what previously had been called nuclear weapons laboratories, and we conscientiously said these are national security laboratories, these are laboratories that take care of a broad range of national security needs, not just in DOE, but also in the DOD, Intelligence Community, and Department of Homeland Security.

So we reaffirmed our commitment and the actions we were taking on that front, as well as to encourage more laboratory-directed research and development and work for all those activities.

On the particular point you raised, what we have decided to do, working together with our laboratories, we meet on a regular basis.

I think it comes down to probably three core things. One is the directives, the DOE directives and the directives we as Federal employees need in order to manage our contracts and make sure that the taxpayer gets what it needs. The second is trust, to build and maintain a level of trust between our organizations. The third is a level and a consistency in governance.

On the directives side, DOE and NNSA have separately, but it overlaps, taken a strong look at directives. If I could just give one example, in security, if one takes a look at the security budget request over the last 3 years, our security request has gone down significantly, over 10 percent in our security area. That's due to the fact that we've simplified, clarified our security directives. That's allowed us to save, essentially reduced our security request from $718 million to $643 million from fiscal year 2010 to 2011.

That savings, that difference of over $60, $70 million, is going right back to doing the scientific and programmatic work that we need to do. Are we going to stop there? We're going to continue on, because there's more we can do on cleaning up and simplifying our directives.

On the trust area, we have our laboratory directors. I meet with our laboratory directors on the phone every week. No substitutes allowed. We can't have the deputy or the deputy of the deputy or someone down the line. It's a personal phone call. We have monthly video calls with the laboratory directors, as well as the whole enterprise together, both the Federal and contractor team together, to work out these problems.

We recognize we have a lot more to do on the governance side. On the governance side, we've taken action and as recently as within the past 12 months, to drive efficiencies by consolidating our contracts between Y12 and Pantex. We've now established a single site office, Federal site office. Instead of having two offices, one in Texas and one in Tennessee, we have an integrated office so that there's no question about a consistent set of documents and guidance and directives that are coming out. It makes it easier to ensure that the things that we talk about, my Principal Deputy Administrator, Ms. Neile L. Miller, on pushing forward the concept of integrating as one organization, making sure that actually gets to the contracting officer that has a day-to-day impact on our particular laboratory.

The final point—and I recognize time is limited—is that we've taken a look and we've brought on board—Admiral Donald was kind enough to allow one of his star performers, Michael Lemke, to come into, report directly to me, and take a look at all of our sites and drive consistency in how our Federal site offices are run, organized, and how they interface with their functional heads.

Previously the site office work was reporting within the weapons program itself, and that provides—that makes it a little bit more difficult for us to drive consistency on functional operations, like human resources, procurement, and contracting. Those types of activities drive costs into our laboratories and plants, and that's a piece that we think is very ripe for helping out on.

Senator NELSON. Thank you.

Senator Sessions.

Senator SESSIONS. Mr. D'Agostino, I respect you and know that you're committed to doing the right thing.

Mr. D'AGOSTINO. Yes, sir.

Senator SESSIONS. I'm pushing you to be aggressive in making progress. But I think you remember the debate over the START Treaty, and my colleague Senator Kyl, with whom I worked very closely, ranking Republican, he was one of the more active members of that entire effort. He feels that the agreement that was made in exchange for certain decisions about the START treaty has been breached and it has not been honored by this budget.

It seems to me plain that that's correct. Am I wrong? Is there another way to look at that?

Mr. D'AGOSTINO. I think there's another way to look at it. I greatly appreciate Senator Kyl's commitment to this mission area.

Senator SESSIONS. He's leaving the Senate and his belief is that one of the critical issues facing America is to get out of this "we're not going to do anything about nuclear weapons, they're all going to go away one day and we don't have to invest any more money in it," and we have to do what experts have all told us, modernize the weapons systems.

You agree that's a good goal, I trust?

Mr. D'AGOSTINO. Absolutely.

Senator SESSIONS. That's why it was such a big issue. This was not a little matter. The wording of the thing was discussed with the White House in depth.

So I'm asking you, does not this budget break faith with that commitment?

Mr. D'AGOSTINO. It does not break faith with that commitment. The President has committed and if the fiscal year 2013 budget is authorized and appropriated as proposed there will be a 20 percent increase in essentially a 2-year period of time, or a 3-year period of time, to our program. This is a significant increase by any measure in a very complicated area.

Senator SESSIONS. I'm not saying did you have an increase or not. I'm asking if it met the agreement that was entered into at that time.

Mr. D'AGOSTINO. It met the agreement in order to take care of the stockpile and recapitalize our enterprise. We have, of course, as we've discussed, deferred the plutonium facility for the reasons that I've identified, and that is a prudent risk management approach, given that the laboratory directors and I had actually talked about this before the budget was released, that if faced with challenges the priority is work actually on the stockpile itself. That is why we're going forward with the fiscal year 2013 budget as proposed.

Senator SESSIONS. I'm going to look at the numbers. It won't be long, we'll figure out who is correct about that.

Mr. D'AGOSTINO. Yes, sir.

Senator SESSIONS. It's not going to be words. We have real numbers on this situation.

Mr. Chairman, we have other witnesses coming. I won't utilize any more time. I do think it's important that Energy and Defense be more in sync here. I've had a fundamental concern that Energy's focus is too disconnected from the interests of the Nation in getting

the system. To me, we don't have a real good, clear chain of command and interest that would help us.

I think these laboratories have provided fabulous service to America that has kept us in the forefront of the world. But when any institution ages over these many years, not only the building but the whole institutions and bureaucracies, frequently larger and larger numbers of people and efforts get spent on things that are not as critical as they might be. If you're in a competitive business environment, you go out of business if that's so. Sometimes in Washington, when you're not performing up to schedule you ask Washington for more money.

I don't know what the situation is. But it's really important. Thank you, Mr. Chairman, for letting us discuss it.

Senator NELSON. Thank you, Senator.

In that regard, I think there is a continuing question about the independent role of NNSA as it might relate to DOE, because when Congress created NNSA in 1999, a principal concern at that time was to create a "semi-autonomous agency" that was free from the larger elements of DOE, so that it could focus on its core defense-related missions. In fact, if you read the first sentence of the statute it says: "There is established within the Department of Energy a separately-organized agency to be known as the National Nuclear Security Administration." That's exactly what it says.

Can you provide the subcommittee, say maybe within the next 30 days, some legislative suggestions or technical drafting assistance on how NNSA can still report to the Secretary of Energy, but be more independent of the rest of DOE? Because I think it was supposed to be on the organizational chart out here [indicating], not down here [indicating]. That's how it's been explained to me.

It's probably just similar to the Federal Energy Regulatory Commission as it has a separate independent, semi-autonomous relationship. Could you give us some ideas of that, and then provide us with something if you agree?

[The information referred to follows:]

The legislative decision raised in your question is clearly within the congressional prerogative. Although we are committed to assisting Congress in legislative endeavors, there has not been sufficient time to provide the appropriate analysis and support for your request at this time. We will keep you apprised as we review all the potential alternatives and impacts that are identified.

Mr. D'AGOSTINO. Mr. Chairman, we'd be glad to work with the subcommittee in any way possible to make sure that we accomplish the objectives of the NNSA Act and consistent with DOE.

I do want to say that we are a part of DOE. We absolutely depend on DOE, the broader DOE technical infrastructure in order to get our job done, whether it's our NNSA job or not. We are an integrated part of DOE. They need us; we need them.

The key, of course, is making sure that we have the right balance on governance——

Senator NELSON. Yes.

Mr. D'AGOSTINO. The Secretary—I talked to him today, as a matter of fact, on this topic, because I knew it was important. The question of governance has come up a number of times in the press and now in the hearing today, sir, with both of you. The Secretary, first of all, told me that he's committed to continuing to move for-

ward. I could provide to the subcommittee details on where we have moved forward in many areas and what we're planning on doing out in the future. So I'd be happy to work with you, sir.

Senator NELSON. Thank you.

Perhaps to put it a little bit differently, I know that you have a certain integration for the mutual responsibilities for your support with DOE, but Walter Mondale once commented that working from his office in the Old Executive Office Building, that: "You might as well be in Baltimore." That speaks volumes about location in this busy town.

I don't want to say that we ought to move your office necessarily, but there is something to be said about a disconnect that comes from different locations. Sometimes it's very positive; sometimes it's very negative. I don't think you have to answer that question. I just throw it out as an idea for consideration.

Senator SESSIONS. Mr. D'Agostino, looking at the numbers on the written testimony I have, I think these are official numbers, we were projected to have an appropriation for total weapons of $7.9 billion this year. It's going to be $7.5 billion; is that correct?

Mr. D'AGOSTINO. Yes, sir, about $7.5 billion.

Senator SESSIONS. This is an inauspicious start, would you not agree? Next year was projected to go to $8.4 billion, the next year $8.7, the next year $8.9, $9, $9.3, $9.6, $9.8, and $10.1 over the 10 years.

So I guess what I'm saying to you, if we're going to have this much of a miss in really the first year of our new agreement, I thought, to modernize our weapons, aren't we facing inevitably a failure to be able to complete what we've committed to do?

Mr. D'AGOSTINO. Senator Sessions, this is our third year of increases that we're asking for in this program. We've essentially received 10 percent increase the first year. We asked for a 10 percent increase the second year, did not get that 10 percent increase. We only got a 5 percent increase the second year. On top of that, we have the BCA amendment lid on top of it.

So as a result of that environment, we made adjustments. Remember, the fiscal year 2012 budget that was appropriated was not what we had asked for. It was over $400 million less, and as a result we received $7 billion. There were reasons for that. I'm not going to second-guess, tell Congress how to do authorizations and appropriations. I'm on the executive branch. I'm going to execute the program that's authorized and appropriated, and, in fact, that's what we're doing.

You have to use fiscal year 2012 as our jumping off point in order to put together the right program in the out-years.

Senator SESSIONS. Looking at under the blue line at the bottom of this chart, it says 2012, $7.6 billion; 2013, it looks like we're coming in at $7.5. Why isn't that a decline? Help me on that? You didn't meet the $7.6 last year, either. So you missed the $7.6 last year, is that the answer?

Mr. D'AGOSTINO. In fiscal year 2011, there was a year-long Continuing Resolution in the works. We received an anomaly for the weapons activities account that would allow us to get the full amount consistent with the President's promises. Congress gave us the anomaly, which was very much appreciated.

In fiscal year 2012 we asked for a very significant increase in this program and we did not get it. The increase in the program was to do a broad scope of work and assumed increases into the out-years. That, of course, was done in a different fiscal environment, and now we have a good handle on the kind of workload that's important to DOD and important to what we need to get done. That is why we've asked for this essentially close to a 5 percent increase overall for NNSA, and I think actually it's separating out the Defense Programs piece, it might even be closer to 7 percent increase for the Defense Programs piece.

So it's a very strong request and a strong commitment to nuclear security, and particularly working on the stockpile.

Senator SESSIONS. It seems like the numbers just are not coming in to meet the requirement, and that's the whole concern I have.

Mr. D'AGOSTINO. Yes, sir.

Senator SESSIONS. We don't want to just smooth it over and say we can delay this or delay that. Pretty soon you just don't have the money to complete the mission you've been given, and I'm afraid that's where we are, which is contrary to what we thought we had agreed to after much discussion last year.

Maybe we'll pursue it and we'll submit you some questions for the record.

Mr. D'AGOSTINO. Senator, we're glad to take those.

Senator NELSON. You must feel like this: that we gave you $400 million less than you needed and now we're criticizing you for having $400 million less to deal with.

Mr. D'AGOSTINO. Something like that, sir.

Senator NELSON. Something like that, I understand.

Senator SESSIONS. You need to say that. You need to say: "You guys are not giving me enough money to meet the mission you gave me to meet." If you won't say that then it's hard for us to help.

Senator NELSON. Yes, because I was very uncomfortable seeing that $400 million disappear, with the representations that we've made to be fully funded to carry out the program. So my discomfort continues, and I commend you for trying to find ways to do the same amount that you needed to do in a different way with less. We're all faced with that. We just don't want to be critical. What we want to know is as some things slip, will the mission slip? If you tell us no, the mission is not going to slip, even though you may defer some things, then I perhaps would feel better.

But I would have felt a lot more at ease with the $400 million being in your budget to do it the way we were initially representing to others that we were going to do it.

Mr. D'AGOSTINO. Thank you, Mr. Chairman.

Senator NELSON. Thank you. You are excused, Mr. D'Agostino, so we can call forward the next panel of witnesses, thank you again. [Pause.]

On the second panel we have the Honorable Donald L. Cook, Deputy Administrator for Defense Programs at the NNSA; Admiral Kirkland H. Donald, USN, Deputy Administrator for Naval Reactors and Director of Naval Nuclear Propulsion at the NNSA; and Mr. David G. Huizenga, Senior Advisor for EM at the Office of EM at DOE; all from DOE. We appreciate your being here.

"Hie-ZEN-ga." I'll get it right one of these days. I may just call you "Doctor H," I don't know.

Mr. HUIZENGA. That will be fine, sir.

Senator NELSON. Let's see. Would you like to make some brief opening statements? I know you have statements for the record, but please, if you would, why don't we start with you, Admiral Donald, and move in that direction.

STATEMENT OF ADM KIRKLAND H. DONALD, USN, DEPUTY ADMINISTRATOR FOR NAVAL REACTORS AND DIRECTOR, NAVAL NUCLEAR PROPULSION, NATIONAL NUCLEAR SECURITY ADMINISTRATION, DEPARTMENT OF ENERGY

Admiral DONALD. Mr. Chairman, thank you very much, and Ranking Member Sessions. I do have an opening statement I would like to make if that's suitable to you. I appreciate the opportunity to testify before you today on the Naval Reactors fiscal year 2013 budget request. Our budget request is for $1.1 billion and this funding provides the resources required for the day-to-day work associated with the safe and reliable operation of 104 naval nuclear propulsion plants, plants which provide power to more than 40 percent of the U.S. Navy's major combatants.

The fiscal year 2013 budget also supports the President's national security strategy with the continued development of the *Ohio*-class replacement submarine and stewardship of our naval nuclear infrastructure. DOD has decided to delay the *Ohio*-class replacement by 2 years. The Naval Reactors fiscal year 2013 request reflects that shift and supports the Navy's revised shipbuilding schedule, while ensuring the continuity of a sea-based strategic deterrent.

The budget further provides funding for the land-based prototype refueling overhaul, a critical aspect of the development of a life-of-the-ship core for the *Ohio*-class replacement. Core manufacturing, development, and demonstration for a life-of-the-ship core will be performed as a part of this project. By constructing the replacement core for the prototype with the technologies we plan to use for *Ohio*-class replacement, we will mitigate technical, cost, and schedule risks associated with that ship construction program.

Finally, resources are requested for the recapitalization of the aging spent nuclear fuel handling facility at the Naval Reactors Facility in Idaho. As you may recall from previous testimony, we must remain in compliance with the 1995 Idaho settlement agreement for movement of our fuel from wet storage to dry storage and ultimately for disposal. While working to meet this commitment to the people of Idaho, that aging infrastructure must also support the demands of a challenging refueling schedule for our nuclear-powered fleet, specifically our *Nimitz*-class aircraft carriers.

Mr. Chairman, the Naval Reactors budget for fiscal year 2013 is consistent with the goals set out in the BCA of 2011. However, as Mr. D'Agostino has pointed out, the out-years with the placeholder numbers between fiscal years 2014 and 2017 is less than Naval Reactors' validated requirements and is subject to review between DOE and the Navy.

Within these constraints, my first priority must be to safely sustain the Naval Reactors fleet support and regulatory oversight mis-

sion within our baseline funding, followed by continued progress on these major projects. Within the BCA funding constraints in the out-years, I cannot deliver the very important projects and maintain the proven standards of oversight and technical support that will continue to ensure nuclear fleet safety and effectiveness. Given the vital importance of our nuclear ships, the growing challenges of both the high operational tempo and an aging fleet, and the grave consequences of even the perception of eroding day-to-day standards and support, I must apply my resources, as available, to sustaining today's nuclear fleet. This prevents me from progressing on the new projects absent some additional funding to be addressed in the out-years.

As a result, the fiscal year 2013 budget will maintain the land-based prototype refueling overhaul to be executed in 2018. The fiscal year 2013 request will support reactor design for the *Ohio*-class replacement on the DOD revised schedule, but it will not support the recapitalization of the spent fuel handling infrastructure in time to support the existing plan for refueling of CVN–73, USS *George Washington*.

We're currently reviewing options as work-arounds, but all options will include some additional cost and risk. I will keep this subcommittee apprised of that analysis.

In addition, I'm further forced to consider deferral of maintenance of facilities work, decontamination, and decommissionings across our infrastructure. But I understand the impacts of those and we judge those to be prudent risks to be taking at this time.

I recognize that we've come before you today in a time of daunting fiscal constraints, constraints we haven't seen in decades. Prior to initiating the new projects in 2010, I embarked on a large-scale strategic alignment of funding as well as significant initiatives to streamline our support infrastructure and gain cost savings and efficiencies, such as combining the maintenance, management, and operations contracts for our two laboratories.

I respectfully ask that you consider the contributions our program makes every day to national security and will be required to make well into the future to meet our strategic objectives.

I would like to point out before I close one important milestone for Naval Reactors and for the Nation. This year marks the final deployment of the world's first nuclear-powered aircraft carrier, USS *Enterprise*. Commissioned in 1961, *Enterprise* has deployed for the last time as of Sunday. No other ship better illustrates the successes and evolutions of the nuclear-powered Navy like the *Enterprise*. She has served us well since 1961. After her final deployment, she'll commence her inactivation in November 2012.

Chairman Nelson, pending your retirement and the completion of my term as the Director of Naval Reactors later this year, this will likely be the last time that I will testify before you, and I thank you. It's been an honor to work with you and I thank you for all that you've done for my program and for the U.S. Navy.

My written statement has been submitted for the record and I look forward to responding to any questions that you may have.

[The prepared statement of Admiral Donald follows:]

PREPARED STATEMENT BY ADM KIRKLAND H. DONALD, USN

The request for this appropriation is $1.089 billion; an increase of almost 1 percent over the fiscal year 2012 appropriation. The program directly supports all aspects of the U.S. Navy's nuclear fleet, which encompasses the Navy's submarines and aircraft carriers, over 40 percent of the U.S. Navy's major combatants. Currently, the nuclear fleet is comprised of 54 attack submarines, 14 ballistic missile submarines, 4 guided missile submarines, and 11 aircraft carriers. Over 8300 nuclear-trained Navy personnel safely operate the propulsion plants on these ships all over the world, and their consistent forward presence protects our national interests. At any given time, about half of these ships are at sea.

2011 was a successful year for Naval Reactors. The nuclear-powered fleet surpassed 148 million cumulative miles safely steamed, providing the Navy with a consistent forward presence, capable of rapid response to emerging world events. The endurance, forward-presence, and instant readiness enabled by nuclear propulsion plants were on full display during Operation Odyssey Dawn, with deployed submarines launching over half of the initial salvo of cruise missiles, just one of this year's 57 submarine missions of significance to national security. Naval Reactors has also surpassed important milestones in the *Ohio* Replacement reactor design, including sufficient completion of design and manufacturing development of core materials to support the 2012 core materials decision. In Idaho, the Program loaded its 50th spent fuel dry storage canister, with a third of the Navy's current spent fuel inventory now ready for shipment to a permanent repository. Finally, as highlighted by the commissioning of the USS *California* (SSN 781) and the christening of the PCU *Mississippi* (SSN 782), *Virginia*-class submarines are consistently delivered under-budget and ahead of schedule. Throughout all these significant efforts, Naval Reactors also contributed to the relief in response to the tragic earthquake, tsunami and resultant events at the Fukushima Dai-ichi nuclear power plant in Japan.

Continued safe and reliable Naval nuclear propulsion requires that Naval Reactors maintains the capability to anticipate and respond to small problems before they become larger. The technical base and laboratory infrastructure allows thorough and quick evaluation of technical issues that arise from design, manufacture, operation and maintenance with technically-sound dispositions, ensuring crew and public safety without unnecessarily restricting the important missions of our nuclear powered-ships. Through careful collection and meticulous technical analysis of fleet operational and inspection data, and rigorously engineered designs, as well as prudent maintenance and modernization, the Program maintains a record of over 60 years of safe and effective operations. Uncompromising and timely support of the nuclear fleet continues to be the highest priority for Naval Reactors. This focus will prove even more important as the nuclear fleet, whose oldest ship, USS *Enterprise* (CVN 65), recently celebrated her 50th birthday, continues to increase its average age. Day-to-day activities include oversight and operation of two laboratories across multiple sites, including a prototype site with two operating reactor plants, and a spent nuclear fuel processing and handling facility. This budget funds all required facilities, maintenance, capital equipment, compliance, and remediation for these facilities. The work at these facilities enables complete lifecycle support for every nuclear-powered warship, from construction through inactivation. Technical work is conducted in areas such as structural mechanics, electrical engineering, nuclear engineering, materials science, reactor servicing, chemistry, and spent fuel management.

In addition to fleet support, Naval Reactors has embarked on important new projects: namely, the refueling overhaul for the S8G Land-based Prototype reactor, the design of the *Ohio* Replacement reactor plant, and recapitalization of our naval spent nuclear fuel infrastructure. Each of the projects is critical to fulfillment of the Navy's longer term needs.

The Budget Control Act of 2011 established discretionary caps, which are delaying several of the administration's nuclear modernization initiatives. Of the three new projects, only the S8G Land-based Prototype Refueling Overhaul remains on the originally envisioned schedule that was presented to Congress last year. The Prototype reactor plant has served Naval Reactors' needs for research, development, and training since 1978, and the reactor provides a cost-effective testing platform for new technologies and components before they are introduced to the Fleet. Equally important, it provides an essential, hands-on training platform for the fleet's reactor plant operators, every one of whom qualifies on an operating reactor before their assignment to a submarine or aircraft carrier. To continue vital research capabilities, as well as train sufficient operators to man the Fleet, the S8G Land-based Prototype Refueling Overhaul must begin in 2018. This budget fully funds the fiscal

year 2013 effort required for the upcoming refueling overhaul of the S8G Land-based Prototype. The new prototype reactor core work will be used to test the manufacturability of new core materials required for the *Ohio* Replacement submarine.

The *Ohio* Replacement reactor plant design continues and the fiscal year 2013 requested amount supports continuing this work to meet the Navy's revised schedule and procurement of reactor plant components in 2019 (to support a 2021 lead-ship procurement). This represents a 2-year delay compared to the schedule presented to Congress last year, which the Navy considers the best balance between BCA constraints and operational risk. The current *Ohio*-class ballistic missile submarines are reaching the end of their operational life and will begin to retire in 2027. Naval Reactors is designing and developing a life-of-ship core to ensure continuous and credible strategic deterrence, as well as enable substantial cost savings. The planned life-of-ship core will have a longer reactor life than any previous core, and will eliminate the need for a mid-life refueling, enabling the Navy to reduce maintenance requirements by shortening the mid-life overhaul. This increased SSBN operational availability will reduce strategic deterrence submarine procurements by two. Full funding for this program is crucial to support designing, building, and testing of systems for a new design of a nuclear reactor plant on the identified schedule. Completion of this work drives the overall design maturity of the reactor plant, which, as demonstrated by the successful construction of *Virginia*-class submarines, is vital to minimizing risk and cost during component procurement and ship construction. The request is sufficient for *Ohio* Replacement development through fiscal year 2013 and we are working with DOD to address the out-years.

Finally, the Spent Fuel Handling Recapitalization Project is needed to maintain the capability to manage naval spent nuclear fuel in a cost-effective way that does not impede the refueling of active ships and their return to operations. This project includes receipt, inspection, processing, packaging, and secure dry storage. The existing facility is more than 50 years old, and was never designed for its current primary mission of packaging naval spent nuclear fuel for permanent dry storage. Although the current Expended Core Facility continues to be maintained and operated in a safe and environmentally responsible manner, it no longer efficiently supports the nuclear Fleet. Uninterrupted receipt of naval spent nuclear fuel is vital to the timely refueling and return of warships to full operational status. Due to the fiscal constraints of the Budget Control Act, Naval Reactors is reviewing the schedule for the SFHP and developing a revised profile. Delays past 2020 will require the procurement of additional M–290 shipping containers to store CVN fuel until it can be unloaded at a new facility. These additional containers will be procured using Department of the Navy funds at an estimated cost of $200 million.

Senator NELSON. Thank you, Admiral.

Senator Sessions has a 4 o'clock that he has to take, and so he has a question. We'll just go out of order and we can wait.

Senator SESSIONS. Thank you very, very much, Mr. Chairman.

Mr. Huizenga, the request for the fiscal year 2013 for EM is $5.49 billion. That is almost $500 million more than the level appropriated in fiscal year 2012. You and I briefly discussed it before. You indicated it was not an increase, but it seems to be delineated on page 377 of your DOE budget manual, and that money is for a defense environmental cleanup contribution program.

Given the EM funding is part of the security spending, how do you justify that large an increase for EM while we're getting a $371 million reduction from Dr. Cook from the funding level that was planned for fiscal year 2013 for the weapons program? It appears to me that the national security requirements of weapons modernization has been reduced in favor of additional money in environmental cleanup; is that correct? If you'd like to answer for the record, you could do that. If you have a brief response to that now, I'd be glad to take it.

[The information referred to follows:]

The fiscal year 2013 request for the defense environmental cleanup account is $5.49 billion. This amount includes the $463 million that would be transferred from the General Fund to be deposited into the Uranium Enrichment Decontamination

and Decommissioning Fund—netting to zero in the request. There is no programmatic increase of $463 million. The total fiscal year 2013 request for the Environmental Management program is $5.65 billion, which is a reduction of $60 million from the fiscal year 2012 enacted level of $5.71 billion.

Mr. HUIZENGA. Sir, thank you for bringing that up. I think maybe I misunderstood before. Our overall request of $5.65 billion this year is down about 1 percent, or just a little bit more than 1 percent, from the request from last year. That's what I was referring to in our previous conversation.

I think that with the overall constraints that we do find ourselves in this year, we believe that our request will allow us to meet our compliance agreements and commitments to the citizens around these facilities that supported us in the Cold War efforts, and we think it's a responsible request, sir.

Senator SESSIONS. I'll be glad to examine it and I may follow up with a more detailed question.

Thank you, Mr. Chairman. It's been an excellent hearing.

Admiral Donald, thank you for your work and your patriotism, all of you. All of those associated with the labs have done really great work. But it just may be in this point in history that it's time for a rigorous reevaluation of the massive amounts of monies that are being handled. Maybe some of the bureaucracies need to be realigned and people reorganized and we could get more production and maybe save some money at the same time.

Thank you, Mr. Chairman.

Senator NELSON. Thank you, Senator. I appreciate it.

Dr. Cook.

STATEMENT OF HON. DONALD L. COOK, DEPUTY ADMINISTRATOR FOR DEFENSE PROGRAMS, NATIONAL NUCLEAR SECURITY ADMINISTRATION, DEPARTMENT OF ENERGY

Dr. COOK. Chairman Nelson and Ranking Member Sessions, good afternoon. I want to thank you for the opportunity to come here to testify before you on the President's fiscal year 2013 budget request.

The fiscal year 2013 budget request provides $7.57 billion for weapons activities. That's an increase of 5 percent. Within that, the amount for Defense Programs is $6.23 billion. That's an increase of $420 million in fiscal year 2013. NNSA has the responsibility to maintain a safe, secure, and reliable nuclear weapons stockpile to help ensure the security of the United States and of its allies, to deter aggression, and to support international stability.

Maintaining a safe, secure, and reliable stockpile necessitates continuing progress in mission-essential sciences to achieve accurate health and status assessments of our aging nuclear weapons systems. Over the last decade, NNSA has been devoted to filling this need.

The $17 million increase in this year's budget request for science campaigns further demonstrates the administration's support. The science and the experimental tools developed by Defense Programs allow our scientists, our technicians, and engineers to perform the needed assessments of the weapons systems and the components within to ensure that the effects of aging have not deteriorated the desired performance levels and to guarantee the safety, the secu-

rity, and the reliability of these systems without having to resort to a new underground nuclear weapons test.

I should note that September 2012 will mark the 20th consecutive year in which we have not required a nuclear test in order to ensure the safety, the security, and the reliability of our weapons stockpile. The Stockpile Stewardship Program is working.

As these systems, designed in the 1960s and 1970s, continue to age, life extension activities are required to preserve the established safety, security, and reliability thresholds. The fiscal year 2013 budget request includes a $214 million increase to the directed stockpile work that supports the W76, B61, W78, and W88 LEPs.

We've worked diligently with DOD and the NWC in crafting the programmatic schedule that is necessary to meet the NWC's requirements established for these systems. The B61 is a critical component of the U.S. strategic and of the extended nuclear deterrent. The current system is among the oldest in the stockpile. It has key non-nuclear components that are reaching their end-of-life and in need of replacement. The B61 LEP will allow consolidation of four variants into a single version of the B61 bomb, allowing NNSA and DOD to save on long-term sustainment costs, enable future stockpile reductions, ensure safety, and reduce the amount of special nuclear material used. The NWC has endorsed entry of the B61 LEP into phase 6.3, the engineering development phase.

Defense Programs is also charged with maintaining and replacing the infrastructure that provides the foundation and basis of the nuclear security enterprise. Some of the facilities have survived beyond their lifespan and are in dire need of replacement. The efforts and activities executed within Defense Programs are vital to the Nation's nuclear deterrent and in order for this critical work to continue we have to have both a safe and a secure operational environment.

The President's budget request includes an increase of $179 million in fiscal year 2013, enabling accelerated construction of the UPF at Y12. The completion of this facility will allow our personnel to vacate Building 9212 at Y12, which has already endured 63 years of operational use and it poses one of the highest programmatic and operational risks across the nuclear enterprise should it fail. NNSA has determined that an acceleration of the UPF at Y12 is required to ensure continuity of our sole uranium manufacturing capability.

We're also working with the General Services Administration on completing the construction of the Kansas City Responsive Infrastructure Manufacturing and Sourcing Campus. We will begin transitioning to the new facilities in 2013. We will complete the transition in 2014.

We'll also finish the construction of the High Explosive Pressing Facility at Pantex in fiscal year 2017. That's designed to support the LEPs. We will start construction as well of the Transuranic Waste Facility Phase B at Los Alamos. The Resource Conservation Recovery Act permit modification approval is expected by the State of New Mexico still in fiscal year 2012.

With all that said, however, under the BCA we now face new fiscal realities. Adding to this fiscal challenge is the fact that the

funds appropriated to the NNSA weapons activities in fiscal year 2012 were $416 million less than the President's request and that forced us to make tough decisions on which projects can or cannot be executed at this time.

In light of these actions, we've been compelled to deviate from our previous strategy and to modify our programmatic schedule to meet the Nation's immediate military requirements. Through coordination with DOD and the NWC, we have selected a path forward within the Nation's budgetary limitations. One of the decisions selected is the deferral for at least 5 years of the CMRR Nuclear Facility (CMRRNF) Project planned for Los Alamos National Lab. Deferring the CMRRNF will create an estimated $1.3 billion in cost avoidance over the next 5 years, permitting the funding of the most critical programs and capabilities, such as the weapons LEPs I've already mentioned and an accelerated UPF construction profile.

We will continue to maintain our plutonium capabilities by utilizing facilities at Los Alamos, such as the PF4, Plutonium Facility No. 4, and a part of the CMRR project already constructed, that is the radiological lab and utility office building. That building, incidentally, has been completed ahead of schedule and under budget.

In agreement with the NWC, we have delayed the first production unit of the B61–12 gravity bomb to 2019, but we will still meet the military requirements of the Nation. Despite the tough decisions made, we remain resolute in meeting the Nation's operational requirements, and we intend to remain vigilant in our mission to ensure the safety, security, and reliability of the Nation's nuclear weapons stockpile.

Lastly, we recognize that a critical element of our enduring mission is the need to maintain healthy relationships between the national labs, the production plants, the Federal site offices, and headquarters. We're implementing governance and oversight transformations in order to streamline how NNSA will do business, reduce the cost of operations, and increase productivity, and we will strive to maximize mission performance while maintaining or enhancing overall safety and security of the nuclear security enterprise.

I want to thank you again for the opportunity. I'll look forward to answering questions.

Senator NELSON. Thank you.

I'm going to try to get it right: Mr. Huizenga.

Mr. HUIZENGA. Excellent, sir. It's a good Dutch name and you got it just right.

Senator NELSON. Thank you.

STATEMENT OF DAVID G. HUIZENGA, SENIOR ADVISOR FOR ENVIRONMENTAL MANAGEMENT, OFFICE OF ENVIRONMENTAL MANAGEMENT, DEPARTMENT OF ENERGY

Mr. HUIZENGA. Chairman Nelson, I'm honored to be here today to discuss the positive things that we are doing for the Nation through our ongoing efforts of the EM program. Our request of $5.65 billion enables the Office of EM to continue the safe cleanup of the environmental legacy brought about from 5 decades of nuclear weapons development and government-sponsored nuclear en-

ergy research. Our cleanup priorities are based on risk and our continuing efforts to meet our regulatory compliance commitments. Completing cleanup promotes the economic vitality of the communities surrounding our sites and enables other crucial DOE missions to continue. By reducing the cleanup footprint, we are lowering the cost of security and other overhead activities that would otherwise continue for years to come.

In August 2011, the Office of EM was aligned under the Office of the Under Secretary for Nuclear Security, as was pointed out by Under Secretary D'Agostino earlier this afternoon. This realignment promotes the natural synergies that exist between EM and NNSA. For example, at the Oak Ridge National Laboratory we're working with NNSA to accelerate the transfer of certain components of uranium-233 inventory. This inventory is valuable for national security applications and supports NNSA's missions related to safety, nuclear emergency response, special nuclear material measurement, and detection. This initiative will result in cost savings for EM and enable us to move forward on a cleanup of nuclear facilities in the heart of the Oak Ridge National Lab.

Over the years the Office of EM has made significant progress in accelerating environmental cleanup across the departmental complex. For example, last December at the Defense Waste Processing Facility at our Savannah River Site in South Carolina, we solidified a record 37 canisters of highly radioactive waste, marking the most canisters filled in 1 month in the facility's 15-year history. Out west, at the Moab site in Utah, we celebrated the removal of 5 million tons of uranium tailings from the site to a safe location away from the Colorado River. Through 2011, we safely conducted over 10,000 shipments of transuranic waste to the WIPP in New Mexico, the world's largest operating deep geologic repository. As you can see from these accomplishments, the Office of EM has made great progress and will continue to do so with your help.

We could not have achieved such notable accomplishments without an outstanding Federal and contractor workforce. The safety of our workers is a core value that is incorporated into every aspect of our program. We've maintained a strong safety record and continuously strive for an accident-free and incident-free workplace. We seek to continue improvements in the area of safety by instituting corrective actions and by aggressively promoting lessons learned across our sites. In collaboration with DOE's Office of Health, Safety, and Security and our field sites, we're working to achieve a stronger safety culture within the program, thereby improving the safety of our construction and operations facilities.

We will continue to identify opportunities to reduce the life cycle costs of our program, including the development of new technologies and other strategic investments. For example, in 2013 we will continue our efforts to develop technologies that allow for the segregation and stabilization of mercury-contaminated debris and improve groundwater monitoring.

We continue working with the Government Accountability Office to institutionalize improvements in contracting and project management. We have established project sponsors at headquarters for all of our capital asset projects and conduct regular peer reviews of our most complex projects. We are including U.S. Army Corps

of Engineers personnel who have demonstrated experience in project and contract management on these project review teams. We are committed to becoming a best-in-class performer in this area.

Chairman Nelson, we will continue to apply innovative cleanup strategies so that we can complete quality work safely, on schedule, and within cost, thereby demonstrating our value to the American taxpayers.

Thank you, and I would be pleased, as the others, to answer any questions you may have.

[The prepared statement of Mr. Huizenga follows:]

PREPARED STATEMENT BY DAVID G. HUIZENGA

Good afternoon, Mr. Chairman, Ranking Member Sessions, and Members of the Subcommittee. I am pleased to be here today to answer your questions on the President's fiscal year 2013 budget request for the Department of Energy's (DOE) Office of Environmental Management (EM). The EM fiscal year 2013 budget request of $5.65 billion enables EM to continue the safe cleanup of the environmental legacy brought about from 5 decades of nuclear weapons development and government-sponsored nuclear energy research.

ENVIRONMENTAL MANAGEMENT PROGRAM STRATEGIES: A NATIONAL RESPONSIBILITY

The DOE Strategic Plan highlights EM's objective to complete the environmental remediation of our legacy and active sites by disposing of radioactive wastes, remediating contaminated soil and groundwater, and deactivating and decommissioning (D&D) radioactively contaminated facilities. EM is committed to sound technology development and deployment. EM develops and implements first-of-a-kind technologies to further enhance its ability and efficiency in cleaning up radioactive waste. Through these innovations, EM and the companies that perform its cleanup work have remained world leaders in this arena. Our work in EM enables other crucial DOE missions to continue across the United States. By reducing our cleanup footprint, EM is lowering the cost of security, surveillance, infrastructure, and overhead costs that would otherwise continue for years to come.

OVERVIEW OF PROGRAM PRIORITIES

To best address our cleanup objectives, EM's cleanup prioritization is based on achieving the greatest risk reduction benefit per radioactive content (wastes that contain the highest concentrations of radionuclides) while continuing to meet regulatory compliance commitments and promote best business practices. EM's priorities to support this approach include:

- Radioactive tank waste stabilization, treatment, and disposal;
- Spent (used) nuclear fuel storage, receipt, and disposition;
- Special nuclear materials consolidation, processing, and disposition;
- Transuranic waste and mixed low-level/low-level waste disposition;
- Soil and groundwater remediation; and
- Excess facilities D&D.

CREATING SYNERGIES THAT LAST

In an effort to maximize the accomplishments of mission-critical projects and organize needs more closely with DOE's resources, EM was aligned under the Office of the Under Secretary for Nuclear Security in August 2011. This alignment allows DOE to capitalize on the expertise that exists among the National Nuclear Security Administration (NNSA), EM, the Office of Legacy Management, and the DOE Chief Nuclear Safety Officer on areas related to project management, nuclear materials and waste handling, and nuclear safety and security.

There are natural synergies between EM and NNSA. At Savannah River Site, EM and NNSA are working closely together to utilize the H-Canyon facility and support multiple missions including: converting about 3.7 metric tons of plutonium into suitable feed for NNSA's Mixed Oxide Fuel (MOX) Fabrication Facility; removing contaminants in the plutonium to make it amenable for use as MOX feed; and reducing the amount of plutonium that EM needs to package and send to the Waste Isolation Pilot Plant for disposal. These activities will occur in addition to EM's utilization

of H-Canyon for activities such as the commencement of the process for the disposition of spent (used) nuclear fuel that is not suitable for extended storage in L-Basin.

At Oak Ridge National Laboratory, EM and NNSA are working together to accelerate the transfer of certain components of the Uranium-233 inventory that are valuable for national security applications. This cooperative effort will support NNSA's missions related to safety, nuclear emergency response, and special nuclear material measurement and detection. This initiative will result in cost savings for the EM program and enable EM to move forward on cleanup of nuclear facilities which will allow other DOE missions to continue. In addition, EM has established a partnership with NNSA to build upon the success of the Supply Chain Management Center, leveraging buying power across the combined EM and NNSA complexes for commonly used goods and services with the objective of realizing cost savings for the EM program similar to those NNSA has achieved.

SAFETY CULTURE

The safety of EM workers is a core value that is incorporated into every aspect of the EM program. To best protect our workers, EM has a goal of zero accidents or incidents in the work place and to date, has maintained a strong safety record. EM continues to utilize the Integrated Safety Management System to ensure that all work activities are appropriately scoped, analyzed for hazards, comprehensively planned to eliminate or mitigate those hazards, and effectively performed by trained employees. In addition, EM follows DOE Order 226.1B, Implementation of Department of Energy Oversight Policy which instills the philosophy that line management is responsible for ensuring the safety when work is being performed. EM seeks to continue improvements in the area of safety by instituting corrective actions, promoting lessons learned, and developing new or improved processes.

EM strives to promote and maintain a healthy safety culture at all of its sites. DOE defines safety culture as "an organization's values and behaviors modeled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect the workers, public, and the environment." As part of this effort, EM is working with DOE's Office of Health Safety and Security (HSS) and utilizing DOE's Implementation Plan for the Defense Nuclear Facilities Safety Board Recommendations 2011–1, Safety Culture at the Waste Treatment and Immobilization Plant to guide its actions and decisionmaking. As part of this effort, HSS has provided guidance and recommendations including how to better promote the raising of safety concerns on projects such as the Waste Treatment and Immobilization Plant. HSS will also conduct independent "extent of condition reviews" of major EM capital projects this year including the Sodium Bearing Waste Treatment Facility at Idaho and the Salt Waste Processing Facility at the Savannah River Site. In accordance with the Consolidated Appropriations Act Conference Report, fiscal year 2012, DOE, including EM and HSS, will conduct reviews of nuclear facility construction projects with a total project cost greater than $1 billion, to determine if those projects are being managed in a way that could pressure contractors or Department managers to lessen nuclear safety in order to demonstrate acceptable project performance.

To further instill a healthy safety culture in EM, within the next year, EM will conduct 'town hall' style meetings at its sites with defense nuclear facilities. At these meetings, EM senior leadership will emphasize the importance of maintaining a strong safety culture and soliciting employee input regarding safety. EM will continue to keep its employees, the public, and the states where cleanup sites are located, safe from radioactive and hazardous materials contamination. EM will also further instill core values and principles that will allow for improved communication and team building in order to accomplish its mission goals.

COMPLIANCE

Over the last 22 years, EM has maintained a working relationship with regulators and developed agreements and compliance milestones that provide the framework and schedule for cleaning up the Cold War legacy at DOE sites. There are approximately 40 such agreements. In fiscal year 2011, EM met 97 percent of its enforceable agreement milestones. In light of the potential need to renegotiate some of the compliance milestones, EM's goal in fiscal year 2013 is to meet 100 percent of its compliance agreement milestones.

The fiscal year 2013 EM budget request funds the closure of high level waste tanks 18 and 19 in the Savannah River Site F–Tank Farm. At Los Alamos National Laboratory, fiscal year 2013 funds expedite the disposal of much of the aboveground transuranic waste that is currently stored on the mesa at the Laboratory.

In addition, all remedial actions related to soil cleanup will be completed in the northwest section of Oak Ridge National Laboratory.

REDUCING LIFE-CYCLE COST

EM will continue to identify opportunities to make strategic investments that reduce the overall cost of the cleanup program while shortening project and program schedules. The current life-cycle cost estimate for EM is $274 to $309 billion. This includes $100 billion in actual costs from 1997 through 2011, and an additional estimate of $174 to $209 billion to complete EM's remaining mission in the timeframe of 2050 to 2062. EM will continue to identify opportunities, including technology development, to reduce the life-cycle cost of its program. In fiscal year 2013, EM will continue efforts to develop technologies that allow for the segregation and stabilization of mercury contaminated debris; develop attenuation-based remedies for groundwater; and utilize technologies that enable the safe extended storage of spent (used) nuclear fuel at DOE sites. To enhance its technology program, EM has established the position of Chief Scientist to provide recommendations to the Senior Advisor for Environmental Management on complex technical and design issues.

CONTRACT AND PROJECT MANAGEMENT

To ensure that EM delivers the best value for the American taxpayers, the fiscal year 2013 budget request reflects its continued improvement in acquisition, contract, and project management. EM will require more rigorous front-end planning ensuring contract statements of work and deliverables are based on clear project requirements and assessment of risks; nuclear safety requirements are addressed early; and changes to the contract and the project baseline are managed through strict and timely change control processes. EM will further improve acquisition processes by obtaining early involvement and approvals on various acquisition approaches from DOE senior management, including the Office of Engineering and Construction Management, the Office of Procurement and Assistance Management, the Office of the General Counsel, and the Office of Small and Disadvantaged Business Utilization.

In terms of project management, since August 2009, EM has been utilizing the Office of Science model for construction project review/project peer review process that relies on the expert knowledge and experience of certified engineers, scientists, DOE contractors, engineering laboratories, and the academic community. These reviews determine whether the scope of projects and the underlying assumptions regarding technology, management, cost, scope, and schedule baselines are valid and within budget. These reviews are scheduled to occur approximately every 6 months and assist EM with actively addressing problems and monitoring the effectiveness of the resulting corrective actions.

Over the last 2 years, EM has established separate operations activities and capital asset projects within its Project Baseline Summaries. Capital asset projects are managed in accordance with DOE Order 413.3B, Program and Project Management for the Acquisition of Capital Assets. EM is currently finalizing the operations activities policy and the protocol to manage operations activities, which are not governed by DOE Order 413.3B.

EM's continued progress in contract and project management has resulted in EM meeting three of the five criteria needed in order to be removed from the Government Accountability Office's (GAO) High Risk List. GAO has noted that: EM has demonstrated strong commitment and leadership; demonstrated progress in implementing corrective measures; and developed a corrective action plan that identifies root causes, effective solutions, and a near-term plan for implementing those solutions.

One of GAO's remaining concerns is that EM must provide the capacity (people and resources) to address problems. To address GAO's first concern, EM's reorganization establishes project sponsor positions at Headquarters for all capital asset projects. EM is also continuing to enhance its partnership with the U.S. Army Corps of Engineers by supplementing selected project peer review teams with U.S. Army Corps of Engineers personnel who have demonstrated expertise in project and contract management.

GAO's second remaining concern is that EM must monitor and independently validate the many corrective measures that it has taken are both effective and sustainable over the long term. To address this concern, EM's Annual Performance Plans have been established as a vehicle for measuring, tracking, and validating progress. In addition, EM has developed an annual Continuous Improvement Plan for Contract and Project Management to guide and monitor improvements. EM will continue to share improvements in project and contract management with GAO and

other stakeholders. EM is committed to continued improvements in contract and project management and is focused on being removed from GAO's High Risk List.

HIGHLIGHTS OF THE FISCAL YEAR 2013 BUDGET REQUEST

The fiscal year 2013 budget request for EM is $5.65 billion, after offsets of $485.1 million. The offsets reflect the proposed reauthorization of the D&D Fund deposit ($463 million), and the use of prior year uncosted ($12.1 million) and unobligated ($10 million) balances to offset ongoing mission work in the EM program. The fiscal year 2013 budget request for EM is made up of $5.49 billion for defense environmental cleanup activities. Examples of planned activities and milestones for fiscal year 2013 by site-specific categories are:

Idaho National Laboratory, Idaho

(In Thousands of Dollars)

Fiscal Year 2012 Current Appropriation	Fiscal Year 2013 Request
$389,800	$405,397

• Complete operations of the Sodium Bearing Waste Treatment Facility.

The Sodium Bearing Waste Treatment Facility supports the cleanup mission at Idaho National Laboratory by treating the remaining approximately 900,000 gallons of sodium bearing waste stored in tanks that are 35 to 45 years old. The treatment of this waste will enable EM to close the final four tanks, complete treatment of all tank waste at Idaho, and meet the Notice of Noncompliance Consent Order Modification to cease use of the Tank Farm Facility by December 31, 2012. Testing and readiness verification on the Sodium Bearing Waste Treatment Facility will be completed in preparation for startup in the third quarter of fiscal year 2012.

• Ship contact-handled transuranic waste to the Waste Isolation Pilot Plant, as well as retrieve buried waste.

During fiscal year 2013, approximately 4,500 cubic meters or more of contact-handled transuranic waste will be shipped to the Waste Isolation Pilot Plant for disposal. In addition, small quantities of buried waste will be retrieved and shipped to the Waste Isolation Pilot Plant for disposal.

Los Alamos National Laboratory, New Mexico

(In Thousands of Dollars)

Fiscal Year 2012 Current Appropriation	Fiscal Year 2013 Request
$188,561	$239,143

• Disposition of transuranic waste and low-level/mixed low-level waste.

The Solid Waste Stabilization and Disposition Project is comprised of the treatment, storage, and disposal of legacy transuranic waste and low-level/mixed low-level waste generated between 1970 and 1999 at Los Alamos National Laboratory. The end-state of this project is the safe disposal of legacy waste. In fiscal year 2013, to support the requirements in the 2005 Compliance Order on Consent, Los Alamos National Laboratory will disposition 1,603 cubic meters of transuranic waste and continue low-level/mixed low-level waste disposal activities.

• Maintain soil and water remediation.

The Soil and Water Remediation Project scope at Los Alamos National Laboratory includes identification, investigation, and remediation of chemical and/or radiological contamination attributable to past Laboratory operations and practices. The remaining scope of the project includes characterization, monitoring, and protection of the surface and groundwater at the Laboratory and approximately 860 Potential Release Sites left to be investigated, remediated or closed after evaluation and assessment of human health and ecological risks. In fiscal year 2013, activities include: investigation and characterization of two Technical Areas under the Canon de Valle Capital Asset Project and completion of the investigation and corrective measures evaluation of Material Disposal Area T to obtain final regulatory remedy selection.

Oak Ridge Reservation, Tennessee

(In Thousands of Dollars)
(Includes Safeguards & Security Funding)

Fiscal Year 2012 Current Appropriation	Fiscal Year 2013 Request
$419,758	$421,250

• Maintain operation of the Transuranic Waste Processing Center.

The continued operation of the Transuranic Waste Processing Center enables EM to meet various regulatory milestones. By the end of fiscal year 2013, Oak Ridge will process a cumulative total of 236 cubic meters of contact-handled transuranic waste and a cumulative total of 70 cubic meters of remote-handled transuranic waste at the Transuranic Waste Processing Center in preparation for eventual disposition. Fiscal year 2013 activities include the: continued transfers of transuranic waste bound for the Transuranic Waste Processing Facility; and the continued processing and disposition of contact-handled transuranic and remote-handled transuranic waste.

• Mitigate mercury contamination at the Y–12 National Security Complex.

Mercury cleanup activities within the Y–12 National Security Complex are necessary to reduce the potential contamination of the Upper East Fork Poplar Creek that flows through the city of Oak Ridge. In fiscal year 2013, with the utilization of American Recovery and Reinvestment Act funds, EM will complete characterization activities at the Y–12 National Security Complex land area formerly housing the Building 81–10 Mercury Recovery Facility.

Richland Site, Washington

(In Thousands of Dollars)
(Includes Safeguards & Security Funding)

Fiscal Year 2012 Current Appropriation	Fiscal Year 2013 Request
$1,021,824	$1,037,773

• Continue facility D&D and remedial actions within the River Corridor.

The River Corridor Closure Project includes the D&D of contaminated facilities and various remedial actions along the Columbia River Corridor as part of EM's continued pursuit of the Hanford 2015 Vision. In an effort to reduce Hanford's cleanup footprint, fiscal year 2013 activities include: operating the Environmental Restoration Disposal Facility in support of Hanford Site demolition and remediation activities; completing the interim response actions for the 100 N Area; completing the interim remedial actions for the 300–FF–2 Waste Sites; completing the selected removal and/or remedial actions for 13 high risk facilities in the 300 Area; and continuing the remediation of the 618–10 and 618–11 burial grounds.

• Conduct groundwater remediation efforts.

To protect the groundwater resources within the Hanford site, remediation activities that address groundwater contamination, including carbon tetrachloride, chromium, technetium, and strontium, must be conducted. In fiscal year 2013, EM will: continue site-wide groundwater and vadose zone cleanup activities; groundwater contamination monitoring, operations, and necessary modifications of existing remediation systems; and deploy chemical and biological treatment to select areas in support of final remedies.

Office of River Protection, Washington

(In Thousands of Dollars)

Fiscal Year 2012 Current Appropriation	Fiscal Year 2013 Request
$1,181,800	$1,172,113

• Manage the tank farms in a safe and compliant manner until closure.

The radioactive waste stored in the Hanford tanks was produced as part of the Nation's defense program and has been accumulating since 1944. To ensure protection of the Columbia River, over 50 million gallons of radioactive waste must be removed and processed to a form suitable for disposal, and the 177 underground storage tanks to be stabilized. In fiscal year 2013, activities include: complete bulk retrieval of one C Farm single shell tank; completing hard heel removal of two C Farm single shell tanks; operating the 222–S laboratory and 242–A evaporator; and continuing activities for tank waste mixing.

• Continue construction of the Waste Treatment and Immobilization Plant complex.

The Waste Treatment and Immobilization Plant is pivotal to EM's tank waste cleanup mission at Hanford. The Waste Treatment and Immobilization Plant provides the primary treatment capability to immobilize (vitrify) the radioactive tank waste at the Hanford Site. The Waste Treatment and Immobilization Plant complex includes five major facilities: Pretreatment Facility, High-Level Waste Facility, Low-Activity Waste Facility, Analytical Laboratory, and the Balance of Facilities. As of December 2011, the Waste Treatment and Immobilization Plant construction is approximately 59 percent complete and design is 84 percent complete. In fiscal year 2013, activities include the following:

• At the Pretreatment Facility, continue engineering, design and large scale integrated testing to confirm the design of critical Pretreatment process vessels.
• At the High-Level Waste Facility, continue forming, rebar, and placement of concrete for High-Level Waste Facility walls and slabs on the third to fourth stories.
• At the Low-Activity Waste Facility, continue planning activities for construction startup and turnover of multiple Low-Activity Waste Facility systems to operations.
• At the Analytical Laboratory, complete mechanical systems procurement and complete electrical terminations.
• At the Balance of Facilities, complete Balance of Facilities Plant design engineering and complete construction of nine facilities that make up the Balance of Facilities including the Chiller Compressor Plant and Steam Plant.

Savannah River Site, South Carolina

(In Thousands of Dollars)

(Includes Safeguards & Security Funding)

Fiscal Year 2012 Current Appropriation	Fiscal Year 2013 Request
$1,316,922	$1,303,493

• Reduce radioactive liquid waste.

The mission of the Liquid Tank Waste Management Program at Savannah River Site is to safely and efficiently treat, stabilize, and dispose of approximately 37 million gallons of legacy radioactive waste currently stored in 49 underground storage tanks. In fiscal year 2013, activities include: continue construction of Salt Waste Processing Facility; continued operation of F and H Tank Farms; continued to operation the Defense Waste Processing Facility and the production of 312 canisters of high-level waste packaged for final disposition; continued operation of the actinide Removal Process and Modular Caustic Side Solvent Extraction at planned rates; continued operation of the Saltstone Facility at planned rates; and continue construction of Saltstone Disposal Units 3–5.

• Consolidation of special nuclear materials.

In fiscal year 2013, activities include: initiation of the processing of non-pit plutonium to produce plutonium oxide suitable for use in the MOX Fabrication Facility; packaging the non-MOX plutonium for disposition to the Waste Isolation Pilot Plant; reducing the residual plutonium-238 contamination in the F Area Materials Storage Facility; and initiating the disposition of any vulnerable spent (used) nuclear fuel in H Canyon that is not suitable for extended storage in L–Basin.

Waste Isolation Pilot Plant, New Mexico

(In Thousands of Dollars)

(Includes Safeguards & Security Funding)

Fiscal Year 2012 Current Appropriation	Fiscal Year 2013 Request
$218,179	$202,987

• Operate the Waste Isolation Pilot Plant in a safe and compliant manner and dispose of contact-handled and remote-handled transuranic waste from DOE sites.

The Waste Isolation Pilot Plant in Carlsbad, New Mexico, is the Nation's only mined geologic repository for the permanent disposal of defense-generated transuranic waste. In fiscal year 2013, the EM budget request supports maintaining an average shipping capability of 21 contact-handled transuranic waste and 5 remote-handled transuranic waste shipments per week from major shipping sites such as Idaho, Savannah River Site, and Los Alamos National Laboratory.

CONCLUSION

Mr. Chairman, Ranking Member Sessions, and members of the subcommittee, I am honored to be here today representing the Office of Environmental Management. EM is committed to achieving its mission and will continue to apply innovative environmental cleanup strategies to complete work safely, on schedule, and within cost thereby demonstrating value to the American taxpayers. I am pleased to answer any questions you may have.

Senator NELSON. Thank you. Thank you, all three.

Admiral, what is it, fair seas and prevailing wind, or whatever; may I wish you that.

Admiral DONALD. Thank you.

Senator NELSON. Thank you for your service.

Dr. Cook, you mentioned the B61 gravity bomb, but it's my understanding you've been recently granted the go-ahead for the engineering work on the B61 gravity bomb. If that's true, it's good news and congratulations. Of course, the question that follows is when would you be able to provide us with a design definition and cost estimate study, or more commonly called a 6.2A study, for the LEP of the B61 that would come from this work?

Dr. COOK. The short answer is we expect to provide a full report by July. We're doing costing work now between NNSA and the Cost Analysis and Program Evaluation (CAPE) Group of DOE. That work is aggressively underway, and it is a fact that the NWC Chairman Frank Kendall signed out the authorization letter, and so we're now going through the steps we require and are normal to begin the engineering work.

Senator NELSON. Very good. In connection with the extension, in DOD any major acquisition program requires by statute an independent cost estimate by the CAPE Office. Do you believe that it's sound policy and likewise should be so for any major extension program or similar large engineering weapons effort in NNSA as in the case of the B61?

Dr. COOK. I generally do, sir.

Senator NELSON. Dr. Cook, what's the status of the 6.1 study on the W78 warhead, and do you think having a common warhead with the W88 is feasible?

Dr. COOK. The current status of the W78/88 study is that, first, it is joint. The study has both Air Force and Navy participation, certainly NNSA participation with our labs, and some elements of

the production plants, as well as STRATCOM and DOD civilian participation. So we believe that we are likely to complete the 6.1 study this fiscal year and move into a 6.2 study. 6.2A comes later, but we still have more work to do. So that will be a topic for NWC determination later in the year.

Senator NELSON. It's my understanding that DOE worked with DOD to transfer some $8 billion budgetary authority over the next 10 years to perform a number of tasks, one of which was to complete design and begin construction of the CMRR and commence operations by 2022. As part of this transfer, my understanding is that DOE was to plan to produce 50 to 80 pits per year in 2022 in the Los Alamos PF4 facility which makes the plutonium pits. Do you still believe that there is the ability to produce 50 to 80 pits per year and that that's a valid requirement? Will you have to renegotiate the 2022 date for making those 50 to 80 pits per year based on your decision to defer the construction of the CMRR building?

Dr. COOK. If I could, I'd address several points of your question, and I'll try to speak fairly quickly.

Senator NELSON. Yes, sure.

Dr. COOK. With regard to CMRR and the UPF, I will link those, and the LEPs, our strategy is a balanced strategy. We have worked it through with the Senate Armed Services Committee, with STRATCOM, and DOD. When we looked at the key priorities first for B61, would we start that or not, for the UPF and the CMRR Nuclear Facility, there was a very large body of work, and the requirement for providing cost for that to do all three in parallel did not look like it could be supported in the budget reality that we have. There was a change in 2012, as you all know, and going forward we determined that we would choose not to delay the B61, and there's a sizable investment there.

We determined that the most cost-effective strategy for the UPF, where we don't have another option because we make the secondaries in building 9212, the best cost strategy would be to actually accelerate the UPF conventional construction. We'll deal with the tooling near the end of the project, but we want to move aggressively once the conventional construction is completed in the period of a few years to move out of building 9212 because of the large operational and programmatic risk. It's our intent to begin that migration in 2019.

With regard to CMRR now, a piece that's already done is the radiological lab, as mentioned already. We will substantially complete the engineering design for CMRR in 2012 and we will tie that up with a cost estimate for that design when we then defer construction. But it's a rational point. Without that deferral on CMRR we could not do both the B61 and the UPF. So it was a conscious choice.

With regard to now the pit numbers, it's a fact that what we're doing with the W76 LEP, known as the 76–1, and what we intend to do with the B61–12 is pit reuse. There are three different approaches here. They're certainly written in our program plans. One is pit reuse, one is pit refurbishment, and one is manufacturing newly manufactured pits, but of existing design. No new military requirements or characteristics that are essential.

So to get to the end of the answer, we do believe that we can continue conducting a very aggressive modernization program for LEPs by using all three of those. But the real impact of the decision to defer CMRR by 5 years means that it will not be operational by, the correct number was 2023, as we laid out in the last set of reports last year. That will now not be sooner than 2028.

But I again will emphasize, as the Administrator has, we've not cancelled it. We have decided that the immediate need was to support the B61 LEP as it is the oldest weapons system that we have in our stockpile. I think I've mentioned the rest.

Senator NELSON. Thank you. Do you agree with Mr. D'Agostino's risk management and risk assessment and risk analysis comments about that this will not impair the ability to move forward with the missions that are being undertaken?

Dr. COOK. I absolutely do. I'll state that we have made conscious decisions to have a balanced program, and part of those decisions has been to accept a higher risk and to manage that risk. We have many talented people. They understand the decisions that we've taken and we're going forward with the priorities that we have agreed at the NWC.

Senator NELSON. Can you explain the differences in numbers for the B61 and W76 warhead LEPs? In your fiscal year 2012 budget submission, you were going to request for fiscal year 2013 about $279 million for the B61 and $255 million for the W76 LEPs. This year, for the fiscal year 2013 request, we see you requested $361 million for the B61, $82 million more than you thought you'd need last year, and $175 million for the W76 LEP, actually about $80 million less than you thought you'd need last year.

Dr. COOK. That is accurate. So this is part of the trade study that we did and the balance. We recognized, as more work was done on the B61–12, when we went through the options in the decisionmaking process for the NWC, we wound up taking, not the largest cost option and not the lowest cost option, which would not have been a LEP but only replacing limited life components. The latter would have driven us into either needing to take that weapons system out of service in a matter of time or we would have just kicked down the road for a few years, maybe 5 years, possibly 10, a more aggressive LEP for the B61.

So you see that that larger cost estimate for the B61 is reflected in the President's request for fiscal year 2013.

With regard to the W76, the strategy is that we will build the hedge for the W76–1s after we have supported all operational requirements. Once again, there's no question that we are taking a somewhat higher risk. We have used up some of the margin that we might otherwise have in building ahead should we have an operational difficulty in manufacturing the 76–1s, and the budget reflects having a rate of manufacturing and production which is comparable to the current rate, extending the hedge-building at the end of the operationally deployed weapons.

Senator NELSON. What is the effect of this lower request number for fiscal year 2013 on the W76 program with the Navy's submarine fleet?

Dr. COOK. I'll say where we are in the President's request. We believe that we have a manageable program, but there is very little

margin for error. NNSA is working with the Navy to understand some of the details now of the Navy requirements, at the same time that we're sharing in a very open and transparent way what our operating plans are at Pantex for assembly or at Kansas City site for components.

We're working that together. If we determine that there's something that has a risk that we feel we cannot manage, that the risk is too large, then we'll make accommodations for that when we determine it. At this point we've not yet found a major stumbling block.

Senator NELSON. So this is a dynamic effort that could change depending on what risk assessment you might do as you engage in the life extension?

Dr. COOK. That is correct.

Senator NELSON. Admiral Donald, from our discussion the other day, I understand DOD is moving the construction of the first *Ohio*-class replacement submarine by 2 years to 2021, which saves some $4.3 billion over the next 10 years. I understand this has also impacted your budget profile, such that last year you were going to ask for $149.7 million for fiscal year 2013 and this year it is now $89.7 million, down some $60 million.

Can you explain to us what impact this will have on the funding reduction and whether it affects any other portions of the naval reactors program?

Admiral DONALD. Yes, sir, Mr. Chairman. The decision to extend the *Ohio* replacement, and to delay it 2 years, was part of a larger discussion to address the BCA reductions with DOD overall. I participated in that decisionmaking process both from my point of view as the hat in the U.S. Navy, but also with great interest from my role in NNSA. I agreed with that decision, acknowledging there's risk, and I'd characterize the risk in two categories.

First, is programmatic risk. Implicit in the decision is that the resources would be made available to conduct the work so that we can start construction on the ship in 2021 with a sufficiently mature design, such that we can control cost, schedule, and deliver a quality product. On the Navy side, the DOD side, that is the case. In fiscal year 2013 and beyond, the resources are there for us to execute that program as we deem necessary and effective.

On the NNSA side, for fiscal year 2013, I'm comfortable with the resources I have. But, as Mr. D'Agostino pointed out, the placeholder numbers that are in the fiscal years 2014 through 2017, if they were to remain in place, I would not be able to fulfill that obligation to deliver the reactor plant for that ship on time. That's acknowledged both in DOD and NNSA, and the work to resolve that is ongoing right now.

Senator NELSON. Is that part of what you would call the appropriations risk?

Admiral DONALD. Yes, sir.

Senator NELSON. That's not a risk—it's a risk you assume, but not one you have a lot of control over, right?

Admiral DONALD. Yes, sir.

Senator NELSON. It's on this side of the desk we have to reduce that risk; is that a fair way of saying it?

Admiral DONALD. Yes, sir.

Senator NELSON. I understand.

Admiral DONALD. The second element of risk is operational risk. What that delay entails is the number of SSBNs available for the strategic mission when you get out to 2029 to 2041, a long way off obviously, but that's when the first of the *Ohio*-class replacements will be coming on line with the delayed schedule. The result during that period of a time is only have 10 SSBNs available to fulfill the strategic mission.

Now, remember we've reduced the number of SSBNs required from 14 to 12. That was based on our action to develop the life-of-the-ship core so we could eliminate the midlife refueling, minimize the time in maintenance, and improve the operational availability. So there was already some risk associated with that. This further adds to that risk.

It's acknowledged that if the strategic requirement does not change, there will be some periods of challenge during that window of time with the number of ships out there to meet STRATCOM's requirements for ships at sea and ships available on notice.

The second aspect of that operational risk is a recognition that in 2029—that's right before the first *Ohio*-class replacement comes on line—the average age of the ballistic missile submarine force will be 37 years. That is well in excess of, on a class basis, anything we've ever done in the past. We acknowledge that that does come with some risk. We are certainly committed to mitigating that risk and we do take good care of these ships to ensure they last for their full life expectancy.

But, as with anything that arrives at that age with that operational tempo that they fulfill, there is a certain risk that ships may not be available because of material problems and things of that sort. That tends to be the situation with ships of that age.

Senator NELSON. Is it fair to say—this goes to Dr. Cook as well—that in life extensions, we're able to make those life extensions because as time goes by we develop new ways, new methods of life extension? In other words, some things we can't change, but other things we learn we can improve? Is that one of the reasons why we get life extensions beyond the original projections?

Admiral DONALD. I would say there's a couple of issues that are a part of being able to extend the life. First, it starts off with a good design from the beginning, and if you look at the *Ohio*-class submarines, that was a very well-designed ship. It was designed to be maintained over a long lifetime. That facilitates our ability to maintain it and maintain it effectively.

Second, you do have to invest in the maintenance as you go along. It's just like changing the oil in your car. If you do that when you're supposed to, you're going to get the life out of it that you would fully expect to get for an investment of that nature.

The third thing is, you do, in fact, learn things as you get more experience with the design, as life goes on. We see that even today in such mundane things as how do you prevent rust and corrosion and add life. You get a sense of the operational tempo of the ship and how much fatigue, stress, and things like that. So you do learn as you go along.

But the fourth thing, and I think it's critically important, is applicable both to Dr. Cook and to me as well, is that you have the

technical resources at your disposal to address issues as they arise, and they do. Unexpected things do come along. You do have to address those types of things with knowledgeable people, with engineers, designers who understand that, who have the experience to deal with those types of things. Hence, the importance of the intellectual capital that we have in our laboratories to go and address those. We see that to this very day.

Senator NELSON. Very good.

Dr. Cook?

Dr. COOK. If I can follow up to Admiral Donald, I agree that many of the things he's mentioned are correct in weaponland as well. When we talk about science and weapons science, we could use words such as the "core capability" for the national lab directors to do annual assessments of the existing stockpile. That's one of the most important jobs that we have. You could tell from my voice we are proud that the Stockpile Stewardship Program has given us 20 consecutive years of not having to go back to do underground testing.

The fact that these weapons systems are so thoroughly surveilled—and you are well aware and you supported a more aggressive surveillance program for the past few years—that gives us an ability to determine with data which parts of these weapons systems give us the most concern, and by the people, as Admiral Donald said, who are most technically able to do that for weapons within the weapons labs.

So, that's the choice. In fact, sometimes we say we can go further on because some of the concerns have not grown more severe, where in other systems something unanticipated happened, but, thankfully, corrosion or whatever occurred was noticed and now we know we need to adjust our schedules.

Senator NELSON. Admiral Donald, I know you maintain a large fleet of reactors at sea that's funded by the Navy. Can you explain any impacts that the BCA might have on these reactors?

Admiral DONALD. Yes, sir. In my opening statement, I discussed that my first priority is to ensure the safety and effectiveness of those reactors that are operating at sea, the two that we have in land-based locations, and the two that we have in shore facilities as well. That's my charter, that's my responsibility, and when it comes to applying my resources, that's where they will be applied first. That is my strategy right now for dealing with, if there should happen to be some shortfalls in the overall budget, that I will first make sure that the fleet is operating safely and has what it needs to continue to operate, and then I will apply my resources to the projects, whether they be the replacement for the *Ohio*-class, the land-based prototype refueling, or the expended core facility in Idaho. I will deal with those next in order.

Senator NELSON. But there could be some implications to the rest of the budget, that you might have to rob one account to take care of the other account to take care of the safety of the reactors; is that fair to say?

Admiral DONALD. That's correct, yes, sir. The first priority is safety of those reactor plants.

Senator NELSON. Admiral Donald, can you explain the status of the construction of the new spent fuel pool at the Idaho National Laboratory?

Admiral DONALD. Yes, sir. The Spent Fuel Handling Recapitalization Project that's in my budget, I do have $28.6 million this year for some conceptual work and also some environmental studies. This facility is vital to our business. This is where all of our spent fuel goes to be examined and ultimately processed into dry storage. The facility allows us to meet our commitments to the State of Idaho, but also to support the operating fleet, to ensure that the cores that we load into these ships perform as we expect them to perform.

This facility is aging. It's 50 years old in many parts. It has its challenges, whether it be seismic certifications, whether it be leaks and things of that sort, that we manage on a day-to-day basis. But it is aging and needs to be replaced, and that's the project that we're here to undertake.

Senator NELSON. So you're not going to be in a position where you can use both simultaneously? One will replace the other? I understand that there's already another spent fuel pool at the Idaho Laboratory, but that you're designing for a new one. My question is, will you be able to use both or will the new one replace the old one?

Admiral DONALD. We have an existing facility that needs to be replaced. There is also another water pit facility.

Senator NELSON. That's operational?

Admiral DONALD. That's operational. It's Building 666, as it's referred to in Idaho. We have looked at that as a potential source for us to use whether during the interim as a part of the transition from our old facility to the new facility. We found it to be unsatisfactory. It doesn't meet our requirements from a capability point of view, from a capacity point of view, and from a timing point of view.

Specifically, the water pit is not configured properly to handle the fuel that we will be bringing off of our aircraft carriers. It's not deep enough. The fuel is in a configuration that's too long. There are a couple of locations in the water pit where it would handle that longer fuel, but those locations are currently occupied by existing spent fuel that won't be out of that water pit until the 2023 timeframe. Even if it were available, it wouldn't be of sufficient capacity to deal with the flow that we have coming off the ships.

The other aspect of this facility is, even if we tried, there'd be some significant facility modifications that would be required, whether in additional cranes, raising the height of the building to support the extra length of the fuel. All of that would have to be done in a radiologically controlled area, which would add significantly to the cost.

So we looked at it both in 2005 and 2009 and concluded that, no, it did not meet the need. Ultimately it doesn't—we'd still have to have a new facility at our facility anyway to deal with this 50-year-old facility we have right now.

Senator NELSON. I understand. Thank you.

Mr. Huizenga, I understand you've recently taken over the job of managing the DOE's Office of EM. Congratulations again.

Having said that, what is the status of the Hanford Waste Treatment Plant and when will you begin to drain the high-level waste tanks into the plant to produce what are called glass logs?

Mr. HUIZENGA. Thank you, sir. You did point out we were on the front page of USA Today in your opening remarks, and I will try to address that. It's a complicated, extremely large facility, of course, with many different individual facilities. The good news is that four out of the five major facilities we're making steady progress on. I think it's fair to say that we do have some issues with the final one, the pretreatment facility, and we're indeed in the process now of trying to work through some testing to ultimately prove that that facility will be able to mix these complicated wastes in a satisfactory fashion.

So we are making steady progress on some, we're working on testing for the others. The fiscal year 2013 funding level will allow us to continue to make steady progress and do this testing and also work on the tank farms that are associated with this facility that will ultimately feed liquid into these facilities. So we think we have a solid strategy for success.

Senator NELSON. What's the status of the salt waste processing facility at the Savannah River Site? I understand there may have been some cost overruns and some delays in that project.

Mr. HUIZENGA. Yes. As a matter of fact, I was down there earlier this week with Under Secretary D'Agostino. We had an opportunity to walk through that facility personally and ask a lot of questions, make sure that we are indeed understanding what needs to be done.

The biggest problem that we have there, frankly, is we have some complicated vessels that are being manufactured and we've had some delays in receipt of those vessels. We were supposed to have received them late last year. Now it looks like we'll be receiving them in the next month or so.

I know the Under Secretary made a trip to this vendor to actually make sure that they were focused. We haven't had this discussion with Admiral Donald, but I know they're doing some work for him as well. So they have a lot of work on their plate and we're trying to get them to make sure that they deliver.

But the bottom line is we've had to leave a hole in the top of the facility and do some work-arounds in order for us to be able to lower those vessels. There are 10 of them, 6 in one area and 4 in another—in order to lower those down onto the floor and then go ahead and put the ceiling or the roof in place.

So we don't know for a fact what it's going to do to our schedule. We still think that we can complete this some time around October 2015, which is our baseline. When we get the vessels in, we're going to have to address what it will do to our overall costs.

Senator NELSON. In the 2011 DOE financial report, it lists the cleanup liability for former Cold War production sites at some $250 billion over the next 75 years. Some of these are highly contaminated sites that will require, once cleaned up, even continued monitoring into perpetuity. We're now in a world of flat or declining budgets, and yet your office is driven by legally enforceable milestones with the States where many of these sites, like Hanford, reside in.

How are we going to make it work? How are we going to, over a longer strategy, make the dollars work to meet the obligations we've undertaken?

Mr. HUIZENGA. I think it's fair to say, Mr. Chairman, that we're going to have to continue to look for efficiencies and technology improvements, to look for basically some game-changers in the way we do business as these budgets flatten out. It's been tough for the last couple of years. I know you've had a lot of things to balance up here, and we've indeed had some reductions in our requests, and to that extent we're looking now strategically across the complex at a way that we might rebaseline our efforts over the next few years to accommodate what is likely to be a flatter budget portfolio.

I think again there are some bright spots. When we were at the Savannah River Site, we were talking to them about the fact that they're developing some new solvents that will help remove radioactivity from one vessel or one solution and bring it into another one to be resolidified in these glass logs. There are ways that you can do this that can actually increase the effectiveness and reduce the time of operations of the facilities by several years and save several billions of dollars. So we're looking for ways to improve the way we're doing business.

Senator NELSON. Obviously, that is going to be required, because—and it's not to say that we can't get smarter as we have more experience moving forward. So hopefully there will be some cost savings achieved with better techniques as we learn more about what we're doing.

Then finally, what's the status of the Greater-Than-Class C waste environmental impact statement (EIS)? I understand this type of waste is particularly troublesome and, as difficult as everything else is, this is perhaps even more so.

Mr. HUIZENGA. We issued an EIS on the Greater-Than-Class C waste in February 2011, and we conducted a 120-day public comment period. We got over 5,000 comments. We're in the process right now of reviewing those and taking those into consideration. We hope to issue a final EIS later this year, and we're going to consult with Congress, as is required by the Energy Policy Act of 2005. When we develop our preferred alternatives, we'll be up here talking to you about ways that we hope to move forward.

This is another area of the synergies between NNSA and the EM program, because ultimately when we can develop a preferred place to dispose of these materials you know that NNSA has been collecting materials that could be used for dirty bombs. Some of those are Greater-Than-Class C, sealed sources, and those we'd hope to be able to dispose of permanently and take them out of harm's way.

Senator NELSON. I wish you good luck in doing that. While I don't have a strong portfolio in science, I do have to point out that I was president of the science club in high school. [Laughter.]

Mr. HUIZENGA. We might come to you with some questions then, sir. [Laughter.]

Senator NELSON. I knew a few things back then and that's probably where it all stayed.

I want to thank you particularly, Admiral Donald, for your continuing service over the years. Thank you for service to our coun-

try. To all of you, thank you for what you're doing for our country in a very vital area. We want to work with you, with budgets. Obviously, we're going to ask serious, deep, probing questions, deep for us at least, to try to understand more about what it is you're doing and also how we can help you do what you need to do to reduce the appropriations risk that you always face. The requirement will be there. You need to have the adequate resources to be able to meet those requirements, and sometimes when they don't quite match, we need to work together to find different ways of doing it.

So thank you all. The hearing is adjourned. Thank you.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR BEN NELSON

NATIONAL NUCLEAR SECURITY ADMINISTRATION

1. Senator NELSON. Mr. D'Agostino, when Congress created the National Nuclear Security Administration (NNSA) in 1999, its principal concern was to create a semi-autonomous agency that was free from the larger elements of the Department of Energy (DOE) so that it could focus on its core defense-related missions. In fact, if you read the first sentence of the statute it says, "There is established within the Department of Energy a separately organized agency to be known as the National Nuclear Security Administration." Would you please provide legislative suggestions or technical drafting assistance on how the NNSA can still report to the Secretary of Energy but be more independent of the rest of the DOE, similar to say the Federal Energy Regulatory Commission (FERC)?

Mr. D'AGOSTINO. The legislative decision raised in your question is clearly within the congressional prerogative. Although we are committed to assisting Congress in legislative endeavors, there has not been sufficient time to provide the appropriate analysis and support for your request at this time. We will keep you apprised as we review all the potential alternatives and impacts that are identified.

2. Senator NELSON. Mr. D'Agostino, there has been concern in the NNSA about satisfying the Defense Nuclear Facilities Safety Board (DNFSB) recommendations. This board is an advisory body, not a regulator. Some in either Department of Defense (DOD) or NNSA have gone so far as to suggest NNSA and DOE be regulated by the Nuclear Regulatory Commission (NRC). Do you support having NNSA regulated by NRC?

Mr. D'AGOSTINO. As you indicated, DNFSB is an advisory agency instead of a regulatory authority. This relationship was designed for conditions that existed in DOE over 20 years ago. Since that time, there have been studies that evaluated the feasibility of the NRC regulating DOE/NNSA. The consistent conclusion from those studies has been that NRC regulation is technically feasible, but it is unclear whether one of the several regulatory models used by the NRC would improve safety, improve efficiency, or save money. Given that there is no clear conclusion that a change of regulatory model would be an improvement, I neither support nor oppose regulation of the NNSA by the NRC. I do believe that any decision to change our regulatory approach should be preceded by a thorough evaluation of the different regulatory models available at the NRC and specifically how they would apply to NNSA, and whether there would be clear benefits. I would be reluctant to support a change without first identifying the problem the change was intended to fix, and being able to demonstrate that the change would provide benefits that justified the expense.

3. Senator NELSON. Mr. D'Agostino, the Secretary of Energy has three exemptions to DNFSB recommendations: (1) national security; (2) technical reasons; or (3) they are cost prohibitive; and that DNFSB is to consider cost as one of its factors but not the sole one. Do you believe this is a sound approach?

Mr. D'AGOSTINO. I believe that our overall approach to responding to board advice, and the provisions that enable us to decline their advice, if warranted, is sound and is in keeping with our statutory responsibility for the safety of our operations.

As you indicated, there are three bases by which the Secretary of Energy can decline a DNFSB recommendation. We consider them when responding to a board recommendation, and there have been very few cases where the Secretary has rejected a board recommendation, even in part. In more than 20 years of oversight by the DNFSB, there have been only three recommendations that have been rejected in

part (1995–2 on integrated safety management; 2011–1 on safety culture; and 2010–1 on the standards/regulations covering safety bases).

Asking the Secretary to reject a safety recommendation, even when DOE/NNSA believes that it is appropriate, is not something we undertake lightly. Significant internal debate always precedes such an action.

CHEMISTRY AND METALLURGY RESEARCH REPLACEMENT FACILITY

4. Senator NELSON. Dr. Cook, my understanding is that DOE worked with DOD to transfer some $8 billion of budgetary authority over the next 10 years to perform a number of tasks, one of which was to complete design and begin construction of the Chemistry and Metallurgy Research Replacement (CMRR) Facility and commence operations by 2022. As part of this transfer, my understanding is that DOE was to plan to produce 50 to 80 pits per year in 2022 in the Los Alamos PF–4 facility, which makes the plutonium pits. Do you still believe the ability to produce 50 to 80 pits per year is a valid requirement?

Dr. COOK. There were a number of factors DOD and NNSA considered that informed the decision to seek a pit production capability of 50 to 80 newly manufactured pits per year. First, at an unclassified level, the best estimate for minimum pit lifetimes in the U.S. stockpile is 85 to 100 years, and most pits are nearing half that age. There are many uncertainties with regard to the pit lifetime estimates and performance of aged pits (the details of which are classified) which all support the prudent maintenance of a capability to manufacture pits to ensure against technological surprise. Furthermore, adding modern safety and surety capabilities to the majority of the enduring stockpile will require capabilities to remanufacture and rework pits and pit components. These factors have not changed, and therefore a pit production rate of 50 to 80 pits per year is currently assessed to be a prudent, long-term capability to achieve.

As noted in a letter from the Secretaries of Energy and Defense on March 2, 2012, the programmatic modifications made as a result of the requirement to operate within the Budget Control Act (BCA) of 2011 included deferring construction of the CMRR for at least 5 years. We plan to employ a strategy of reusing existing pits at a rate of up to 125 per year and remanufacturing existing pit designs at a rate up to 20 to 30 pits per year to meet the short- to medium-term needs of stockpile life extension programs (LEP). The timeframe to increase pit manufacturing capacity will be determined by working closely with DOD, and will take into account a number of factors, including cost, future stockpile size, and specific LEPs for weapons systems.

5. Senator NELSON. Dr. Cook, will you have to renegotiate the 2022 date for making 50 to 80 pits per year based on your decision to defer construction of the CMRR Facility?

Dr. COOK. The timeframe to increase pit manufacturing capacity will be determined by working closely with DOD, and will take into account a number of factors, including cost, future stockpile size, and specific LEPs for weapons systems.

6. Senator NELSON. Admiral Donald, I understand there is another spent fuel facility at the Idaho National Laboratory (INL). Can you explain whether this facility can be used in place of the one you are designing?

Admiral DONALD. It is important to recognize the reasons underlying Naval Reactors' (NR) need for the Spent Fuel Handling Recapitalization Project. NR requires a new facility to handle spent nuclear fuel because the existing Expended Core Facility (ECF) is over 50 years old, does not meet current design standards, and carries escalating risk and costs with each year of continued operations. Also, the existing ECF does not have the capability to unload full-length aircraft carrier fuel from M290 shipping containers.

At the INL, some naval nuclear fuel is currently stored in Building 666 at Idaho Nuclear Technology and Engineering Center (INTEC [BL 666]), but that facility does not meet all necessary spent fuel handling requirements. INTEC (BL 666) is not a viable permanent replacement for the current ECF, as it lacks the size and capability to safely receive, inspect, and process all spent naval nuclear fuel.

INTEC (BL 666) is also not an acceptable temporary solution for many reasons. Primarily, it does nothing to address my long-term need for a new facility. Further, with respect to carrier fuel unloading capability, most of the water pits in INTEC (BL 666) are incapable of receiving full-length aircraft carrier fuel. The two water pits that are deep enough will not be empty for several years. Once those water pits are free, several hundred million dollars in modifications such as rail installation,

crane procurement, and high-bay extension would be required for conversion to handling aircraft carrier fuel. Even after storage and initial processing in INTEC (BL 666), the aircraft carrier fuel would still be transported to NRF for inspection and final processing for dry-storage in a naval spent fuel canister. Further, because of space limitations at INTEC (BL 666), submarine fuel would still be handled at another facility.

On balance, use of INTEC (BL 666) is not cost effective, and does not provide me with the long-term spent fuel handling and processing capabilities I need to reliably support fleet submarine and aircraft carrier needs.

QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

PIT PRODUCTION

7. Senator LIEBERMAN. Mr. D'Agostino and Dr. Cook, U.S. Strategic Command (STRATCOM) has a validated requirement for the production of 50 to 80 plutonium pits per year starting in 2021 as part of the agreement between DOD and DOE to transfer some $8 billion in budget authority from DOD to DOE for modernization. The director of Los Alamos National Laboratory (LANL) has stated that without the CMRR Facility he cannot meet that requirement. Do you believe the 50 to 80 pit requirement is valid?

Mr. D'AGOSTINO. There were a number of factors DOD and NNSA considered that informed the decision to seek a pit production capability of 50 to 80 newly manufactured pits per year. First, at an unclassified level, the best estimate for minimum pit lifetimes in the U.S. stockpile is 85 to 100 years, and most pits are nearing half that age. There are many uncertainties with regard to the pit lifetime estimates and performance of aged pits (the details of which are classified) which all support the prudent maintenance of a capability to manufacture pits to ensure against technological surprise. Furthermore, adding modern safety and surety capabilities to the majority of the enduring stockpile will require capabilities to remanufacture and rework pits and pit components. These factors have not changed, and therefore a pit production rate of 50 to 80 pits per year is currently assessed to be a prudent, long-term capability to achieve.

As noted in a letter from the Secretaries of Energy and Defense on March 2, 2012, the programmatic modifications made as a result of the requirement to operate within the BCA of 2011 included deferring construction of the CMRR Facility for at least 5 years. We plan to employ a strategy of reusing existing pits at a rate of up to 125 per year and remanufacturing existing pit designs at a rate up to 20 to 30 pits per year to meet the short- to medium-term needs of stockpile LEPs. The timeframe to increase pit manufacturing capacity will be determined by working closely with DOD, and will take into account a number of factors, including cost, future stockpile size, and specific LEPs for weapons systems.

Dr. COOK. I agree.

8. Senator LIEBERMAN. Mr. D'Agostino and Dr. Cook, what steps are you taking to try to reduce the expected shortfall in pit production capability and what production rate do you aim to achieve?

Mr. D'AGOSTINO and Dr. COOK. NNSA is assessing a planning production rate of 30 pits per year by 2021. NNSA and LANL are evaluating capabilities and approaches to support this planning rate without CMRR Nuclear Facility (CMRR–NF) (at LANL and elsewhere in the enterprise) and what investments are needed to increase capacity at LANL's plutonium facility (PF–4).

9. Senator LIEBERMAN. Mr. D'Agostino and Dr. Cook, do you believe that there is any risk that this stated 5-year delay to the CMRR Facility will become lengthier or turn into a permanent cancellation?

Mr. D'AGOSTINO and Dr. COOK. In a time of fiscal austerity, such a risk always exists; however, NNSA is committed to being responsible stewards of both taxpayers' dollars and the nuclear security enterprise. The decision to defer CMRR–NF construction for at least 5 years and move forward with Uranium Processing Facility (UPF) construction is fully consistent with an independent DOD review of both projects completed in 2011. As we develop plans for future budgets, NNSA will continue to assess the most cost-effective delivery of maintaining analytical chemistry, materials characterization, and plutonium storage capabilities.

10. Senator LIEBERMAN. Mr. D'Agostino and Dr. Cook, how would you address the pit production shortfall in that event?

Mr. D'AGOSTINO and Dr. COOK. The administration plans to address the manufacturing shortfall by reusing existing pits. For the W76–1 LEP, we are reusing pits, and our current plans for the B61–12 LEP also include pit reuse. NNSA is evaluating the technical viability of possible additional pit reuse options for meeting stockpile needs, and is working on cost estimates for such a pit reuse capability (which would be in addition to manufacturing 30 pits per year) if the reuse options require work in LANL's plutonium facility.

HEADQUARTERS FUNDING

11. Senator LIEBERMAN. Mr. D'Agostino, I noticed a 66 percent increase in the fiscal year 2013 NNSA request for headquarters funding over the fiscal year 2012 appropriations. Can you describe what comprises "headquarters?"

Mr. D'AGOSTINO. Funding allocated to headquarters is mainly comprised of salaries and related expenses for NNSA Federal employees, procurements that occur from our Washington, DC, area offices, legacy contractor pension payments, and funding awaiting programmatic decisions or competitive solicitation that will ultimately be distributed throughout the NNSA and DOE complex during the year of execution. For example, the fiscal year 2012 budget request for NNSA showed approximately $942 million for headquarters in fiscal year 2012. The estimate for fiscal year 2012 in the fiscal year 2013 budget request is now $705 million, a reduction of 25 percent, largely reflecting solidification of programmatic decisions and the initial distribution of the funds from headquarters to NNSA and DOE sites/contractors. It is anticipated a significant portion of the estimated $1,175 million reflected at headquarters in the fiscal year 2013 budget request will eventually be allocated to NNSA and DOE sites/contractors as well.

Some examples of the scope associated with the estimated $1,175 million identified for headquarters are:

- $283 million associated with NNSA Federal salaries and related expenses within the Office of the Administrator appropriation;
- $247 million associated with Legacy Contractor Pensions;
- $150 million associated with the domestic uranium enrichment research, development, and demonstration project within Defense Nuclear Nonproliferation;
- $35 million associated with identification of plutonium storage alternatives within Readiness in Technical Base and Facilities;
- $41 million associated with platform and hardware procurements within the Advanced Simulation and Computing Campaign;
- $30 million associated with implementing the NNSA Network Vision (2NV) Strategy within the NNSA Chief Information Officer Activities program;
- $45 million associated with the DOE Working Capital Fund across all programs; and
- $15 million associated with Minority Serving Institution initiatives across most programs.

When these procurements are issued, the funding will be spent at various locations throughout the NNSA and DOE complex.

12. Senator LIEBERMAN. Mr. D'Agostino, is any headquarters funding directly supporting Weapons Activities, and if so, how much and what does it support?

Mr. D'AGOSTINO. Yes, approximately $626 million is directly supporting the Weapons Activities programs. As noted above, much of this funding will get distributed to the labs and plants during the year of execution.

The funding identified at headquarters supports the following programs:

Headquarters Site Funding Table	$ thousands FY 2013 Request
Weapons Activities	
Directed Stockpile Work	47,386
Science Campaign	59,204
Engineering Campaign	1,500
Inertial Confinement Fusion Ignition and High Yield Campaign	28,500
Advanced Simulation and Computing Campaign	91,378
Readiness Campaign	1,429
Readiness in Technical Base and Facilities	85,023
Nuclear Counterterrorism Incident Response	1,711
Site Stewardship	18,112
Defense Nuclear Security	38,385
NNSA CIO Activities	68,260
National Security Applications	350
Legacy Contractor Pensions	185,000
Total, Weapons Activities	626,238

EFFICIENCIES INITIATIVES

13. Senator LIEBERMAN. Mr. D'Agostino, early last year former Secretary of Defense Gates announced that he was undertaking an efficiencies initiative within DOD to find savings and invest them in modernization. I believe that the principles behind Secretary Gates' efforts are applicable to other Federal agencies. Have you undertaken any efficiencies initiatives within NNSA? If so, please describe them and the outcomes they have achieved.

Mr. D'AGOSTINO. We also believe that the principles behind Secretary Gates' efforts are applicable to other Federal agencies. That said, NNSA is currently undergoing a governance reform effort in the interest of increasing efficiency, eliminating redundancy, and reexamining the requirements set to make sure requirements are not overly burdensome and facilitate the safe, productive operation of the national nuclear security enterprise.

One of the key undertakings that we are embarking on is balancing oversight of safety, security, and business practices while allowing flexibility and minimizing intrusive bureaucracy. This will require sustained effort on the part of NNSA management and our private sector partners.

NNSA, in partnership with DOE, has been working actively to enhance the relationship between the laboratories, sites, and headquarters; to enact a series of management reforms intended to improve the way we do business; to increase efficiency; and to maintain safe, secure, and responsible operations at our sites.

Here are examples of ongoing efforts at reshaping our relationship:

- The Secretary's "National Laboratory Director's Council," which includes the NNSA Labs, was tasked with identifying Burdensome Requirements for the DOE and NNSA. Of the 28 identified to date by the Lab Directors, 25 have been resolved, 2 are on hold at the request of the Directors, and 1 is still being worked.
- The NNSA's Enterprise Operating Requirements Review Board engages Lab and Plant Directors, Site Managers, and Headquarters leadership to look at requirements and directives in order to right-size them.
- The Administrator's NAP–21 "Transformational Governance and Oversight," signed out last year, defined principles, responsibilities, processes, and requirements to help in transforming and improving governance and oversight. We also develop implementation plans for each fiscal year to track performance in meeting the NAP–21's Governance goals.
- To maximize trust, the Administrator has initiated monthly executive video teleconferences including the executive core from labs, plants, and headquarters, and has hosted two off-site retreats.

We believe that the current contractual arrangements will allow NNSA to establish broad program objectives and goals and to capitalize on the private sector ex-

pertise of our contractors, while giving them sufficient flexibility to do their jobs efficiently and while holding them accountable for results. We are undertaking the actions described above to continuously improve relationships between laboratories, sites, and headquarters and to improve the way we do business.

14. Senator LIEBERMAN. Mr. D'Agostino, do you believe further streamlining of NNSA is possible to find further savings to invest elsewhere within the agency?

Mr. D'AGOSTINO. The initial governance reform efforts have achieved some significant streamlining in the Site Office and M&O contractor interface. A number of DOE directives have been reviewed and some balance restored between the degree of oversight and the acceptance of risk by the program managers, such as myself and Dr. Don Cook. This effort has cleared away some brush so that we can more clearly see additional aspects of the problem. Through our governance initiative, we are continually seeking additional opportunities to streamline and improve the efficiency of our organization. I believe that the savings from this approach would not only be in reduced direct Federal staff expenses (salaries, travel, training) but also over time in the opportunity for staffs at the M&Os to shift to more direct mission support activities.

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

MEMORANDUM OF AGREEMENT ON STOCKPILE MODERNIZATION

15. Senator SESSION. Mr. D'Agostino, according to the May 2010 Memorandum of Agreement (MOA) between DOD and DOE on the modernization of the U.S. nuclear infrastructure, DOE agreed to fully fund the CMRR Facility to complete construction in 2020 and ramp up to a minimum of 50 to 80 pits per year in 2022. According to the Office of Management and Budget budget tables, over the next 10 years DOD will transfer $7.1 billion in budget authority to NNSA in support of this MOA. Given the NNSA budget no longer meets the terms of the DOD/DOE agreement, does NNSA intend to return that budget authority back to DOD?

Mr. D'AGOSTINO. No, the transfer in budget authority is intended to assist NNSA in meeting DOD requirements. The decision to defer the CMRR–NF for at least 5 years is an adjustment to one element of the plans to meet multiple DOD requirements called for in the Nuclear Posture Review (NPR) and represents the best use of available Federal resources.

The May 2010 MOA between DOD and DOE on modernization of the U.S. nuclear infrastructure delineated funding for a number of important efforts defined in the NPR. Beyond the CMRR–NF and pit production efforts, the MOA also included the B61 and W78/W88 LEPs, completion of W76–1 production, the UPF at Y–12, and the development of capabilities for the conduct of future LEPs to increase margin and enhance warhead safety, security, and control.

The program envisioned at the time of the MOA has been revised for a number of reasons. The total level of resources available to pursue these efforts for fiscal year 2013 and beyond is not what was envisioned in fiscal year 2011 and fiscal year 2012 due to the new fiscal climate reflected by the BCA. Additionally, the cost of pursuing some of these efforts, such as the B61 and W78/W88 LEPs and CMRR–NF, increased as planning for these efforts matured. The revised program reflected in the President's budget request represents the best use of the available Federal dollars and has been coordinated with DOD through the Nuclear Weapons Council (NWC). We continue to work with DOD to refine cost data on these and other Stockpile Stewardship programs.

16. Senator SESSION. Mr. D'Agostino, if NNSA no longer intends to honor the terms of the MOA, why should DOD—which the budget proposes be cut by $487 billion over the next 10 years—be taxed to supplement baseline DOE responsibilities?

Mr. D'AGOSTINO. Even though recent budgetary constraints have certainly caused scheduling changes and adjustments to the original MOA project timelines, DOD is still the major beneficiary of these efforts. Beyond two major construction projects, the MOA also included the B61 and W78/W88 LEPs, completion of W76–1, and production and development of technologies for the conduct of future LEPs to increase margin and enhance warhead safety, security, and control. NNSA will continue to work with DOD to meet their requirements while performing within available resources.

CHEMISTRY AND METALLURGY RESEARCH REPLACEMENT FACILITY REQUIREMENT

17. Senator SESSION. Mr. D'Agostino, in a question for the record from our hearing last year, I asked you to highlight some of the consequences for not pursuing the CMRR Facility at Los Alamos. Specifically, I asked how a delay in construction would impact both future LEP and NNSA's ability to meet existing STRATCOM requirements. In response, you said that: "NNSA will not be able to achieve the required 80 pits per-year rate until the new CMRR Facility is in operation. This capability is required for the W78 LEP by 2021." Is it correct that your budget assumes that an 80-pit-per-year rate is no longer necessary for the W–78 LEP? If so, what has changed in less than 1 year to suggest that a capability you told me was once required for the W78, now no longer is?

Mr. D'AGOSTINO. Recent budgetary constraints in the form of the BCA have caused NNSA to reevaluate the W78 LEP schedule and the scope of the design options for the LEP. As the study has progressed, NNSA has become increasingly confident that, at least for the W78 LEP, pits can be reused rather than remanufactured. There will certainly be added risk as the technical details of reusing pits requires further evaluation, but this risk, and the risk of delaying CMRR, were assessed to be manageable. Being able to produce 50 to 80 newly manufactured pits per year would have allowed us to avoid making the decision to accept that risk, but budgetary realities have driven us in a different direction. Consistent with this production rate change, we have also slipped the schedule for the W78, with the first production unit required in 2023 rather than 2021. We believe the decision to push back first production on the W78 by 2 years and delay CMRR and the ability to produce 50 to 80 newly manufactured pits by 5 years, though not ideal, is the most prudent use of our available resources.

18. Senator SESSION. Mr. D'Agostino, is it correct that one of your justifications for indefinitely deferring CMRR Facility is that you assume that new pits will not be required for the W78 LEP and that you will be allowed to cannibalize pits currently held in the strategic weapons reserve?

Mr. D'AGOSTINO. The decision to defer CMRR–NF for at least 5 years was not driven by assumptions for the W78 LEP. Again, CMRR–NF was never intended to produce pits—pit production is within Plutonium Facility 4—but would provide the analytical chemistry and materials characterization necessary to qualify the pits. Deferral was driven by budgetary and strategic decisions, as well as the NNSA taking the opportunity to utilize existing infrastructure, ie: Radiological Laboratory, Utility, and Office Building (RLUOB) under the modern dose conversation factors which increased the amount of plutonium we could characterize in the new lab.

Our W78 Life Extension Study, Phase 6.1, concept study includes pit production and reuse options to evaluate program cost, ability to meet design requirements, and production capability. All three of these constraints will factor into our final decision on newly produced or reuse pits. At this phase, we have not made any assumptions but, we must consider the budget, and therefore production, constraints we are facing regarding pits.

19. Senator SESSION. Mr. D'Agostino, has DOD, the NWC, or the White House made a policy decision that the only option to be considered for the W78 is the reuse of pits currently held in the strategic hedge? If not, is your decision to indefinitely defer CMRR Facility limiting the options of future policy decisions?

Mr. D'AGOSTINO. To date, we continue to follow the policy outlined in the 2010 NPR report to look at reuse, refurbishment, and replacement options to ensure the labs have maximum flexibility and the full range of options. We have not received any external policy decisions regarding limiting pit options for the W78/88 common warhead. NNSA is conducting analysis to determine how we can increase our planned capacity for remanufacturing war reserve pits. We will retain options for pit reuse up to 125 per annum and remanufactured pits up to 20 to 30 per annum. We believe that this set of options will enable the W78/88 LEP to be conducted effectively.

20. Senator SESSION. Mr. D'Agostino, am I correct in understanding that the most recent NPR states the full range of LEP approaches will be considered, including the replacement of nuclear components?

Mr. D'AGOSTINO. Yes, while the NPR is clear that the United States will give preference to nuclear component refurbishment or reuse, it is equally clear that the full range of options will be considered for each warhead LEP, including replacement of nuclear components. As noted in their April 9, 2010, statement on the NPR, the laboratory directors affirmed that this approach "provides the necessary technical

flexibility to manage the nuclear stockpile into the future with an acceptable level of risk."

21. Senator SESSION. Mr. D'Agostino, in another question for the record from our last hearing less than 1 year ago, I asked you how a delay in CMRR Facility could impact future LEPs. In response you stated: "the safety, security, and environmental issues associated with the aging existing facilities are mounting, as are the costs of addressing them ... in the event that [existing] facilities had to be shut down due to safety, security, or environmental concerns, the loss of workforce and critical skills would be considerable, and it would likely be extremely expensive to restart operations." What requirements have changed in less than 1 year to justify the indefinite deferral of CMRR Facility?

Mr. D'AGOSTINO. The BCA required difficult program choices, including the deferral of CMRR–NF construction for at least 5 years. I would note that the question for the record you reference from last year concerned not only CMRR–NF, but UPF, which is being accelerated to address the risks you cite. The decision to defer construction of the CMRR–NF still provides for the planned orderly phase-out of program activities from the CMR building, concluding in approximately 2019. During the deferral period for CMRR–NF construction, NNSA is focused on ensuring our plutonium needs are met by using the capabilities and expertise found at existing facilities. Maximizing use of existing facilities will allow us to ensure uninterrupted plutonium operations while focusing on other key modernization projects. While this path is not ideal, and likely not sustainable for the long-term, the risk to plutonium operations was assessed to be manageable—though NNSA is examining where additional investments are required for this strategy to be execute successfully. More broadly, this plan was assessed to be the most prudent path forward given budget constraints.

COST OF NUCLEAR CONSTRUCTION

22. Senator SESSION. Mr. D'Agostino, as I mentioned in my opening remarks, indefinitely deferring the facility at Los Alamos while also increasing funding for the multibillion dollar facility at Y–12 sends the wrong message. It perpetuates the status quo mentality that everything nuclear has to be cost prohibitive. It also validates the out-of-control risk aversion that has ballooned cost. As of March 2012, how much to date has been spent on studying and designing the CMRR Facility?

Mr. D'AGOSTINO. A decision has been made to defer CMRR–NF construction for at least 5 years, but not indefinitely. Through March, the CMRR project has spent approximately $362 million on design of the NF to reach a design maturity of approximately 80 percent. Closing out NF design efforts in fiscal year 2012 will inform future projects by improving the application of safety requirements in the design of nuclear facilities and enhancing our understanding of the seismology at Los Alamos. A part of the CMRR project, the RLUOB, is now complete and preparing for finishing equipment installation and beginning operations in fiscal year 2013.

23. Senator SESSION. Mr. D'Agostino, as of March 2012, what are the current cost estimates for the UPF at Y–12?

Mr. D'AGOSTINO. The current cost range for the UPF is $4.2 to $6.5 billion as reported in the construction Project Data Sheet. The project baseline for cost and schedule will be established at Critical Decision-2 which is scheduled for the end of fiscal year 2013.

24. Senator SESSION. Mr. D'Agostino, what specific steps are you taking to ensure affordability?

Mr. D'AGOSTINO. NNSA has, and will continue to have, external reviews that evaluate project cost-saving opportunities as the design matures. To ensure the costs of the UPF project remain affordable, NNSA is in the process of revising the execution plan to construct the building and support systems and phase installation of process equipment according to a priority of the processes at greatest risk of failure. Moving capabilities out of Building 9212 are of the highest priority.

25. Senator SESSION. Mr. D'Agostino, what cost-savings measures have you considered?

Mr. D'AGOSTINO. The project has an ongoing effort to seek opportunities to reduce costs without compromising safety, security, and continuity of capability. To name a few, the project is exploring options in project acquisition, technology development, reduction of existing security areas, and optimization of phases of construction.

NNSA has recently created the Office of Acquisition and Project Management which is an independent organization that combines critical elements of project execution oversight and is dedicated to ensuring that costs and schedules are validated and maintained through the life of a project. Under this new project oversight strategy, NNSA has emphasized that construction contractors for all construction projects, including UPF, are accountable to meet milestones, deliverables, safety and security elements, and cost with annual monetary incentives. In addition, NNSA has hired a new Federal Project Director, John Eschenberg, to lead the design and construction efforts for the Y–12-based UPF in Oak Ridge.

26. Senator SESSION. Mr. D'Agostino, are there any cost-savings measures you haven't considered because of government regulation or legislative restrictions?

Mr. D'AGOSTINO. NNSA has not eliminated any cost-saving measures from consideration due to government regulation or legislative restrictions, and continues to seek cost-savings opportunities.

27. Senator SESSION. Mr. D'Agostino, given your proposal to indefinitely defer CMRR Facility, what steps will you take to ensure that the hundreds of millions of dollars that were spent designing this facility will not go to waste?

Mr. D'AGOSTINO. Through March, $32 million has been spent on design of the CMRR–NF. The CMRR–NF design will continue until the project achieves a substantially complete design in 2012. The decision whether or not to construct the CMRR–NF has yet to be made. The strategy for CMRR–NF is to defer construction for at least 5 years. Closing out NF design efforts in fiscal year 2012 will inform future projects by improving the application of safety requirements in the design of nuclear facilities and enhancing our understanding of the seismology at Los Alamos. Moreover, the CMRR–NF design and other alternatives will be evaluated over the next 5 years to determine the most effective approach to sustain the plutonium capability.

NEW PLUTONIUM STRATEGY

28. Senator SESSION. Mr. D'Agostino and Dr. Cook, in your prepared statement you state that the decisions made were in "close consultation with our national laboratories and national security sites." However, I understand that it was not until the day of the budget release that NNSA sent a memo to Los Alamos informing them of the decision to cancel the CMRR Facility and requesting that they develop a plan within 60 days for implementing a new NNSA plutonium strategy. I understand this new strategy will utilize a number of various facilities, some of which will require additional investments to prepare, and will require the shipment of plutonium across a large portion of the southwest. Some estimate that your alternative plutonium strategy will cost at least $500 million over the next 5 years. As of March 2012, has a cost benefit analysis taken place confirming that the long-term cost implications of deferring CMRR Facility over the next 5 years will be significantly less than the costs of pursing an alternative strategy?

Mr. D'AGOSTINO. NNSA tasked LANL to develop high-level plans to evaluate the implications for our plutonium capability in the event that construction of the CMRR–NF was delayed, considering several options and alternatives. Although preliminary estimates of cost for options and alternatives are under development for consideration, as of March 2012, no cost benefit analysis has been completed, and NNSA will continue to evaluate costs of alternatives and options with LANL through the fiscal year.

Dr. COOK. Planning actions were underway in late 2011 regarding options for the B61–12 LEP, the UPF, and the CMRR–NF, once the BCA of 2011 was passed. The letter requesting formal planning and evaluation by LANL was released as soon as the President's budget request for 2013 was no longer embargoed.

29. Senator SESSION. Mr. D'Agostino and Dr. Cook, as of March 2012, what studies have taken place to validate that the new proposed plan is viable?

Mr. D'AGOSTINO. NNSA tasked LANL to develop high-level plans to evaluate the implications for our plutonium capability in the event that construction of CMRR–NF was deferred, considering several options and alternatives. As of March 2012, NNSA has not dispositioned, selected, or validated the viability of any option or alternative, but will continue to work towards a preferred alternative and assess viability throughout the fiscal year.

Dr. COOK. I agree.

30. Senator SESSION. Mr. D'Agostino and Dr. Cook, as of March 2012, can you certify today that the cost of implementing the new strategy will be cheaper and safer than the cost of proceeding with CMRR Facility?

Mr. D'AGOSTINO. Total cost impacts associated with deferral of NF construction are not known at this time. As NNSA moves forward with the analysis of recommendations from LANL to provide for CMRR–NF capabilities using existing infrastructure, it will weigh recommended options against current fiscal realities. NNSA always considers nuclear safety as a high priority in all aspects of the enterprise to include plutonium production.

Dr. COOK. I agree.

31. Senator SESSION. Mr. D'Agostino and Dr. Cook, I understand that the budget does not include funding to increase PF–4 capacity from 11 per year to the 20 to 30 claimed by the administration, is that correct?

Mr. D'AGOSTINO. Yes. The fiscal year 2013 President's budget includes a minimum sustainment profile to support the manufacturing process transition from W88 pits to W87 pits, but not any funding to increase capacity.

Dr. COOK. I agree.

32. Senator SESSION. Mr. D'Agostino and Dr. Cook, do we know for certain if pits stored at Pantex can be reused or how much it will cost to make that determination?

Mr. D'AGOSTINO. Yes, we do know for certain that some of the pits stored at Pantex can be reused. The cost for reuse in a particular weapon and certification of pit reuse options in a LEP depend on the design of the LEP. The total cost for certification of existing pits in new systems has not yet been determined. Without completing a 6.2/2a study, the cost for certification of a remanufactured pit into a new system would also be undetermined.

Dr. COOK. I agree.

33. Senator SESSION. Mr. D'Agostino and Dr. Cook, is it true that the budget does not include funding to analyze this?

Mr. D'AGOSTINO and Dr. COOK. The budget does include funding which will allow for preliminary evaluation of technical options and associated costs. These results will be reflected in the 2014 and subsequent budget requests.

ISSUES WITH A PIT REUSE STRATEGY

34. Senator SESSION. Mr. D'Agostino and Dr. Cook, is it true that old pits generally do not meet some modern requirements and that existing pits typically considered for reuse are already between 20 and 50 years old?

Mr. D'AGOSTINO. Existing pits that are candidates for reuse span a variety of ages. Not all of the existing pit types are the best candidates for future LEP designs. However, this is more due to physical characteristics (e.g., the fact that they have been designed to function using conventional high explosive rather than designed for insensitive high explosive) and not their age. We have several existing pit types that are viable to meet requirements for modernized LEP designs.

Dr. COOK. I agree.

35. Senator SESSION. Mr. D'Agostino and Dr. Cook, is it true that there are a fixed number of existing pits and pit types and that not every pit type is compatible with every weapons system type?

Mr. D'AGOSTINO. It is true that there is a finite quantity of existing pits and pit types. Not every existing pit type is a candidate for reuse to modernize existing systems.

Dr. COOK. I agree.

36. Senator SESSION. Mr. D'Agostino and Dr. Cook, is it true that there is a risk that an approach to mix and match pits and weapon types could exhaust the available supply of a given pit type, limiting stockpile options?

Mr. D'AGOSTINO. We continue to review the viability of pit designs to support future reuse and modernization of the stockpile. Our analysis includes the quantities necessary to support the full scope of a LEP including sufficient quantities to support system qualification and destructive evaluation for an associated stockpile evaluation program. When we consider reuse and refurbishment options, we include in the analysis the flexibility and additional capability to produce prior designs at the level of 20 to 30 new pits annually.

Dr. COOK. I agree.

NATIONAL ACADEMY OF SCIENCES STUDY

37. Senator SESSION. Mr. D'Agostino, in a recently published study authorized by this committee in the National Defense Authorization Act (NDAA) for Fiscal Year 2010, the National Academy of Sciences characterized the relationship between NNSA and the weapons labs by a persistent level of mistrust exacerbated by poor communications and lack of transparency at the highest levels. Do you agree with the study?

Mr. D'AGOSTINO. We are continuing our efforts to reduce administrative burdens and increase transparency, and therefore building trust through governance reform. We are committed and energized to continue to make improvements in NNSA oversight efforts and in rebuilding trust in the NNSA/laboratory relationship.

38. Senator SESSION. Mr. D'Agostino, what do you believe should be done to overcome the issues raised in the study?

Mr. D'AGOSTINO. One of the key undertakings that we are embarking on is balancing oversight of safety, security, and business practices while allowing flexibility. This will require sustained effort on the part of NNSA management and our private sector partners.

NNSA, in partnership with DOE, has been working actively to enhance the relationship between the laboratories, sites, and headquarters to improve the way we do business; to increase efficiency; and to maintain safe, secure, and responsible operations at our sites.

We believe that the current contractual arrangements will allow NNSA to establish broad program objectives and goals and to capitalize on the private sector expertise of our contractors, while giving them sufficient flexibility to do their jobs efficiently and while holding them accountable for results. We are undertaking the actions to continuously improve relationships between laboratories, sites, and headquarters and to improve the way we do business.

IMPROVING RELATIONSHIPS

39. Senator SESSION. Mr. D'Agostino, one key recommendation of the bipartisan Strategic Posture Commission (SPC) focused on the current NNSA governance structure and the determination that it is "not delivering the needed results." To address this shortfall, the SPC recommended that Congress should amend the NNSA Act to "establish the NNSA as a separate agency reporting to the President through the Secretary of Energy." Do you agree with the SPC's findings? If yes, how do you believe we should reform NNSA governance? If not, why not?

Mr. D'AGOSTINO. We are investigating ways to reduce the administrative burden and increase flexibility for management and staff operating our mission facilities. NNSA has, however, faithfully delivered on all national security requirements, and will continue to do so through any transition in governance structure.

We believe that the current contractual arrangements will allow NNSA to establish broad program objectives and goals and to capitalize on the private sector expertise of our contractors, while giving them sufficient flexibility to do their jobs efficiently and while holding them accountable for results. We are undertaking the actions described above to continuously improve relationships between laboratories, sites, and headquarters and to improve the way we do business.

ENVIRONMENTAL MANAGEMENT

40. Senator SESSION. Mr. D'Agostino and Mr. Huizenga, the fiscal year 2013 request for Environmental Management (EM) is $5.49 billion, almost $500 million more than the level appropriated in fiscal year 2012. Given EM funding is a part of security spending, how do you justify large increases for EM and a $371 million reduction from the funding level planned for fiscal year 2013 in the fiscal year 2012 budget for the weapons program? It appears to me that national security requirements are being traded for environmental cleanup.

Mr. D'AGOSTINO and Mr. HUIZENGA. The fiscal year 2013 request for the Defense Environmental Cleanup account is $5.49 billion. This amount includes $463 million that would be transferred from the General Fund to be deposited into the Uranium Enrichment Decontamination and Decommissioning Fund—netting to zero in the request. There is no programmatic increase of $463 million. The total fiscal year 2013

request for the EM program is $5.65 billion, which is a reduction of $60 million from the fiscal year 2012 enacted level of $5.71 billion.

41. Senator SESSION. Mr. D'Agostino and Mr. Huizenga, a January 2012 front page USA Today article on the cleanup project at Hanford painted a very troubling picture of the decade-long, multi-billion-dollar symbol of what is wrong with the EM program. According to the article, the Waste Treatment Plant's (WTP) $12.3 billion price tag is not only triple original estimates but is "well short of what it will cost to address the problems and finish the project." What will it cost and how much more time will it take to finish this project?

Mr. D'AGOSTINO and Mr. HUIZENGA. Today, the WTP Project is over 62 percent complete, and DOE has directed the WTP Project contractor to develop a Baseline Change Proposal projecting the total project costs and schedule for completing the capital project. This proposal should be completed by the fall of 2012. Until we receive the Baseline Change Proposal from the contractor, and conduct our own independent government cost estimate that will serve as the basis for the independent review of that proposal, we are unable to address potential cost and schedule changes. DOE remains committed to working with Congress and its stakeholders to complete this important project and reduce the risk posed by the tank waste at Hanford.

42. Senator SESSION. Mr. D'Agostino and Mr. Huizenga, given the complexity of a high-risk, one-of-a-kind NF, why was a design-build approach—which a Government Accountability Office official quoted as being "good, if you're building a McDonald's"—taken?

Mr. D'AGOSTINO and Mr. HUIZENGA. DOE selected a design-build approach because it vests a single contractor with the responsibility to design, build, and commission the WTP under a single contract. One entity is clearly responsible to assure the adequacy of design to meet project performance expectations; to assure construction meets design specifications; and to demonstrate, through commissioning, that performance expectations are met. Another reason that a design-build strategy was selected was that this approach allowed facilities to be completed and commissioned earlier, meeting stakeholder desires to begin processing waste as soon as possible. At the time the decision was made to apply the design-build strategy to the WTP, no one anticipated that the resolution of the technical issues would be so complex. If DOE were presented with the same decision now with the current level of knowledge, a key consideration would focus on the development of a plan for closing the technical issues and validating design.

43. Senator SESSION. Mr. D'Agostino and Mr. Huizenga, who is being held accountable for this project?

Mr. D'AGOSTINO and Mr. HUIZENGA. Accountability for the successful completion and operation of the WTP Project extends to all levels of DOE. This project has the attention of and support from the most senior levels in DOE, and I assure you that they have clearly communicated their expectations and hold me and my management team—which extends down to the Federal Project Director of the WTP—accountable for safely and successfully completing this project.

44. Senator SESSION. Mr. D'Agostino and Mr. Huizenga, why shouldn't this project be terminated immediately or stopped to evaluate whether the current plan is affordable?

Mr. D'AGOSTINO and Mr. HUIZENGA. The safe cleanup of the 56 million gallons of chemical and radioactive waste stored in underground tanks at the Hanford Site in Washington State, only 7 to 10 miles from the Columbia River, is one of the highest priorities for the Office of EM's mission. This waste, the legacy of DOE's plutonium production mission for the national defense, is highly complex, and is currently stored in tanks that are decades beyond their design life. The WTP Project is the cornerstone of EM's cleanup strategy, and it is of utmost importance that we continue to move forward to get this solution in place and operating to reduce the risk posed by Hanford's tank waste. Today, the WTP Project is over 62 percent complete, and there is unmistakable physical progress toward accomplishing the tank waste cleanup mission at Hanford.

45. Senator SESSION. Mr. D'Agostino and Mr. Huizenga, in 2005, Senator Graham was able to speed up cleanup at the Savannah River Site (SRS) by 23 years and save taxpayers $16 billion. Section 3116 of the 2005 NDAA illustrates that there are, in fact, vehicles and legislative options for reducing both cost and schedule of environmental cleanup programs. What over the past year has EM done to address

the staggering and growing cost of cleanup and what can Congress and the executive branch do to make sure that we get the job done without spending such a staggering amount of taxpayers' dollars?

Mr. D'AGOSTINO and Mr. HUIZENGA. The Office of EM continues to use a risk-informed decisionmaking process to set priorities and, working with our regulators, establish cleanup standards that are protective of human health and the environment. EM also continues to incorporate efficiencies into the processes used to complete environmental remediation at all of the DOE sites. This is attained by developing new technologies to address highly complex technical issues and implementing contract strategies that achieve more cost-effective cleanup while maintaining high safety standards.

Section 3116 has saved costs and reduced schedule in DOE's high-level waste tank closure efforts at SRS and INL. Using this waste determination process, DOE has closed at INL, 11 large tanks (300,000 gallons), and 4 small tanks (30,000 gallons), and at SRS, low activity radioactive waste is being disposed of as saltstone in onsite vaults and the closure process for the F Tank Farm, specifically, Tanks 18 and 19, began in April 2012.

At Oak Ridge, we have reevaluated the disposition of U–233 at the Oak Ridge National Laboratory. In the first phase of the U–233 project, approximately half of the inventory is being shipped directly without processing to the Nevada National Security Site for disposal or storage for future programmatic use. This alternative strategy significantly reduces the capital asset requirements for the project and is estimated to avoid hundreds of millions of dollars from the previous project cost estimate.

Using funds from the American Recovery and Reinvestment Act of 2009, EM has accelerated decommissioning and deactivation of excess facilities and cleanup of contaminated areas to reduce the legacy cleanup from over 900 square miles in 2009 to 318 square miles by the end of fiscal year 2011; significantly below the end of the fiscal year 2011 target of 540 square miles. EM is using cost-effective processes such as entombment of reactors to reduce the inventory of excess facilities. The continued management and removal of legacy transuranic waste from generator sites will directly support risk reduction and aid in the goal of reducing site footprint.

EM continues to implement sustainable remediation remedies and to explore new technologies that are more effective and efficient. EM is continuing to look at using monitored natural attenuation and enhanced attenuation to remove contaminants from groundwater, therefore eliminating constructing and operating pump and treat systems, which generally must operate for long periods of time, thereby reducing costs. EM is also using new types of impermeable barriers to reduce the spread of contamination in the subsurface, further reducing the cost to remediate groundwater. At West Valley, NY, an 860-foot-long and 30-foot-deep impermeable barrier was installed to prevent the spread of strontium. At SRS, a gate and funnel type barrier was used to funnel the groundwater into an area where it can be treated. At Hanford, EM is using a new treatment material (resin) to remove chromium from the groundwater. The use of this new resin removes about 15 times the amount of chromium, therefore reducing the operating costs associated with resin change out.

For high level waste, EM is investing in technologies to improve glass formulation to increase the amount of radionuclides that can be incorporated into glass at Hanford's WTP. EM is also developing a small column ion exchange (SCIX) to be coupled with a rotary microfilter to pretreat the radioactive tank waste at SRS and Hanford. Since 2008, EM has been employing at SRS the Caustic-Side Solvent Extraction process for removing radioactive cesium-137 from waste in a modular unit, and will be implementing it at full scale at the SRS's Salt Waste Processing Facility. The next-generation chemistry promises to be transformational in its impact, especially when coupled with SCIX. These technology advances accelerate waste processing to shorten the schedule and reduce cost.

The EM program is large and complex. Many of the problems require unique solutions to address the cleanup. EM will continue to find innovative ways to address these problems, reduce risks, maintain safety, and be protective of human health and environment while continuing to explore innovative ways to reduce the cost.

SSBN(X) LIFE-OF-THE-HULL REACTOR

46. Senator SESSION. Admiral Donald, what is the current technology readiness level for the life-of-the-hull reactor anticipated for the SSBN(X)?

Admiral DONALD. The reactor for *Ohio* replacement will incorporate technologies proven over the last 30 years that provide greater energy and a longer lifetime than any previous submarine core.

Development of the materials required to achieve the life-of-ship core were part of previous research, design, and manufacturing efforts that NR is evaluating today. The knowledge gained from these efforts identified the additional steps needed to be ready for full-scale production in support of *Ohio* replacement. NR is confident in the ability of the material to support the life-of-ship core and will validate through manufacturing demonstrations as part of efforts supporting the Land-Based Prototype Refueling Overhaul.

While NR has not historically used technology readiness levels to manage its technical efforts, the program judges that the life-of-ship core material technology would represent a level 5 (component and/or breadboard validation in a relevant environment). This assessment is based on the fact that a prototype test cell incorporating the new material has been inserted in an operating, land-based, reactor plant. Manufacturing development at the ship-production scale needs to be demonstrated, and will be derisked as part of the Land-Based Prototype Refueling Overhaul.

47. Senator SESSION. Admiral Donald, how are the requirements for the life-of-the-hull reactor design for SSBN(X) different from those in current *Virginia*-class submarines?

Admiral DONALD. SSBNs spend more time at sea than SSNs in order to meet the requirements for strategic patrols and therefore are operated by two distinct crews. *Ohio* replacement will also be designed for a life of 42 years, vice 33 for *Virginia*. The *Ohio* replacement core will operate at sea for more than twice as many days as *Virginia*'s core. In order to achieve this increase in energy and lifetime demand, NR is designing a core with new materials to support the increased demands.

48. Senator SESSION. Admiral Donald, I understand that the current milestone and decision point for determining the technical feasibility of developing a life-of-the-hull reactor for the SSBN(X) will occur this year. Are those studies on track?

Admiral DONALD. Yes. Based on the materials analysis work completed to date, NR is in the process of evaluating a recommendation from its prime contractor laboratory to verify that the technology is sufficiently mature for inclusion in the *Ohio* replacement core design. Continued funding will be necessary to refine the *Ohio* replacement core design and manufacturing capabilities as the core vendor increases to a production scale and ensure that our projections regarding manufacturing capability and core performance remain valid.

49. Senator SESSION. Admiral Donald, do you foresee any significant hurdles which could preclude your ability to develop a life-of-the-hull reactor for the SSBN(X)?

Admiral DONALD. The funding levels for the *Ohio* replacement reactor plant design and the associated work in the Land-Based Prototype Refueling Overhaul in the President's budget for fiscal year 2013 for fiscal years 2014 to 2017 are placeholders. The administration is currently conducting the analysis required to develop a profile that not only provides sufficient resources for *Ohio* replacement and the Land-Based Prototype, but also meets the requirements of the BCA. If the profile is funded from fiscal year 2014 and beyond, we do not see any insurmountable technical hurdles.

50. Senator SESSION. Admiral Donald, if it is determined that a life-of-the-hull reactor for the SSBN(X) is not possible, how will that impact the overall number of boats required to meet STRATCOM's requirements? In other words, would additional boats be required to compensate for refueling?

Admiral DONALD. With adequate funding, NR expects to deliver a life-of-ship core for *Ohio* replacement. Without a life-of-ship core though, two additional ships, at a cost of at least $10 billion, would be required to meet STRATCOM's requirements due to the decreased availability of the class during refuelings.

PRIORITIES REGARDING CMRR AND UPF

51. Senator SESSION. Mr. D'Agostino and Dr. Cook, according to the SPC report, four factors should be assessed when determining if CMRR Facility or UPF is of greatest need. While the SPC concluded that funding both would "best serve the national interest," they stated that if a decision were made to put one before the other, then CMRR Facility at Los Alamos should take precedence. According to SPC:

- A short-term loss of plutonium capabilities may hurt the weapons program more than a short-term loss of enriched uranium capabilities.

- The Los Alamos plutonium facility makes a direct contribution to maintaining intellectual infrastructure that is in immediate danger of attrition.
- Because the future size of the stockpile is uncertain, projects that are relatively independent of stockpile size should take priority . . . [and] the Los Alamos plutonium facility and required independent of stockpile size.

Given the fiscal year 2013 budget decision to forgo the plutonium facility at Los Alamos, perhaps indefinitely, why does the administration proposal, once aligned with SPC, now contradict some of the key findings?

Mr. D'AGOSTINO. CMRR–NF construction is deferred for at least 5 years. The decision to defer CMRR–NF construction and move forward with UPF construction is fully consistent with an independent DOD review and recommendations for both projects completed in 2011. The decision to accelerate the UPF project was made because NNSA and DOE concurred with DOD's independent view that Building 9212 at Y–12 presents the highest program and operational risk. In addition, all three weapons laboratory directors were consulted frequently during the NNSA budget formulation process, and reflects their recommendations. While the SPC Report provides an excellent analysis of America's Strategic Posture, it was published in 2009; prior to the BCA and revised project cost estimate ranges for both CMRR–NF and UPF. Based on input from stakeholders and reflecting increased fiscal austerity, NNSA decided to defer construction of the CMRR–NF for at least 5 years.

Dr. COOK. I agree.

[Whereupon, at 4:42 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MARCH 21, 2012

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

MILITARY SPACE PROGRAMS

The subcommittee met, pursuant to notice, at 2:33 p.m. in room SR–222, Russell Senate Office Building, Senator E. Benjamin Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Nelson and Sessions.

Committee staff member present: Leah C. Brewer, nominations and hearings clerk.

Majority staff member present: Jonathan S. Epstein, counsel.

Minority staff member present: Daniel A. Lerner, professional staff member.

Staff assistant present: Hannah I. Lloyd.

Committee members' assistants present: Ryan Ehly, assistant to Senator Nelson; and Lenwood Landrum, assistant to Senator Sessions.

OPENING STATEMENT OF SENATOR E. BENJAMIN NELSON, CHAIRMAN

Senator NELSON. Senator Sessions is on the way, but we will go ahead and start and then when he gets here, he will give his opening statement.

So let me today call our hearing to order.

The purpose of today's hearing is to receive testimony on the Department of Defense's (DOD) fiscal year 2013 budget submission for its space activities.

First, let me thank today's witnesses for appearing before the subcommittee. I know you are all busy and this subcommittee very much appreciates the time that you are taking to testify.

Let me note that sitting at the table and not behind me, as she once did, is Assistant Secretary Madelyn Creedon. Our committee misses you very much. Welcome back, Madelyn. It is good to have you. Congratulations again on your new position.

The President's fiscal year 2013 request for DOD space programs totals about $9.7 billion, down roughly 17 percent from fiscal year

2012. The decrease mainly represents the completion and launch of several large satellites that were under development in prior years. So for the first time in many years, DOD has more satellites than launch capacity, indicating that we seem to be overcoming several major acquisition challenges in DOD's space programs. However, there are still several concerns that I have that I hope we can discuss to inform this subcommittee as we begin drafting our annual defense authorization bill.

First and foremost is the way forward with our Evolved Expendable Launch Vehicle (EELV) program. Last fall, there was a critical Government Accountability Office (GAO) report on the program's costs growth and the ability to let in new and innovative launch providers for competition to drive down cost without sacrificing our mission assurance.

Second, while we are now launching satellites into space on a regular basis, we are failing to effectively utilize some of them here on Earth.

The Space-Based Infrared Satellite (SBIRS) after many delays and cost overruns is delayed in implementing its ground system. The Navy's Mobile User Objective System (MUOS) satellite does not have terminals that effectively use the satellite's new frequencies.

The Advanced Extremely High Frequency (AEHF) satellite seems to win the prize with a signal so advanced that it has caused the cancelation of the ground system that was to use it, the Family of Advanced Beyond Line-of-Sight Terminals (FAB–T). This cancelation has in turn affected our Air Force strategic bombers' ability to have nuclear hardened, high data rate communications with the satellite. The AEHF's new waveform also caused a cancelation in the Air Force's ground element of their Minimum Essential Emergency Communications Network (MEECN). I will be asking each of the witnesses and the GAO about this issue and what we might do in future programs to avoid it.

Third, I understand that somehow in this budget we managed to cancel two small but highly significant programs that have been paving the way forward on space innovation with low cost but responsive satellites.

The first program, the Space Test Program, was a $50 million a year effort that General Schriever himself, the father of DOD Space, established in 1965 to provide a means to launch innovative and high-risk satellites. This small program led to groundbreaking satellites such as the Global Positioning System (GPS), our first secure communications system called MILSTAR, and finally our defense weather satellites. More importantly, it has served as the venue for students at our universities and military academies to launch and control innovative satellites. Many of these same students who got excited about space from this program are today's military space leaders.

The second program is the Operationally Responsive Space (ORS) program whose purpose is to develop innovative low-cost and responsive satellites that are designed for tactical use by our battlefield commanders and, if necessary, to rapidly reconstitute our satellite system if it were to be disabled. I understand that ORS–1 was developed from start to finish in less than 3 years for a frac-

tion of the cost of normal imagery payloads and is being tasked directly by U.S. Central Command rather than through the traditional tasking processes.

I would like to know how the Air Force came to this decision and whether they understand its full impact. I understand the Army has begun to experiment with small tactical payloads as well. So I look forward to their testimony here to compare and contrast what happened to these two programs.

The third issue is what DOD is going to do about preserving its allocated radio frequency spectrum. We nearly lost a DOD block of spectrum as a pay-for in a recent tax bill and this committee worked very hard to avert what many in DOD saw as a crisis. I would ask consent to enter into the record a letter dated February 3, 2012, on this issue from the Deputy Secretary of Defense, Ashton B. Carter.

[The letter and information paper of Secretary Carter follows:]

DEPUTY SECRETARY OF DEFENSE
1010 DEFENSE PENTAGON
WASHINGTON, DC 20301-1010

The Honorable Carl Levin
Chairman
Committee on Armed Services
United States Senate
Washington, DC 20510

FEB 03 2012

Dear ~~Chairman Levin~~: Sir

This letter responds to your January 31, 2012 request for the Department of Defense's (DoD) views on Title IV of the House "Middle Class Tax Relief & Job Creation Act of 2011"(H.R. 3630). I understand that you have some concerns regarding the radio frequency spectrum provision and I hope you find the Department's views on this subject helpful.

The Department is concerned with Title IV provisions in the House bill that would reallocate and auction the 1755-1780 MHz and 3550-3650 MHz federal bands within a timeframe of three years following enactment. Setting an arbitrary timeline of three years to vacate spectrum contradicts existing law that outlines steps to establish auction procedures and timelines to vacate spectrum. Additionally, the legislation does not include a provision that would give DoD sufficient time to conduct the necessary analysis to determine the cost and operational impacts of reallocating critical national security systems operating in these bands. This analysis has not been done and must be completed prior to any decision to auction or reallocate spectrum in order to fully understand the cost implications of any potential reallocations and to identify alternative frequency bands necessary to sustain military operational capabilities. Furthermore, it is unclear under the proposed legislation whether federal agencies, including DoD, which would be required to withdraw frequency assignments within these bands, would be provided alternative spectrum with comparable technical characteristics.

The Department also opposes a provision in H.R. 3630 that would permit the Federal Communications Commission (FCC) to allow operation of unlicensed devices in the 5350-5470 MHZ bands where critical sensitive DoD systems operate and could be adversely affected. Under the proposed legislation, only the FCC could determine the adequacy of protection for incumbent federal operations without a requirement for validation from the impacted federal agencies.

It is the Department's view that failure to address these concerns could cause significant adverse impacts to military training, operations, and combat readiness and/or cause DoD to incur unacceptably high implementation costs. The attached information paper describes the DoD's concerns with the proposed legislation in greater detail.

The Department believes it is critical that any legislation that proposes the reallocation or auction of spectrum afford DoD, and other affected agencies, sufficient time to conduct

reallocation studies for any spectrum (six months for each spectrum band) in order to determine the associated costs and operational impacts. Further, any such legislation must ensure that DoD and other agencies are provided comparable spectrum for any frequencies to be surrendered as required by Section 1062(b) of P.L. 106-65.

Thank you again for your consideration of the Department's spectrum equities and for your continued support of our men and women in uniform.

Ash Carter

cc:
The Honorable John McCain
Ranking Member

INFORMATION PAPER

SUBJECT: DoD Concerns with Provisions in H.R. 3630 - "Jumpstarting Opportunity with Broadband Spectrum (JOBS)"

Overview

- This information paper details the Department of Defense's (DoD) concerns with spectrum provisions contained in the JOBS Act, currently attached as Title IV to the House "Middle Class Tax Relief & Job Creation Act of 2011" (H.R. 3630), which call for the reallocation and auction of the 1755-1780 MHz and 3550-3650 MHz federal bands where DoD operates critical national security systems.
- The DoD is principally concerned that the proposed legislation sets an arbitrary timeline of not later than three years after enactment for federal agencies to start withdrawing frequency assignments. Timelines to withdraw frequencies (i.e., vacate spectrum) should not be set in legislation and would override existing law (PL 108-494) that outlines the required steps to establish auction procedures and timelines to vacate spectrum. Setting arbitrary timelines to vacate spectrum could adversely impact defense operational capabilities and could pose potentially high implementation costs.
- Equally importantly, there has been no analysis of the feasibility of reallocations from the spectrum bands identified in the JOBS Act (1755-1780 MHz, 3560–3660 MHz and 5350-5470 MHz) including the cost and operational impact of reallocating these bands. DoD and other federal agencies,, must be given sufficient time (six months for each spectrum band) to conduct the necessary feasibility analysis to determine the cost and operational impacts of withdrawing frequencies from the targeted frequency bands.

1755-1780 MHz Band

- The proposed legislation is unclear as to whether federal agencies will receive comparable spectrum. Per the President's 500 MHz plan, DoD has only conducted feasibility studies to relocate systems from the 1755-1850 MHz band because many DoD systems operate across the entire band.
- The DoD is concerned that an exception to relocate out of the 1755-1780 MHz band can only be granted by the Secretary of Commerce, which is inconsistent with current law regarding spectrum reallocation. The DoD would request that a provision, consistent with P.L. 106-65, be included that would require the Secretary of Defense and Chairman of the Joint Chiefs of Staff to certify that comparable spectrum is available to support essential military capabilities that are forced to vacate out of 1755-1780. The DoD is also concerned that federal agencies that request an exception to remain in the 1755-1780 band must vacate comparable spectrum elsewhere, when no fallow spectrum exists.
- DoD Military Services and Agencies operate over 100 distinct systems in the 1755-1850 MHz band, most of which require the use of the entire 95 MHz band to meet mission requirements. Key systems/capabilities affected include: satellite launch and on-orbit control operations, electronic warfare weapon systems, air combat training systems, air mobile

telemetry for test and evaluation of aerial weapon systems, tactical communications systems, small unmanned aerial systems/vehicles, and precision guided munitions. Any legislation directing the auction of the 1755-1780 MHz band without the necessary cost and operational impact assessment, including the availability of comparable spectrum, could have significant adverse impact to military training, operations, and combat readiness.

3550-3650 MHz Band

- The study referenced in the legislation only addressed geographic sharing without any intent to withdraw frequencies. The study also did not consider alternative spectrum with comparable technical characteristics per P.L. 106-65. The lack of an adequate migration plan will certainly result in significant operational impact and excessively high costs. There are also no exceptions to reallocating spectrum specified for this band.
- The Navy operates critical radar systems in the 3550-3650 MHz band, including shipborne Air Traffic Control (ATC) radar that support the tactical deployment of aircraft, as well as two advanced radar systems being developed for all future aircraft carriers, cruisers and destroyers. The Air Force also operates Station Keeping Equipment systems and associated Zone Markers in the band that aid cargo aircraft for formation flying in poor weather and for air drops of personnel and materiel.

Other Concerns

- DoD is concerned that the Federal Communications Commission (FCC) would have sole authority to determine the adequacy of protection for incumbent federal operations in the 5350-5470 MHz band where critical sensitive DoD systems operate in order to allow operation of unlicensed devices. The federal agencies must be the ones to determine operational impact and adequacy of protection for each of their capabilities.
- DoD is concerned that the Technical Panel (independent of the appropriate technical and operational expertise resident in the agencies) created by the proposed legislation does not permit the impacted federal agencies to make determinations regarding the "sufficiency" of each federal agency's relocation or sharing transition plan.
- DoD is concerned that the creation of a dispute resolution board that requires the federal agencies to appeal the board's decision on spectrum matters at the U.S. Court of the District of Columbia Circuit would set a precedent that may conflict with the National Telecommunications and Information Administration (NTIA)'s and FCC's spectrum regulatory jurisdiction and place undue litigation burden on DoD.

Senator NELSON. It details clearly the impact of losing portions of the frequency spectrum that DOD currently uses. I will be asking each of you about this topic to ensure its importance is known to our committee members.

Fourth and finally, I would like to learn about how we are coordinating space activities both within the United States and internationally. Madelyn, this is your area. I would like to know where we are with the code of conduct for space. There are concerns amongst some members that we are taking actions that resemble a treaty. I know treaties are the realm of the Department of State (DOS), but DOD must have views on the implications of this code of conduct on its space operations. It may not be a treaty, but as you well know, it will establish international norms amongst nations.

Within the United States, I would like to know what we are doing to coordinate our space efforts with the Missile Defense Agency (MDA), National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), and the Intelligence Community. I understand the MDA

is proposing to launch and control up to 12 satellites to detect missile tracks in space. How is this being coordinated and why is MDA controlling a fleet of satellites? Past DOD efforts with NOAA resulted in a failed weather satellite program. What did we learn here that will apply to any future interagency space efforts? It seems to me that the failure of past coordination has resulted either in failed programs or large cost increases to DOD. So I would like your help for us to understand what is being done to avoid future problems in this area.

With that, it is my pleasure to turn the microphone over to my good friend and ranking member, Senator Sessions, for his opening statement. Let me say that we have had great cooperation and friendship in dealing with these issues in the past, and I know that we will continue to do that.

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS. Absolutely. Thank you, Mr. Chairman, for that good statement. You raise a lot of issues. I will be brief.

I thank all of you for being here and for the work that you do. Secretary Creedon, it is especially good to have you back to this committee room where you have harassed other witnesses. [Laughter.]

So maybe you deserve to get some harassment today or, at least, help us harass other people.

I was pleased that the Defense Strategic Guidance released in January recognized space as an area where DOD should prioritize and protect new capabilities and investments. It is a critical mission area. Our entire military depends on communication and observation from satellites that we just must have and be able to maintain even under hostile conditions.

Defense is not immune, however, to budget cuts in fiscal year 2013. The budget request makes a number of difficult choices, some of which I agree with and some of which cause me concern. The fiscal year 2013 budget proposes significant reductions to the Air Force budget which is the majority of space funding, General Shelton, we calculate as being down 22 percent. You and I have talked about that. You feel like that number may appear larger than it is based on some things that will not be needed by this year. But still, it is a pretty big number, Mr. Chairman. Given the magnitude of the reductions, I look forward to hearing from our witnesses about how we are doing for the future.

The defense space enterprise is benefitting today from investments in the past over a long period of years, as it shifts from a challenging period of development to what I hope is a more stable period of production. Avoiding the challenges of the past decade will again require continued smart investments for the future.

Over the course of the past few years, DOD has taken a number of important steps to address the rapidly growing costs of space, both out of necessity driven by budget pressures and NASA-related impacts on an already fragile industrial base, their reductions. The cost of developing, procuring, launching, and operating military space systems remains volatile. Affordability remains the central concern and despite some continuing instability, the fiscal year

2013 budget appropriately recognizes that significant strides must still be made to address the cost trends.

Mr. Chairman, you mentioned ORS. I share your concerns there and maybe we can talk about that more.

I am also pleased to see that GAO is participating in the hearing today. Good to see you. In recent months, GAO has published a number of assessments on programs spanning the defense space enterprise. GAO serves as an invaluable resource to the committee, Congress, and the American taxpayer taking into account some of GAO's recent recommendations on program improvement. I look forward to hearing from our DOD witnesses on what progress they have made in addressing these concerns.

Finally, during our last hearing, I raised concerns about the administration's support for joining a European Union (EU) code of conduct for space, as you mentioned, Mr. Chairman. But I am pleased and I believe I understand that since that hearing, the administration appears to have concluded that signing this code as originally drafted would not be in the national interest unless significant modifications were made. So I look forward to understanding the administration's plan moving forward and specifically how DOD intends to protect our national security interest in space.

There are other issues that I have concerns about, including some matters not appropriate for an open venue. I look forward to working with you to address those concerns. I know that you will be cooperative with our staff as Secretary Creedon used to benefit from when she was staff over here. So I know you will work with us on those issues.

Thank you for joining us today. I look forward to the testimony.

Senator NELSON. Thank you, Senator Sessions.

We will start with the testimony today, and we will start first with Secretary Creedon.

STATEMENT OF HON. MADELYN R. CREEDON, ASSISTANT SECRETARY OF DEFENSE FOR GLOBAL STRATEGIC AFFAIRS

Ms. CREEDON. Chairman Nelson, Senator Sessions, it is a pleasure to be back here today, albeit a little bit strange to be at this side of the table and not in markup. But it surely is a pleasure, and thank you for the opportunity.

Just a year has passed since the release of the first-ever National Security Space Strategy (NSSS), and I am pleased to be here to discuss its implementation and the defense space programs.

This past January, as you mentioned, DOD published new Defense Strategic Guidance. This guidance was informed by the space strategy and reinforces the strategy's main tenets. Both documents stress the importance of operating effectively in space, promoting responsible behavior, operating when possible with allied and coalition forces, and increasing the resilience of our space-based capabilities.

The goals serve a critical objective of DOD: protecting the advantages we derive from a domain that is increasingly congested, contested, and competitive. I would like to explain briefly and expand briefly on three important aspects of our space strategy.

First, the NSSS and the new Defense Strategic Guidance both stress the need for resilience in our space capabilities in response

to emerging anti-access, area-denial challenges. Resilience strengthens deterrence of attacks on our space assets and enables us to continue vital missions in a degraded space environment. Resilience is not the property of a single system. Rather, it is the ability of a whole architecture to provide functional capabilities that are necessary for mission success despite environmental adversity or hostile action. Resilience can be achieved in a variety of ways, including hosted payloads, commercial augmentation, international cooperation, and backup capabilities in other domains.

A second key aspect of our strategy is promoting responsible behavior in space. In this area, DOD is playing a leadership role by providing countries and companies across the globe with warnings of potential collisions in space. In addition, DOD supports DOS's efforts to work with the EU and others to develop an international code of conduct for space activities. A widely subscribed code can encourage responsible space behavior and single out those who act otherwise while reducing the risks of misunderstanding and misconduct.

The EU's draft is a promising basis for an international code of conduct, but it is just that. It is just a starting point. It focuses on reducing the risk of creating debris and increasing the transparency of space operations. It is not legally binding, and it does recognize the inherent right to self-defense. Further, this draft addresses behavior rather than unverifiable capabilities. Ultimately, it serves our interests much better than legally binding agreements, and it will not ban space weapons or any of the other capabilities that we have proposed.

DOD is committed to ensuring that a code advances our national security as we continue to support the development and adoption of such measures moving forward.

Third, the strategy emphasizes the need for a strong space industrial base. We can help energize the industrial base by allowing U.S. industry to compete internationally in sales of satellites and technologies that are already widely available. Last year, DOD and DOS provided an interim assessment of space export controls which concluded that commercial communication satellites and related components with a few exceptions can be moved from the U.S. munitions list to the Commerce Control List without posing an unacceptable security risk. Such a transition has dual benefits. It provides much needed support to the U.S. space industry while also focusing controls and enforcement on those technologies that are most sensitive and that are critical to national security.

The forthcoming report, which we hope to have to Congress in just a few weeks, will recommend the movement of additional items to the Commerce Control List. This approach, higher fences around fewer items, will require new legislation, and your support will be needed.

Implementation of the NSSS is ongoing, and I am pleased that DOD's new Defense Strategic Guidance reinforces our approach. DOD needs your continued support to deploy necessary capabilities, increase their resilience, and protect the industrial base that underpins the critical domain and that is so important to our national security.

Thank you very much. I look forward to your questions.

[The prepared statement of Ms. Creedon follows:]

PREPARED STATEMENT BY HON. MADELYN R. CREEDON

Chairman Nelson, Ranking Member Sessions, and members of the subcommittee, I am pleased to join General Shelton, Dr. Zangardi, Mr. Winokur, Lieutenant General Formica, and Ms. Chaplain to testify on the Department of Defense (DOD) space program and policies. When Ambassador Greg Schulte testified here a year ago, the Department, together with the Office of the Director of National Intelligence, had just released the National Security Space Strategy (NSSS). Today, I am pleased to discuss our progress in implementing that strategy.

U.S. space capabilities allow our military to see with clarity, communicate with certainty, navigate with accuracy, and operate with assurance. Maintaining the benefits afforded to the United States by space is central to our national security, but the evolving strategic environment increasingly challenges U.S. space advantages. Space is increasingly congested, with over 22,000 trackable manmade objects in orbit, contested, by an ever-increasing number of manmade threats, and competitive, as the U.S. competitive advantage and technological lead in space erodes.

However, the challenges of a congested, contested, and competitive environment also present the United States with opportunities for leadership and partnership. The joint DOD and Intelligence Community NSSS released last year charts a path for the next decade to respond to the current and projected space strategic environment.

The NSSS identifies three U.S. national security space objectives: strengthen safety, stability, and security in space; maintain and enhance the strategic national security advantages afforded to the United States by space; and energize the space industrial base that supports U.S. national security. Achieving these objectives will ensure our military continued access to space-based assets national security purposes.

The United States will retain leadership in space by strengthening our national security, civil, and commercial space capabilities and improving our collaboration with others worldwide. Leadership cannot be predicated on declaratory policy alone. It must build upon a willingness to maintain strategic advantages while working with the international community to develop collective norms of responsible behavior, collaborate on capabilities with international and industry partners, and improve our coordination and information sharing.

The President and Secretary of Defense recently released the Defense Strategic Guidance. This Guidance articulates priorities for a 21st century defense that protects the country and sustains U.S. global leadership. It reflects the need for DOD and the military to adapt in order to proactively address the changing nature of the security environment and to reflect new fiscal realities. This Defense Strategic Guidance identifies the need to operate effectively in space as one of the missions most important to protecting national interests. Further, it cites resilience of space capabilities as an important component in projecting power in response to Anti-Access/Area Denial challenges.

The new Defense Strategic Guidance builds on and reinforces key elements of the NSSS. The NSSS outlines five interrelated strategic approaches to chart a future course for national security in space, and many of those key approaches are also reflected in this Guidance. Both documents emphasize strengthening norms of responsible behavior, and finding opportunities to leverage growing civil, foreign and commercial capabilities. Both detail the need to strengthen deterrence while ensuring preparedness to operate in a degraded environment should deterrence fail. Both highlight the importance of the industrial base, as well as the need for innovative approaches and continued investment in science and technology.

The Defense Strategic Guidance gives us renewed impetus to implement the NSSS, and we are incorporating the key points of the strategy into the departmental directives, guidance, and instructions. These documents shape how the DOD conducts the space enterprise, and changes here are integral to ensuring that we respond to this more challenging space environment.

Additionally, we are further defining concepts like resilience as they relate to space. An important facet of the NSSS's effort to prevent and deter aggression against our space infrastructure is to strengthen the resilience of our architectures to deny the benefits of an attack. The strategy notes that resilience will also enable our ability to operate in a degraded space environment. As we invest in next generation space capabilities and fill gaps in current capabilities, the strategy directs us to include resilience as a key criterion in evaluating alternative architectures. Resilience is not the property of a single system. Rather, it is the ability of a whole architecture to provide functional capabilities necessary for mission success despite envi-

ronmental adversity or hostile action. Resilience can be achieved in a variety of ways in space and beyond. These include system protection, cross-domain solutions, leveraging foreign capabilities, maturing responsive space capabilities, and hosting payloads on a mix of platforms.

With this in mind, we developed a definition for resilience and criteria for assessment. We can no longer think only in terms of cost and capability. We must also consider whether that capability will be available when the warfighter needs it and an adversary seeks to deny it. This definition was reviewed and improved by the Defense Space Council and is now being promulgated. Our definition is simple:

"Resilience is the ability of an architecture to support the functions necessary for mission success in spite of hostile action or adverse conditions. An architecture is "more resilient" if it can provide these functions with higher probability, shorter periods of reduced capability, and across a wider range of scenarios, conditions, and threats. Resilience may leverage cross-domain or alternative government, commercial, or international capabilities."

We are implementing the definition and associated methodology for evaluation through current and future architectures, as well as across the Department's requirements, acquisition, and budget processes. Resilience is a key criterion in ongoing architecture reviews for our SATCOM, defense weather, and other satellite-based capabilities.

We are taking a leading role in international efforts to promote responsible, peaceful, and safe use of space. The NSSS emphasizes that the United States will promote the responsible, peaceful, and safe use of space as the foundational step to addressing the congested and contested space domain. A more cooperative, predictable environment enhances U.S. national security and discourages destabilizing crisis behavior. We are supporting development of data standards, best practices, transparency and confidence-building measures, and norms of behavior for responsible space operations. For instance, we are participating, with other U.S. departments and agencies, in efforts taking place in the United Nations Committee on the Peaceful Uses of Outer Space to further the long-term sustainability of space.

DOD supports U.S. efforts to work with the European Union and other spacefaring countries to develop an international code of conduct for space activities. A widely-subscribed Code can encourage responsible space behavior and single out those who act otherwise, while reducing risk of misunderstanding and misconduct. We view the European Union's draft code of conduct for space activities as a promising basis for an international code. The EU's draft focuses on reducing the risk of creating debris and increasing transparency of space operations. It already reflects U.S. best practices and is consistent with current practices such as notification of space launches and sharing of space data to avoid collisions. Significantly, the EU's draft is not legally binding and recognizes the inherent right of self-defense. It focuses on activities, rather than unverifiable capabilities, and better serves our interests than the legally-binding ban on space weapons proposed by others. In your recent letter to President Obama, you expressed concerns about the consequences of developing a code of conduct for space activities. As we go through the process of developing an international code, we are committed to ensuring that any code of conduct for space activities advances national security. The United States has been closely consulted by the EU on its draft, and we will continue to shape an international Code through active participation in international negotiations. Additionally, DOD has assessed the operational impact of the current draft and developed steps to ensure that a final Code fully supports our national interests and strategy. We are committed to keeping you informed on the process of developing an international Code.

Working with international partners on encouraging responsible behavior in space is only a part of how our engagement with other spacefarers is evolving. The NSSS is driving changes in how we leverage the capabilities of domestic, international, and industry partners. The strategy directs us to pursue opportunities to partner with responsible nations, international organizations, and commercial firms to augment the U.S. national security space posture. Through these partnerships, we can ensure access to information and services from a more diverse set of systems—and advantage in a contested space environment. Decisions on partnering will be consistent with U.S. policy and international commitments and will consider cost, protection of sources and methods, and effects on the U.S. industrial base.

We are expanding our international partnerships and coalition operations. Space is a domain in which we once operated alone. Increasingly, however, we need to think of operating in space as we do in other domains: in coalition.

Allies like France, Japan, Germany, and Italy have increasing space-based capabilities in a range of mission areas. By leveraging their systems, we can augment our capabilities, add diversity and resilience, and complicate the decisionmaking of

potential adversaries. Cooperation can also better enable coalition operations on land, at sea, and in the air, which for our allies and us are increasingly dependent on space-based capabilities.

The Air Force's Wideband Global Satellite (WGS) system provides a good example. Earlier this year, the Air Force announced that Canada, Denmark, Luxembourg, the Netherlands, and New Zealand have joined with the United States and Australia in a long-term multilateral partnership. This effort will increase WGS capacity to U.S. warfighters by jointly acquiring and launching a ninth WGS satellite vehicle, while also providing system capacity to the partners. In addition to increasing the size and capacity of the constellation, internationalizing WGS also complicates the calculations of any country contemplating interference with the system.

Led by General Kehler at U.S. Strategic Command (STRATCOM), the Department is working to transition today's Joint Space Operations Center into a Combined Space Operations Center (CSpOC). A CSpOC will leverage allied space capabilities to augment our own and increase resilience. It will support our ability to operate in coalition operations as we do in other domains and bolster collective defense and deterrence of attack against collective space assets. As the Department works through this transition, we are building on recent space exercises and cooperative activities, including tracking and analysis of the recent Phobos-Grunt spacecraft re-entry,

Combined space operations require increased sharing of space situational awareness (SSA) and operational information. Earlier this year, the Secretary of Defense transferred to the Commander of STRATCOM his authority to enter into SSA data sharing agreements with foreign governments. This compliments STRATCOM's existing authority to negotiate SSA sharing agreements with commercial satellite operators. With the extension of this authority to foreign governments, the United States will be able to better assist partners with current space operations and lay the groundwork for future cooperative projects. The increasingly challenging space environment means that an unprecedented level of information sharing is needed among space actors, to promote safe and responsible operations in space and reduce the likelihood of mishaps, misperceptions, and mistrust.

Commercial satellite owner/operators play an important role in SAA. STRATCOM currently has more than 30 data sharing agreements with these companies. This is just one of the innovative approaches to working with commercial space operators and protecting the space industrial base that is driven by the NSSS. We seek to foster a space industrial base that is robust, competitive, flexible, healthy, and delivers reliable space capabilities on time and on budget. We are exploring innovative approaches, such as anchor tenancy and hosted payloads, and pursuing strategic partnerships with commercial firms to stabilize costs and improve resilience.

International advances in space technology have put increased importance on reforming U.S. export controls to ensure the competitiveness of the U.S. space industrial base while addressing technology security. Reforming export controls will facilitate U.S. firms' ability to compete in the international marketplace for capabilities that are, or will soon become, widely available globally, while strengthening our ability to protect the most significant U.S. technology advantages. The NSSS reaffirms the necessity of these reforms and echoes the National Space Policy's call for giving favorable consideration for export of those items and technologies that are generally available on the global market, consistent with U.S. national security interests. Reforming export controls on space items will increase U.S. manufacturers' ability to provide U.S. content in foreign satellites, increase opportunities for partnering with foreign manufacturers, and help energize the U.S. space industrial base.

The NSSS responds to an increasingly challenging space environment. The changes detailed in the strategy will allow us to maintain and enhance the strategic advantages we derive from space. Over the past year, we have begun to implement those changes, both in our internal policies, and in how we relate to other spacefaring entities. DOD's fiscal year 2013 budget request, building on the new Defense Strategic Guidance, helps further the implementation of these changes and maintains the U.S. military's leading edge in space. The future architectures that we are developing will increase resilience while leveraging growing international and commercial capabilities in space. The Department looks forward to working closely with Congress, our allies, and U.S. industry to continue implementing this new strategy for space.

Senator NELSON. Thank you.

General Shelton.

STATEMENT OF GEN. WILLIAM L. SHELTON, USAF, COMMANDER, AIR FORCE SPACE COMMAND

General SHELTON. Mr. Chairman, Senator Sessions, it is an honor to appear before you today as the Commander of Air Force Space Command.

It is also my privilege to appear with these other colleagues in the national security space enterprise.

The recently released Defense Strategic Guidance puts a premium on space and cyberspace capabilities, and in accordance with that guidance, the men and women of Air Force Space Command maintain a singular focus, providing vital space and cyberspace assets to the warfighter and to our Nation. Our assured access to space and cyberspace is foundational to today's military operations and to our ability to project power whenever and wherever needed across the planet.

Accordingly, the fiscal year 2013 President's budget invests in programs which enhance the effectiveness of our space capabilities, namely missile warning, positioning, navigation, and timing (PNT), satellite communications, space situational awareness, and space launch. Admittedly, there is an overall reduction in funding levels in the space budget, but that is primarily due to fact-of-life programmatic changes rather than deep cuts in our programs.

First, several of our key satellite programs will ramp down development activity as they transition to procurement, and this is a good news story.

Second, Congress funded two wideband global satellites in fiscal year 2012, so there was no need to fund a satellite in 2013.

Third, the defense weather satellite system was canceled in the fiscal year 2012 Defense Appropriations Act, so there is no longer funding required for that program in this year's President's budget.

In addition to these fact-of-life changes, we made some difficult space program budget reductions as a result of the $487 billion reduction mandated by the Budget Control Act (BCA). This led to relatively minor cuts in some modernization programs and a full restructuring of our approach to ORS and space testing. We continue to pursue acquisition efficiencies through our efficient space procurement actions for the AEHF program and SBIRS.

Finally, we are committed to working closely with our partners in the National Reconnaissance Office (NRO) and NASA to lower the cost and bring stability to our launch programs.

I thank the subcommittee for your steadfast support of my command and DOD's space programs. I look forward to your questions. Thank you, Mr. Chairman.

[The prepared statement of General Shelton follows:]

PREPARED STATEMENT BY GEN. WILLIAM L. SHELTON, USAF

INTRODUCTION

Mister Chairman, Senator Sessions, and distinguished members of the subcommittee, it is my honor to appear before you today as the Commander of Air Force Space Command (AFSPC).

I am privileged to lead over 42,000 Active Duty, Guard, and Reserve airmen; government civilians; and contractors delivering space and cyberspace capabilities around the world for our Nation. The men and women of AFSPC accomplish our mission at 134 worldwide locations, yet we operate in the space and cyberspace domains where borders are nonexistent. AFSPC space and cyberspace capabilities are

integral to joint warfighting, as well as the daily lives of all Americans, and our professionals are passionate in their commitment to excellence and mission success.

This year, AFSPC celebrates its 30th anniversary, and for over two of those three decades, the command has been involved in continuous combat operations. While AFSPC has evolved over the years, with the inclusion and then departure of intercontinental ballistic missile responsibilities, and the relatively new addition of cyberspace operations, a single focus has endured: providing the best capability possible to ensure success on the battlefield.

On January 5, 2012, the Secretary of Defense released a new strategy document titled Sustaining U.S. Global Leadership: Priorities for 21st Century Defense. This new strategy identifies the need to operate effectively in space and cyberspace by stating, "Modern Armed Forces cannot conduct high-tempo, effective operations without reliable information and communication networks and assured access to cyberspace and space." Space and cyberspace forces are key components to the Nation's ability to project power. In concert with the strategy, our mission is to provide resilient and cost-effective space and cyberspace capabilities for the joint force and the Nation. AFSPC's activities are guided by three priorities: support the current fight; control space system costs and deliver capabilities on time and on budget; and for the purpose of organizing, training and equipping, we are operationalizing and normalizing Air Force efforts involving cyberspace. From these general priorities we have adopted three goals to ensure mission success: provide assured full spectrum space and cyberspace capabilities; field resilient, integrated systems that preserve the operational advantage; and provide highly skilled and innovative space and cyberspace professionals. The remainder of the statement is organized around these goals.

PROVIDE ASSURED FULL SPECTRUM SPACE AND CYBERSPACE CAPABILITIES

Our ability to detect launches, track missiles, navigate with precision, detect nuclear events, support military communications requirements, improve space situational awareness, predict weather, and perform operations in cyberspace are all foundational to the way the joint force fights today. We depend on the vast capability of our 14th Air Force, 24th Air Force (24 AF), the Space and Missile Systems Center (SMC), Air Force Network Integration Center (AFNIC), Space Innovation and Development Center (SIDC), and the Air Force Spectrum Management Office (AFSMO) to acquire and operate these space and cyberspace systems. The precision and responsiveness needed to deter aggression and win America's wars stem from our ability to integrate and synchronize capabilities across the full range of military operations and all warfighting domains. In space, the command is deploying the next generation of spacecraft and continuing to provide technologically advanced capabilities. Also, we are pursuing international agreements to expand missile warning, space-based communication capabilities and space situational awareness (SSA). In cyberspace, the command is expanding collaboration with our joint, interagency, and international partners on several initiatives to safeguard our access to the domain. We are operationalizing the Air Force's approach to cyberspace with emphasis on protecting the Air Force infrastructure, developing expertise to meet mission needs, and accelerating our acquisition processes to match the rate of change in cyberspace.

Missile Warning (Launch Detection and Missile Tracking)

Our ability to provide strategic missile warning is critical to the Nation's survival. Ballistic missiles also pose a significant threat to deployed U.S. forces and our allies. AFSPC operates both space- and ground-based sensors, providing correlated data that supports the strategic and tactical missile warning missions. Our space professionals continue to improve upon our missile warning capabilities and processes to better alert and inform our commanders. In U.S. Central Command (CENTCOM), Captain Kara Sartori, Chief of the Combat Operations Division Space Cell at the Combined Air and Space Operations Center, built revolutionary new procedures which provide more accurate and timely missile warning, thereby better protecting personnel assigned across the CENTCOM theater of operations.

Space Based Infrared Systems

The Space Based Infrared System (SBIRS), along with the legacy Defense Support Program satellites, provide advanced early warning of hostile missile threats, allowing our warfighters to take swift and precise action. The Active Duty and Reserve airmen of the 460th Space Wing, Buckley Air Force Base (AFB), CO, as well as assigned British, Canadian and Australian personnel, provided U.S. Combatant Commanders (COCOMs), coalition partners and allies assured warning for nearly 200 missile launches in 2011. They also reported 7,100 special infrared events—an 82

percent increase from 2010. Part of that increase was due to the work of Captain William Sanders and Staff Sergeant Justin Rutherford, 11th Space Warning Squadron, Schriever AFB, who developed new and innovative ways to use the data from these sensors to identify more events of interest to the warfighter.

In May 2011, AFSPC launched the program's first SBIRS Geosynchronous Earth Orbit (GEO) satellite and early mission data are exceeding expectations. This system detects dimmer, shorter duration infrared events and provides more accurate missile launch and impact point predictions than the Defense Support Program satellites. To reduce costs on future acquisitions of these vital satellites, Colonel Michael Guetlein from SMC, Los Angeles AFB, CA, and his program management team streamlined schedules, reduced contractor overhead, and achieved production efficiencies. This effort, and many more like it, will ensure affordable capability well into the future.

The Air Force fiscal year 2013 request for SBIRS Research, Development, Test and Evaluation (RDT&E) and Procurement is $950 million, paced by ground development and continuing efforts on SBIRS GEO satellites 3 and 4 as well as the procurement of SBIRS GEO satellites 5 and 6. We are requesting the use of advance appropriations to fully fund satellites 5 and 6.

Upgraded Early Warning Radar (UEWR)

The UEWR radars are ground-based components of missile warning and missile defense against current and emerging ballistic missile threats. They also provide space object tracking data to help achieve space situational awareness. Throughout 2011, we continued work with the Missile Defense Agency to finalize UEWR deployments to Beale AFB, CA, Royal Air Force Fylingdales, United Kingdom and Thule Air Base, Greenland. In 2012, we will begin the process to upgrade Clear Air Force Station, AK and Cape Cod Air Force Station, MA to the UEWR configuration. At the operational units, long-time system experts, like Mr. Clennis Burress at Beale AFB, CA, analyzed data from the upgraded radar to assess performance on recent space and missile events. Using his experience and creativity, he has devised ways to extract even more capability from these radars.

U.S. Nuclear Detonation (NUDET) Detection System (NDS)

The NDS has maintained the global situational awareness needed by our national decisionmakers and monitored nuclear treaty compliance since the early 1960s. NDS payloads are hosted on the Global Positioning System (GPS) satellites and our Defense Support Program satellites. This capability is also included in the next generation of GPS satellites. The Department of Energy and AFSPC are conducting studies to determine the most effective solution to a long-term space-based NDS architecture.

Positioning, Navigation, and Timing (PNT)

It is difficult to overstate the impact of GPS on the world. On-line banking, vehicle navigation systems, precision farming, cellular phone location for emergency purposes, precise military operations—these are all enabled by GPS. Last October, I was honored to accept, on behalf of the GPS program, an award from the International Astronautical Federation on the occasion of their 60th Anniversary. The award was given to the program which most benefitted mankind throughout the entire 60 year history of the Federation. I was joined by Colonel (Retired) Bradford Parkinson, who is universally regarded as the father of GPS, and the current program manager, Colonel Bernard Gruber.

The GPS program made great strides in 2011. We improved the security and functionality of GPS-enabled military systems by providing for over-the-air distribution of rekeying for our military receivers. Under the leadership of Captains Vernon Reddick and Jayson Andersen from the 2nd Space Operations Squadron, Schriever AFB, we completed the final phase of an operation called "Expandable 24"—the largest satellite repositioning effort in GPS history. The constellation is now optimized for terrestrial coverage in challenging environments such as cities with tall buildings and the mountains and valleys of Afghanistan.

Through the summer and fall of 2011, Captain Justin Deifel from SMC's GPS System Program Office, Los Angeles AFB, expertly led three rigorous tests on behalf of the National Space-Based PNT Systems Engineering Forum to quantify the potential for interference to military and civilian GPS users from LightSquared's proposed terrestrial network. His technical prowess and objectivity ensured these nationally significant tests were professionally accomplished in a thorough, fact-based manner.

We currently have 34 GPS satellites on-orbit with a combined 380 years of service. The oldest GPS operational satellite on orbit was launched 21 years ago. The second launch of our newest version, GPS–IIF, occurred in July 2011. Captain Steve

Dirks from our GPS Reserve Associate Unit, 19th Space Operations Squadron, Schriever AFB, led the check-out of the satellite, integrating it into the operational constellation in August 2011. GPS–IIF satellites are a major component of the GPS modernization process: introducing greater accuracy through advanced atomic clock technology, providing military signals that are more resistant to jamming, adding a new "safety of life" civilian signal, and lowering operating costs through a longer design life. Development of the next generation satellite, GPS–III, is on-cost and on-schedule. These satellites add a fourth civil signal to the constellation and complete the deployment of two civil signals and military signal capabilities that began with earlier GPS satellites. GPS–III will allow us to affordably sustain and modernize the constellation. AFSPC will continue to be proud stewards of this incredible capability, and in line with the National Space Policy, we will strive to ensure it remains the gold standard for global timing and navigation.

With the ubiquitous use of space systems, to include GPS, in the CENTCOM Area of Operations, AFSPC forward deploys experts to ensure warfighter needs are satisfied. Captain Bryony Veater, assigned to the 504th Expeditionary Air Support Operations Group in Afghanistan, provided critical forward-based space expertise and training to help deployed forces fully exploit GPS capabilities. As an example of the versatile use of GPS, CENTCOM performs the precision airdrop of supplies with the Joint Precision Air Drop System, using GPS guided, steerable parachutes. In November 2011, CENTCOM used this system to airdrop 18,000 pounds of winter fuel to Air National Guard soldiers from my home State of Oklahoma, at Combat Outpost Herrera in eastern Afghanistan.

The Air Force fiscal year 2013 request for GPS III in RDT&E and Procurement is $1.264B, which continues GPS III space and ground segment RDT&E and procures additional GPS III Space Vehicles.

Military Satellite Communications

The demand for Military Satellite Communications (MILSATCOM) continues to grow as warfighters increasingly depend on information relayed from space, especially for today's distributed operations in this era of information-enabled warfare. Our protected and survivable MILSATCOM supports presidential communications, forms the backbone of our Nuclear Command and Control System, and provides services for operations in contested environments. MILSATCOM also enables day-to-day communications in more benign environments. There are 18 MILSATCOM satellites on-orbit with a combined 183 years of service.

Advanced Extremely High Frequency (AEHF)

The first satellite in the next generation of protected and survivable MILSATCOM, AEHF–1, reached geosynchronous orbit in October 2011, approximately 14 months after a spacecraft propulsion anomaly had stranded the satellite far short of its operational orbit. The AEHF–1 operations team designed an innovative orbit-raising strategy to preserve the planned 14-year design life of the satellite. The team, led by Mr. David Madden, SMC, is a finalist for an Aviation Week Laureate Award to recognize their extraordinary achievement. Each AEHF satellite will provide a ten-fold throughput increase over Milstar in secure, jam-resistant communications for national leaders, COCOMs and our international partners—Canada, the Netherlands and the United Kingdom.

The Air Force fiscal year 2013 request for AEHF RDT&E and Procurement is $786 million, which provides for remaining development efforts and continued procurement of AEHF Space Vehicles 5 and 6. We are also requesting the use of advance appropriations to fully fund satellites 5 and 6.

Wideband Global SATCOM (WGS)

The WGS system provides flexible, high-capacity communications to the Department of Defense, the White House Communications Agency and the State Department. Each satellite improves on the communications capacity, connectivity and flexibility of legacy systems, allowing for seamless crossbanding between users with X and Ka frequency band terminals. WGS supported the Reagan Carrier Strike Group as it provided humanitarian assistance and disaster relief support to Japan in the aftermath of the 2011 Tohoku earthquake and tsunami, allowing users outside of Japan with Ka-terminals to communicate directly with users in Japan with X-band terminals.

WGS–4, the first WGS Block II satellite, launched this past January. These satellites were developed in direct response to warfighter feedback and will support the transmission of airborne intelligence, surveillance, and reconnaissance imagery at data rates approximately three times greater than those currently available on Block I satellites. In addition, we are exploring future enhancements to WGS that

will deliver even more flexibility and capacity as we incorporate commercial technology advances and cost-saving practices into the system.

We are especially proud of the robust international partnerships we have formed as part of this program. Australia provided funding for WGS–6, and in January 2012, the Department of Defense and counterpart agencies from Canada, Denmark, Luxembourg, Netherlands and New Zealand signed a Memorandum of Agreement to procure WGS–9 through a cooperative effort.

Space Situational Awareness

SSA is fundamental to everything we do in space. As our dependence on space capabilities increases, and as the number of space faring nations and objects in space increase, so does the need to improve our SSA. We have a vast amount of SSA data, but we cannot yet fuse those data into a single, correlated, comprehensive situational awareness picture. The Joint Space Operations Center (JSpOC) Mission System (JMS) program will correct this shortfall.

Joint Space Operations Center

The JSpOC, at Vandenberg AFB, is the primary national security space command and control center for our Nation. Thanks to the dedicated efforts of Airmen such as Major Brian Capps and Master Sergeant Thomas Clark, during one noteworthy surge period, the JSpOC provided simultaneous support to day-to-day global space missions, CENTCOM activities, U.S. Africa Command military operations in Libya and humanitarian assistance and disaster relief efforts in Japan. In 2011, JSpOC personnel provided SSA in support of COCOMs by processing 155 million sensor observations and tracking approximately 22,000 manmade objects. They provided reentry warning and analysis for 72 high-interest objects, including the National Aeronautics and Space Administration's decommissioned Upper Atmosphere Research Satellite, and most recently, the Russian Phobos-Grunt spacecraft.

While accomplishing their complex missions, JSpOC personnel manage and update the catalog of all manmade objects that orbit the earth using a system called the Space Defense Operations Center which has been operational since the mid-1980s, and which hasn't had a major software upgrade since the early 1990s. The replacement for this legacy system is the JMS. It will automate many of the tasks done manually today and will incorporate traditional and non-traditional sensor inputs to produce relevant, actionable information for the Commander, Joint Functional Component Command for Space, currently Lieutenant General Susan Helms. In 2011, we completed the restructure of the JMS acquisition program to significantly lower costs, better align initial capability deliveries with warfighter needs and more efficiently execute the program. This streamlined approach leverages existing industry and government investments, while providing on-ramps for industry to contribute products. Initial Operational Capability of the first increment is scheduled for the end of 2012.

The Air Force fiscal year 2013 request for JMS in RDT&E is $54.6 million, which continues incremental upgrades to SSA and Space Command and Control capabilities.

Weather

The Defense Meteorological Satellite Program (DMSP) celebrates its 50th anniversary in 2012. We will extend the tradition of a half century of unique and superb weather forecasting capabilities when we launch the final two DMSP satellites later this decade. Following the congressional direction in the fiscal year 2012 budget, the follow-on program to DMSP was cancelled. We will conduct a study this year to define a lower cost, yet capable, weather satellite follow-on program.

Cyberspace

National and Department of Defense leaders recognize the criticality of operations and freedom of action in cyberspace. As the pace of technological, environmental and geopolitical change quickens, the ability of Joint Force Commanders to defend America's interests will increasingly rely on the access, persistence and awareness provided by cyberspace systems and capabilities. To that end, 24 AF is taking a disciplined approach to cyberspace operations to significantly increase our security posture, defend freedom of action, leverage our effectiveness across Joint and coalition operations, and be more efficient with resources consumed for and by our Air Force cyberspace enterprise.

We are presenting cyberspace capabilities, organized by fixed and expeditionary forces, to support our Air Force and Joint Commanders' objectives and required effects. In 2011, cyberspace operators from 24 AF supported 5 COCOMs in more than 25 operations. Our deployed cyberspace experts facilitated interaction with the COCOMs, contributing to the success of these Joint operations. For Operation Odys-

sey Dawn, Captain Michael Piersimoni deployed from the 624 Operations Center (OC) to assist with U.S. Africa Command's efforts to leverage cyberspace effects.

In the area of cyberspace operations and innovation, we are pursuing practices to expeditiously leverage new technologies in a cost-effective manner—essential to staying ahead of emerging threats and achieving desired end states. With the help of programmers like Staff Sergeant Ryan Knight and testers like Captain Benjamin Truax, the 688th Information Operations Wing, Lackland AFB, is exercising rapid cyberspace capability innovation processes. In just 7 days, they met COCOM needs by developing and testing a new cyberspace capability; creating tactics, techniques and procedures; and training operators. Using similar processes, we were able to expeditiously deliver 28 new cyberspace enhancements to support warfighter urgent needs in 2011.

We are also building a consolidated Air Force Network, known as the AFNet. Major General Suzanne Vautrinot, 24 AF Commander, leads the operation and defense of this network for the Air Force as the AFNet Operations Commander. We continue to make progress toward consolidation of the AFNet projected for completion by the end of fiscal year 2013. As of February 13, 2012, Major Gregory Roberts, 561st Network Operations Squadron, Detachment 3, Scott AFB, IL, and Mr. Nick Davenport, AFNIC, also at Scott AFB, led the migration of 34 bases onto the AFNet, retiring 30 legacy networks and collapsing 104 connections to the Global Information Grid to 16 defensible gateways. These significant steps reduce the costs to operate and enable us to better defend our complex network, supporting over 845,000 users. Operating the network under the principle of centralized control and decentralized execution cleared the way for Senior Airman Zane Williams and other members from the 561st Network Operations Squadron's Detachment 1 at Hickam AFB, HI, to restore AFNet connectivity and services less than 5 hours after the Tohoku earthquake and tsunami.

Our Combat Communications units execute another facet of the cyberspace mission by extending our networks and providing communications to disadvantaged users. Due to the planning efforts of individuals such as Captain David Cox, 54th Combat Communications Squadron, Robins AFB, GA, combat communications personnel provided "last out" communications for redeploying United States combat forces from Iraq. In one case, members of the 263rd Combat Communications Squadron, an Air National Guard unit, volunteered for a short notice deployment, establishing critical communications for the 332nd Air Expeditionary Wing as it relocated from Joint Base Balad in Iraq. In Afghanistan, Staff Sergeant Stephen Herron, from the 52nd Combat Communications Squadron, Robins AFB, received the Bronze Star for his actions as the sole communications member assigned to an Explosive Ordnance Disposal Joint Task Force where he provided tactical communications and force tracking capabilities for ten teams. Within the United States, our Combat Communications Guardsmen supported firefighters near Bastrop, TX, as well as recovery efforts following the tragic tornado in Alabama.

Director of Space Forces

Our space professionals are assigned and deployed to COCOMs around the globe. In January, I met with Colonel Clinton Crosier, the Air Force Central Command Director of Space Forces, and his team. Captain Tracy Lloyd is revolutionizing how the DOD is providing operations planning products for GPS-enabled systems—making them more combat relevant. Major Natalie Mock and Captain Abraham Brunner are using the multi-spectral Operationally Responsive Space-1 (ORS–1) satellite to solve tough intelligence problems in theater. Colonel Crosier's staff is working hand-in-hand with Lieutenant Colonel Chad Le'Maire, from the Cyber Operations Liaison Element, to oversee systems that bring to bear the full synergy of integrated space and cyberspace capabilities in the CENTCOM Area of Responsibility.

Colonel Alan Rebholz, the Pacific Air Forces Director of Space Forces, and the team of space professionals in the Pacific are integrating space at new levels as the emphasis increasingly turns to this area. Major Robert McConnell, a space professional in the Strategy Division of the 613th Air and Space Operations Center, and his teammates are planning the space operations portion of Exercise Terminal Fury 2012, which will be conducted simultaneously with U.S. Strategic Command's Global Lightning exercise. This combined exercise will have an unprecedented, robust space scenario involving participants across the globe.

FIELD RESILIENT, INTEGRATED SYSTEMS THAT PRESERVE THE OPERATIONAL ADVANTAGE

Our second goal is to field resilient, integrated systems that preserve the operational advantage. As the Air Force lead for the space and cyberspace domains, AFSPC is working hard to build efficient architectures and processes. We are defining better ways of doing business to decrease cost while delivering resilient, inte-

grated and affordable space and cyberspace systems—without compromising mission assurance. As part of our efficient approach, the Command is leveraging the Total Force—Active Duty, Guard, and Reserve airmen; government civilians; and contractors—across all areas within the command.

Launch, Ranges, and Networks

Every on-orbit space capability begins with a successful launch—there is no room for error in the launch business. Our 45th Space Wing at Patrick AFB, FL, and our 30th Space Wing at Vandenberg AFB, operate the Eastern and Western Ranges, respectively. They supported a combined 19 commercial and government launches in 2011, including the final 3 Space Shuttle missions. They also conducted over 2,500 weapon system tests, aeronautical tests and launch support operations. Our emphasis on mission assurance underscores an unprecedented record in the history of space flight—83 consecutive successful National Security Space launches since 1999. Mission assurance is a rigorous, structured, and disciplined application of systems engineering, risk management, quality assurance, and program management principles throughout a space system's life cycle.

Launch is often the greatest risk to any space system. There are many examples of how rigorous mission assurance detected and corrected issues that would have led to launch failures if uncorrected. We have a dedicated team of mission assurance technicians at both launch bases performing meticulous quality control for launch operations. On the East Coast, Master Sergeant Michael Claus, 5th Space Launch Squadron, identified a safety violation during hardware movement operations, preventing costly damage to the Atlas V assigned to the Navy's Mobile User Objective System satellite. On the West Coast, Staff Sergeant Paul Lillie from the 4th Space Launch Squadron, Vandenberg AFB, observed and reported a leak in a valve during processing of an Atlas V in preparation for an April 2011 National Reconnaissance Office mission. Failure of this component during launch would have prevented proper orbital insertion of the payload, leading to mission failure.

Mission assurance also includes careful oversight of spacecraft processing at the launch base in preparation for launch. Captain Amanda Zuber and other members of the 45th Launch Support Squadron, Patrick AFB, performed spacecraft mission assurance activities for the first SBIRS GEO spacecraft, which is now exceeding performance expectations on-orbit. Air Force launch and range services are on track to support 11 Evolved Expendable Launch Vehicle missions in 2012: 8 National Security Space launches, 2 National Aeronautics and Space Administration launches, and 1 commercial Orbital Test Vehicle launch.

Due to the critical dependence of the space mission on our launch capabilities, the Air Force established a Program Executive Office for Space Launch to provide a focused effort as we define the future of space launch. In November 2011, the Air Force Service Acquisition Executive approved a new acquisition strategy addressing industrial base viability and cost growth while making provisions to leverage emerging competition. The Air Force, in cooperation with the National Reconnaissance Office, is committed to an annual production rate of launch vehicles, creating more predictability and stability in the program. In addition, the Air Force published a New Entrant Certification Guide, providing a structured certification process by which prospective commercial launch providers become eligible to compete for national security launch service contract awards. Both the annual production rate commitment and the leveraging of new entrants are key elements we must balance as we conduct the fiscal year 2013 through fiscal year 2017 acquisition program, led by Colonel William Hodgkiss, our program manager at SMC. This acquisition program will define the landscape for National Security Space assured access into the next decade.

The Air Force fiscal year 2013 request for the Evolved Expendable Launch Vehicle Procurement is $1.680 billion, which provides launch infrastructure and boosters for national security space launches.

For many of our Nation's most critical satellites, the Air Force Satellite Control Network provides launch support, the capability to receive satellite data, and command and control of these spacecraft once on-orbit. In 2011, our space professionals used the network to conduct over 159,000 satellite contacts, support 15 launches and more than 20 space vehicle emergencies, averaging 450 satellite contacts per day. The network added a new operational antenna in Diego Garcia, doubling our capacity in the Indian Ocean to support satellite operations and to meet near-real-time warfighter, weather, missile warning, PNT, surveillance and communication needs. We are modernizing the Air Force Satellite Control Network by replacing its decades-old communication, scheduling, and antenna systems.

Commercially Hosted Infrared Payload

One avenue AFSPC is exploring for improving system resiliency is the concept of hosting government payloads on commercial satellites. The Commercially Hosted Infrared Payload is a government infrared payload hosted on the SES–2 commercial spacecraft. From program initiation to launch in 39 months, this payload successfully reached orbit with its host, after launch on a European Ariane V rocket from Kourou, French Guiana in September 2011. This mission is providing lessons learned on the operational- and cost-effectiveness of hosting government payloads on commercial satellites, while also demonstrating a potential approach to mission resiliency.

Defensive Space Control

We rely on resilient architectures complemented with passive and active defense measures to deter, and if necessary, defeat potential adversary attacks against our forces. In the defensive space control mission, the Rapid Attack, Identification, Detection, and Reporting System Deployable Ground Segment-0 (RDGS–0), continues its trend of sustained excellence in the CENTCOM Area of Responsibility. In the past year, the members of the 16th Space Control Squadron, Peterson AFB, CO, and its collocated Reserve Associate unit, the 380th Space Control Squadron, deployed the Bounty Hunter system to increase the capability of RDGS–0. The current deployment team, led by Major Matthew Wingert from the 380th Space Control Squadron, and Master Sergeant Timothy Tennerman from 460th Space Wing, are helping protect the vital communications links across all of CENTCOM's operations.

Responsive Capabilities

In 2011, the Air Force launched two space systems demonstrating responsive space principles. ORS–1 launched in June 2011 on a Minotaur I rocket from the National Aeronautics and Space Administration Wallops Flight Facility, Wallops Island, VA, only 32 months from program initiation. CENTCOM began using the imagery products from this satellite 1 month later. Personnel from the 1st Space Operations Squadron and their Reserve Associate Unit, the 7th Space Operations Squadron, at Schriever AFB, are using the Multi-Mission Satellite Operations Center to command and control the satellite. This command and control suite is AFSPC's first step toward a common ground system across multiple satellite programs, with the goal of reducing ground system costs for new programs. Captain David Gwilt from SMC is leading the maturation of this architecture.

The second Orbital Test Vehicle, X–37B, mission launched in March 2011 and has surpassed the first mission's 8-month duration, proving the flexibility of this unique system. Major Scott Babb, from the SIDC 3rd Space Experimentation Squadron, is leading the operations team as they explore the capabilities of this system.

Electromagnetic Spectrum

Electronic devices are pervasive in modern warfare, increasing the demand for electromagnetic spectrum access. AFSPC's AFSMO preserves access to the electromagnetic spectrum for Air Force and selected Department of Defense activities. Mr. Joseph Sulick and his team maintained over 30,000 frequency assignments essential to test, training, Joint and Service exercises and operations. AFSMO's strategic planning efforts, led by Mr. Frederick Moorefield, focus on assuring the continued and improved spectrum access required for critical military systems as both national and international demand increases for finite spectrum resources. Within the United States, they are supporting the President's direction to identify spectrum for broadband wireless services. Internationally, they are engaged with the U.S. delegation to the United Nations International Telecommunication Union's World Radiocommunication Conference to protect United States and Air Force spectrum interests.

Single Integrated Network Environment

The Air Force requires an integrated enterprise network to assure core cyberspace capabilities. Colonel Rizwan Ali, Commander of AFNIC at Scott AFB is forging the AFSPC Single Integrated Network Environment into reality. Mr. Frederick Chambers and his team of professionals are collaborating with leaders from SMC, 24 AF and my staff to achieve the desired end state of seamless information flow across terrestrial, air and space domains. Networthiness, as a component of the Single Integrated Network Environment, will offer integration and interoperability for Air Force networks.

To fuse partnerships with industry leaders, Lieutenant Colonel Jeri Harvey led the Air Force's inaugural Software Development Forum. During the forum, AFNIC announced upcoming changes to Air Force standards for integrating and supporting applications across the AFNet. These standards will increase our security posture

while reducing the number of network resources required. The Software Development Forum, along with other efforts, will help us to provide cyberspace network-centric capabilities to the warfighter.

PROVIDE HIGHLY SKILLED AND INNOVATIVE SPACE AND CYBERSPACE PROFESSIONALS

Our third goal is to provide highly skilled and innovative space and cyberspace professionals. AFSPC is educating, training and cultivating experts skilled in space and cyberspace capabilities and their integration across the full range of military operations in all domains. They are tactically and operationally proficient, and are ready to deploy at a moment's notice.

Space Education, Training, Wargames, and Exercises

Each year, the SIDC's Advanced Space Operations School (ASOpS) provides advanced training to more than 1,930 DOD personnel, while the National Security Space Institute (NSSI) provides space professional certification courses to over 800 personnel from all Services and military representatives from select allied nations. At the end of 2011, the Air Force had over 13,000 certified space professionals. The military construction project to house ASOpS and NSSI on Peterson AFB is near completion and a ribbon-cutting ceremony is scheduled for this spring.

The Schriever Wargame series is a valuable tool for examining the opportunities and threats inherent to the space and cyberspace environments. The Wargame Director, Major David Manhire, from the SIDC, Schriever AFB, will execute the Schriever 2012 Wargame in two phases with a renewed focus on the operational level of planning. The International Wargame is based on a contingency operation, involving North Atlantic Treaty Organization nation participation on the game floor for the first time. In September 2012, Australia, Canada, and Great Britain will join the United States in executing the second phase of the Wargame.

Last year marked the first time a tactical space unit participated in a Distributed Mission Operations exercise from their home station. The SIDC's Distributed Mission Operations Center for Space served as the environment for the 2nd Space Warning Squadron at Buckley AFB, to provide theater ballistic missile warning to the 612th Air and Space Operations Center at Davis-Monthan AFB, AZ. SIDC also premiered the GPS Environment Generator during a Blue Flag exercise. This system generates realistic degraded navigation effects and weapons accuracy, allowing operators and planners to see the direct influence of anticipated hostile and non-hostile GPS interference. Further integration of this model is in work to allow aircrews to plan and employ weapons in a virtual environment.

Cyberspace Education, Training, and Wargames

The Air Force must have professionals capable of integrating cyberspace capabilities across the warfighting domains. Under the Cyberspace Professional Development Program, Total Force personnel receive continuing education to progress from a foundation of fundamentals, through demonstrated depth of knowledge of experience and application, to a strategic understanding of cyberspace. In December 2011, the Air Force formalized this program to include a certification process. We now have over 5,200 Air Force Total Force personnel certified as cyberspace professionals.

In partnership with Air Education and Training Command and Air Combat Command, AFSPC continues to build a highly skilled cyberspace work force by providing cyberspace training at all levels of the Air Force. The 333rd Training Squadron at Keesler AFB, MS graduated the first class of enlisted Cyberspace Defense Operators. With the dedicated efforts of Airmen such as Captain Laura Sepeda, the 39th Information Operations Squadron, Hurlburt Field, FL, graduated the first class of students from Intermediate Network Warfare Training in 2011. They also developed the first Initial Qualification Training, allowing cyberspace operators to arrive at operational units fully qualified to perform the mission. Members of this squadron received the 2011 United States National Cybersecurity Innovation Award from the SANS Institute for "Developing World-Class Cyberspace Talent" through their use of simulators and training ranges to allow students to conduct defensive cyberspace operations. The Air Force Institute of Technology's Cyberspace Technical Center of Excellence began conducting the Cyberspace 200 and 300 intermediate and advanced professional development courses in June 2010. Through the end of 2011, they have graduated 754 people from these courses. In June 2012, the U.S. Air Force Weapons School at Nellis AFB, NV will conduct the first Cyberspace Weapons Instructor Course. Once the students complete this difficult 6-month course, the initial cadre of weapons officers will be instrumental in developing unit level tactics and supporting operational level planning to meet the challenges of evolving cyberspace threats.

Red Flag is the Air Force's advanced aerial combat training exercise. During Red Flag 2011–3 missions, Major Benjamin Montgomery, 624 OC, made history as the first cyberspace operator to lead an exercise event as the designated Mission Commander—integrating full spectrum capabilities into Air and Space Operations Center mission planning and operations. Red Flag is the ideal venue for demonstrating and exercising full spectrum cyberspace capabilities and we intend to continue on this path.

Our cyberspace operators reached a major milestone with the planning and execution of the first Cyber Flag in October 2011 at Nellis AFB, NV. This Joint exercise fused cyberspace across the full spectrum of operations against a realistic and thinking enemy in a virtual environment. Personnel from the AFNIC Simulator Training Exercise Division, led by Major Russell Montante, gave cyberspace operators the opportunity to gain hands-on experience in protecting, defending and fighting in a safe realm without impact to operational networks.

Technically educated U.S. citizens are a national resource—vital to national security, and essential to our ability to operate in, from and through the space and cyberspace domains. The Air Force provides world class space and cyberspace education and training that builds on our Airmen's secondary and university education. However, increasingly fewer of our Nation's students are pursuing science, technology, engineering, and math (STEM) degrees. As many STEM-educated professionals reach retirement age in this country, the lack of technically educated U.S. citizens creates serious shortfalls in many industries, which results in tough competition for this vital resource. As a Nation, we must comprehensively address this shortage in technical talent if we hope to maintain our advantage in an increasingly complex global environment.

CONTINUE TO TAKE CARE OF PEOPLE—OUR MOST TREASURED ASSET, AMERICA'S SONS AND DAUGHTERS

As AFSPC reaches our three goals, we remember that our first and highest priority is to support our Nation's warfighters in harm's way—to give them the tools needed to fight and win as quickly and safely as possible. At the same time, we maintain a continuing focus on ensuring our military and their families have access to necessary services on the homefront.

In Colorado Springs, AFSPC partnered with the local community on several initiatives. One element of this partnership is providing resources for those dealing with Post Traumatic Stress Disorder and Traumatic Brain Injuries as they transition to civilian life.

This summer, the Los Angeles AFB Airman and Family Readiness Center, working with the Air Force Recovery Care Coordinator for California, intervened in the military out-processing of one of our highest decorated heroes. They guided him through the process to receive a medical retirement, vice separation, allowing for continued access to the medical care he needs to recover. The team also provided support when this quiet hero lost a family member in combat in Afghanistan.

This spring, Colorado Springs is once again hosting the Warrior Games. These athletic endeavors allow wounded and seriously ill service members to incorporate sports training as a part of their overall transition and recovery plan. It is the command's privilege to support this event and help honor our Nation's Wounded Warriors.

Unfortunately, not all of our warriors return home. This year AFSPC remembers two of our own who fell on the battlefield: Major Charles Ransom and Airman First Class Matthew Seidler. Their sacrifice serves as a very personal reminder that we owe our best efforts to our warfighters each and every day. We will never forget them and we pray that their families find comfort in their loved one's contribution to freedom.

CONCLUSION

The members of AFSPC have a passion about service to our Nation. Our professionals are innovative. They continue to provide the world class space and cyberspace capabilities for which AFSPC is known, and they have the courage to not only do the right things, but also to do things right. Our command is about producing excellence—every day. We believe passion, innovation and courage lead to that excellence. Because we operate in domains that reach well beyond the globe, our slogan is Excellence, Global and Beyond. It is truly a privilege to command AFSPC and I appreciate the opportunity to represent this great command before the subcommittee.

Senator NELSON. General Formica.

STATEMENT OF LTG RICHARD P. FORMICA, USA, COMMANDER, U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND/ARMY FORCES STRATEGIC COMMAND

General FORMICA. Good afternoon, Mr. Chairman, Ranking Member Sessions. It is my privilege as the Commander of Army Space and Missile Defense Command to appear before your subcommittee again this year. I thank you for your continued support of our soldiers, civilians, and families.

My intent today is to briefly outline for you the necessity of space-based capabilities to our Army, our Nation's force of decisive action.

In the 2012 posture statement, the Army focuses on three areas: support to Afghanistan, responsible stewardship, and the leaner Army. Inherent to these focus areas and the building of the Army of 2020 is an increasing reliance on space. The Army is the biggest user of space-based capabilities which are critical to the conduct of unified land operations. If the Army wants to shoot, move, or communicate, it needs space.

This reliance becomes more critical in an era of tight fiscal resources, smaller Army force structure, and potentially reduced forward presence. The Army works closely with the Air Force who is the executive agent for space and other agencies to define requirements and ensure future warfighters have access to the essential space capabilities General Shelton has laid out.

As a partner of the joint space enterprise, the Army is also a provider of space-based capabilities. Let me summarize our command's contributions to the joint force through our three core tasks.

Our first core task is to provide trained and ready space forces and capabilities to support today's operations. Our forces, comprised of Active, Guard, and Reserve soldiers and civilians, conduct global space operations to include access to wideband satellite communications, missile warning, space control, friendly force tracking, and geospatial intelligence analysis. We support Army operations with our space support teams. These forward-deployed men and women provide access to joint and national capabilities in order to meet our warfighters' needs. Since September 11, more than 70 teams have deployed support operations in Afghanistan and Iraq.

Our second core task is to build the future space forces and capabilities for the Army of tomorrow. The development of operational concepts, adjustments to doctrine, conduct of analyses and studies, and improvements to our space training enable the Army to build and improve our future space forces.

Our final core task is to provide the warfighter with space-related technologies that enable dominant advantages to the battlefield for the day after tomorrow. We focus our science and technology (S&T) efforts on capabilities that will bring maximum advances in our combat effectiveness. The Joint Capability Technology Demonstration (JCTD), enables us to find, demonstrate, transition, and transfer the best space operational concepts, technology solutions, and products. We have proposed three space-related JCTDs, two of which aim to provide economical nanosatellite capabilities to the tactical ground component warfighter. The third JCTD will develop a low-cost launch system for nanosatellites.

These have been approved by the Office of the Secretary of Defense (OSD) and we look forward to favorable consideration by Congress.

In conclusion, as we become a leaner Army, space capabilities will be critical enablers to our ability to conduct unified land operations. Assured access to space and well-trained, experienced space professionals reduce the fog, friction, and uncertainty of warfare. As a command, we will remain disciplined stewards of our Nation's resources. This committee's continued support is essential in enabling us to maintain and further improve our space capabilities and provide the best trained space professionals to combatant commanders.

I appreciate again the opportunity to speak on the value of space to our Army. I look forward to answering any questions you may have.

Army Strong.

[The prepared statement of General Formica follows:]

PREPARED STATEMENT BY LTG RICHARD P. FORMICA, USA

INTRODUCTION

Mr. Chairman, Ranking Member Sessions, and distinguished members of the subcommittee, thank you for your ongoing support of our soldiers, civilians, and families. After my initial appearance last year, I appreciate the opportunity to testify again before this subcommittee. Thank you also for your continued strong support of the Army and the key capabilities that space affords our warfighters. Your continued support is important as we pursue our joint efforts to provide critical space capabilities in support of our Nation, our fighting forces, and our allies.

My role has not changed since my previous subcommittee appearance. I wear three hats that entail distinct responsibilities in support of our warfighters. First, as the commander of the U.S. Army Space and Missile Defense Command, I have Title 10 responsibilities to train, maintain, and equip space and missile defense forces for the Army. Second, I am the Army Service Component Commander (ASCC) to the U.S. Strategic Command (STRATCOM), or Commander, Army Forces Strategic Command. I am charged with the responsibility for planning, integrating, and coordinating Army forces and capabilities in support of STRATCOM missions. Third, I serve as the Commander of STRATCOM's Joint Functional Component Command for Integrated Missile Defense (JFCC–IMD), enabling me to leverage the capabilities and skill sets of the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT).

In my role here today as the Commander of USASMDC/ARSTRAT, I am honored to testify with these distinguished witnesses—all providers of critical space capabilities to the warfighter and essential contributors to the Joint space planning process and our Nation's continued advances to effectively operate in space.

Within the Army, space operations and space-related activities are pursued as an enterprise and are not the exclusive domain of the USASMDC/ARSTRAT, or any other single functional proponent. However, the Chief of Staff of the Army has assigned USASMDC/ARSTRAT as the Army's proponent for space. In this role, we coordinate closely with the other members of the Army Space enterprise, particularly the Army Intelligence, Signal, and Topographic communities. We are increasingly engaged across the broader Army community to ensure space capabilities are maximized and integrated across our entire force and that potential vulnerabilities to our systems are mitigated to the greatest extent possible. We also collaborate with STRATCOM and its Joint Functional Component Command for Space (JFCC Space) and other members of the Joint community to provide trained and ready space forces and space-based capabilities to the warfighter. We also work closely with the acquisition developers in the other Services to ensure the development of systems that provide the best capabilities for ground forces.

Within USASMDC/ARSTRAT, we strive to achieve three core tasks within the space arena:

- To provide trained and ready Space Forces and capabilities to the combatant commanders—our operations function that addresses today's requirements.

- To build future Space Forces—our capability development function that is responsible for meeting tomorrow's requirements.
- To research, test, and integrate space and space related technologies—our materiel development function that aims to advance the Army's and warfighter's use of space the day after tomorrow.

During my appearance last year, my desire was threefold: to outline the Army as a user of space capabilities; to articulate the Army's space strategy and policy; and to inform the committee about the Army as a provider of space capabilities. Today, within the context of my testimony from that appearance, I would like to again address the absolute necessity of space-based capabilities for our warfighters and to expand upon the above three core space tasks that our soldiers, civilians, and contractors diligently execute each and every day.

SPACE-BASED PRODUCTS AND CAPABILITIES—A FORCE MULTIPLIER

As I reported last year, our Army must be organized, trained, and equipped to provide responsive and sustained combat operations in order to fight as a joint team and to respond, as directed, to crises at home and abroad. The Army is dependent on space capabilities to execute unified land operations in support of the combatant commander's objectives. Army space forces contribute to the Army's ability to be adaptive, versatile, and agile to meet tomorrow's security challenges. In other words, space is critical to our ability to shoot, move, and communicate.

The Army is the biggest user of space and it is also a provider of space-based capabilities. Integrating space capabilities enables commanders, down to the lowest echelon, to conduct unified land operations through decisive action and operational adaptability. The Army's Operating Concept identifies six warfighting functions that contribute to operational adaptability: mission command, movement and maneuver, intelligence, protection, fires, and sustainment. Space-based capabilities leveraged and employed across the Army space enterprise enable each of these warfighting functions. Virtually every Army operation relies on space capabilities to enhance the effectiveness of our force—there is no going back. In the coming years, our reliance on space capabilities will continue to grow. This reliance will be even more critical in an era of tight fiscal resources, a smaller force structure, and potentially a reduced forward presence. In essence, space-based capabilities are a force multiplier. When combined with other capabilities, space systems allow joint forces to see the battlefield with clarity, navigate with accuracy, strike with precision, communicate with certainty, and operate with assurance.

The Army depends on space-based capabilities and systems, such as global positioning satellites, communication satellites, weather satellites, and intelligence collection platforms. They are critical enablers to our ability to plan, communicate, navigate, and maintain battlefield situational awareness, target the enemy, provide missile warning, and protect and sustain our forces. The Army and the Joint Forces require assured access to space capabilities and, when required, have the ability to deny our adversaries the same space-based capabilities.

The Army works diligently with the Air Force and other agencies to define our requirements in order to ensure future warfighters have access to essential capabilities and services derived from space-based assets. Most of these services are so well integrated into weapon systems and support processes that many of our soldiers are unaware they are leveraging space capabilities in the daily conduct of their operations. This seamless integration is due in large part to the coordination and cooperation of space professionals across the National Security Space Enterprise at Air Force Space Command, the Joint Functional Component Command for Space, the Navy, the Army, and other Department of Defense (DOD) and joint agencies.

As previously stated, the Army has been and continues to be a provider of space capabilities. In the past, the Army's greatest investment in space capabilities has been in the ground segment—the integration of space capabilities into operational forces through command and control systems, communication terminals, and intelligence feeds. Recently, the Army has strengthened and broadened its efforts to more fully exploit national and strategic space capabilities, defend our space capabilities, leverage space to enhance missile defense systems, and train and develop the needed space professionals and space enablers.

In 2013, as in past years, the Army plans to invest significant resources, both funding and people, in pursuing space and space-related activities. The Army is evolving from a position of simply exploiting strategic space-based capabilities to one where the Army is fully engaged in the planning, development, and use of theater-focused operational and tactical space applications.

PROVIDE TRAINED AND READY SPACE FORCES AND CAPABILITIES TO TODAY'S OPERATIONS

Within our first core task of providing trained and ready space forces and capabilities to the combatant commanders (COCOMs) and the Warfighter, there are numerous recurring operations, capabilities, and training responsibilities that we provide each day. Within our 1st Space Brigade, over 1,000 soldiers and civilians provide space capabilities via access to space-based products and services that are essential in all phases of combat operations. The Brigade, a multi-component organization comprised of Active, National Guard, and U.S. Army Reserve soldiers, has space forces assigned world-wide that are responsible for conducting continuous global space support, space control, and space force enhancement operations. The Brigade's three battalions support combatant commanders by providing satellite communications, space operations, missile warning, and forward-deployed space support teams. These Space Operations Officers, along with members of the Army's Space Cadre, directly influence the execution of strategic operations in support of operational and tactical level ground maneuver forces. Their principal duties include planning, developing, resourcing, acquiring, integrating, and operating space forces, systems, concepts, applications, or capabilities in any element of the DOD space mission areas.

The Army Space Personnel Development Office (ASPDO), part of USASMDC/ARSTRAT, develops policies, procedures, and metrics for the Army Space Cadre and executes the life-cycle management functions of FA 40 Space Operations Officers. The Army's Space Cadre, initiated in 2007 and utilizing FA40s as its foundation, is comprised of over 2,300 soldiers and civilians who perform space and space-related functions in support of the Army's interests in space operations, capability development, materiel development, and policy. The Cadre consists of soldiers and civilians from a wide variety of branches, career fields, disciplines, and functional areas.

The approximately 410 multi-component FA 40s serve in Army and joint commands and organizations across all echelons—tactical, operational, and strategic. The Army continues to integrate space professionals into the Office of the Secretary of Defense, the Joint Staff, the North American Aerospace Defense Command, the U.S. Strategic Command, the Air Staff, the Air Force Space Command, and other space focused organizations and academic institutions. In each of these organizations, personnel not only provide the Army perspective of space related capabilities, they articulate requirements from a ground component standpoint in the joint environment. A summary of the critical space capabilities provided by Army's space professionals is highlighted below.

- Army Space Support Teams: During the current Afghanistan operations, the USASMDC/ARSTRAT's Army Space Support Teams continuously provide space-based products and services to combatant commanders and other international government agencies. The teams are on-the-ground space experts, pulling key commercial imagery, forecasting the impact of space weather, and providing responsive space support to their units. Forward deployed Army space forces support the new defense strategy by providing rotational presence and advisory capabilities in support of broader security operations. The bottom line is these teams bring tailored space products and capabilities that meet critical theater commander's needs. During the Iraq operations, Army Space Support Teams provided essential space capabilities for those commanders and warfighters. More than 70 teams have deployed in support of Operations Enduring Freedom and Operation Iraqi Freedom in order to provide invaluable on-the-ground responsive expertise to combatant commanders and the warfighter.
- Satellite Communications: USASMDC/ARSTRAT's role in satellite communications (SATCOM) has grown beyond our payload operations and transmission control responsibilities for the Defense Satellite Communication System (DSCS) and the Wideband Global SATCOM System (WGS) constellations. We also serve as the Consolidated SATCOM System Expert for the DOD narrowband and wideband SATCOM constellations—the DSCS, the WGS, the Mobile User Objective System (MUOS), the Ultra-High Frequency (UHF) SATCOM, and the Fleet Communications Satellite. Transmission control for more than 97 percent of DOD-owned SATCOM bandwidth is provided by Army operators controlling the payloads on the DSCS and the WGS. These systems provide critical SATCOM capability for Combatant Commanders, other Federal agencies, the Diplomatic Corps, the White House, and now allied nations in accordance with recent international agreements extending our cooperation in SATCOM operations. The

1st Space Brigade's 53rd Signal Battalion and Department of the Army civilians perform this mission via the Wideband Satellite Communications Operations Centers and DOD's Regional Satellite Communications Support Centers located around the globe. A new Wideband Satellite Communications Operations Center opened in Hawaii last year, and just this month, we completed the lifecycle replacement of essential equipment and infrastructure at our Fort Detrick, MD, satellite operations facility. Construction on the replacement for our facility at Fort Meade, MD, is underway and the construction at our site in Landstuhl, Germany will begin soon. The operations centers required modernization and replacement of aging antennas and terminal equipment in order to be compatible with the fleet of new and expanding WGS assets being acquired and launched by the Air Force, and to ensure the continued operation of the regional management hubs for a majority of the DOD's satellite communications capabilities. As the SATCOM System Expert for MUOS, the Army is responsible for DOD's use of our next generation tactical system which will transform tactical SATCOM from radios into secure cellular networked communication tools. During this past year, our Satellite Support Centers participated in numerous worldwide operations and exercises, including Enduring Freedom, New Dawn, Odyssey Dawn/Unified Protector, Tomodachi, and other operations.

• Friendly Force Tracking: USASMDC/ARSTRAT operates the DOD's Friendly Force Tracking Mission Management Center (MMC) on behalf of STRATCOM. The MMC provides situational awareness of U.S. military and other government personnel, along with coalition and allied partners. Translating more than one and a half million location tracks a day, this capability is an essential enabler for our force. As the Army has the greatest number of warfighters and systems to track on the battlefield, our friendly force tracking assets are critical in identifying friendly forces during unified land operations.

• Ballistic Missile Early Warning: Critical to the Joint Force Commander's theater force protection, the Army provides ballistic missile early warning and missile defense support from within the theater or region. The 1st Space Brigade's Joint Tactical Ground Stations (JTAGS) Detachments, operated by Army personnel, monitor enemy missile launch activity and other infrared events of interest and share the information with members of the air and missile defense and operational communities. Our JTAGS Detachments are forward-stationed across the globe, providing 24/7/365 dedicated, assured missile warning to STRATCOM for deployed forces.

• Geospatial Intelligence (GEOINT) Support: The Army provides geospatial intelligence production in direct support of the combatant commands, as an operational element of the National System for Geospatial Intelligence. The Army's space and intelligence experts perform exploitation of a variety of commercial, civil, and DOD imagery data derived from space and airborne sources. Additionally, they aid in the exploration of emerging spectral system technologies and in transitioning new capabilities to the warfighter. Last fall, USASMDC/ARSTRAT activated a new GEOINT branch to support STRATCOM's mapping requirements. In 2011, we provided geospatial situational awareness in support of Hurricane Irene and the Japanese earthquake relief efforts as well as crisis support operations around the globe including North Atlantic Treaty Organization operations in Libya—Operation Unified Protector. We also provided almost 100,000 unclassified commercial imagery products to U.S. Strategic Command, U.S. Northern Command, U.S. Central Command, the State Department, and other agencies.

• Operations Reach-back Support and Services: The USASMDC/ARSTRAT Operations Center, located at Peterson Air Force Base in Colorado Springs, CO, provides reach-back support for our space experts deployed throughout the operational force and allows us to reduce our forward-deployed footprint. This center maintains constant situational awareness of deployed elements, continuously responds to requests for information, and provides the essential reach-back system of connectivity with technical subject matter experts.

• Tactical Exploitation of National Capabilities: The Army Special Programs Office is the Army's focal point for the exploitation of national intelligence, surveillance, and reconnaissance assets and products through the Tactical Exploitation of National Capabilities program. The Army is fully integrated into the National Reconnaissance Office and the Intelligence Community.

- Strategic Space Surveillance: The Army also operates facilities and assets that are of utmost importance to protecting the Nation's use of space. The U.S. Army Kwajalein Atoll/ Reagan Test Site (RTS), located in the Marshall Islands, is a national asset that provides unique radars and sensors that contribute to STRATCOM's space situational awareness mission, enabling protection of the Nation's manned and unmanned space assets.

BUILD FUTURE SPACE FORCES—MEETING TOMORROW'S REQUIREMENTS

The Army's ever increasing dependency on space-based capabilities requires active participation in defining space-related requirement needs. The identified needs serve to ensure necessary Joint force structure, systems, and concept of operations (CONOPs) are developed and acquired, thereby enabling the land force to conduct the full range of military operations now and in the future. Ensuring tactical and assured access to space is our focus—reassuring the requisite capabilities and effects are delivered to the tactical warfighter on time, every time demands that our space capabilities and architectures become more resilient against attacks and disruption. We must ensure that our Army does not face a day without space and space-related capabilities.

In our second core task of building future space forces, we use our capability development function to meet tomorrow's space requirements. As reported last year, the Army uses established and emerging processes to document its space-based needs and pursue Army and Joint validation of its requirements. This disciplined approach helps ensure limited resources are applied where warfighter operational utility can be most effectively served. As a recognized Army Center for Analysis, USASMDC/ARSTRAT conducts studies, in conjunction with the Army and the other Services, to determine how best to meet Army space requirements. With this information, we continue to pursue and develop the necessary adaptability across the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) to mitigate threats and vulnerabilities while sustaining land force operations.

The Army's Space Policy, published in 2009, focuses on the operational and tactical needs of land forces and assigns space related Army organizational responsibilities. It follows implemented DOD space policies and procedures, reestablishes objectives for Army space, and continues the Army Space Council. The Army's Space Policy outlines four broad space related objectives:

- Maximize the effectiveness of current space capabilities in support of operational and tactical land warfighting needs.
- Influence the design, development, acquisition, and concepts of operation of future space systems that enable and enhance current and future land forces.
- Advance the development and effective use of responsive, timely, and assured Joint interoperable space capabilities.
- Seamlessly integrate relevant space capabilities into the operating force.

In May 2011, the Chief of Staff of the Army approved the Army's Space Strategic Plan. This document, which was shaped by national level guidance such as the National Space Policy and the National Security Space Strategy, outlines the Army's space enterprise path for strategic planning, programming, and resourcing.

The essence of our space strategy and the guiding vision of the Army space enterprise are to assure access to resilient and relevant space-enabled capabilities to ensure Army forces can conduct unified land operations. To achieve this, our space strategy rests on three tenets that link Army strategic planning and programming for space to the guidance in national and DOD space policy and strategy. The three essential tenets are:

- To enable the Army's enduring mission by providing requisite space-enabled capabilities to support current operations, as well as future transformation efforts.
- To leverage existing DOD, national, commercial, and international space-based capabilities.
- To pursue cross-domain solutions to create a resilient architecture to mitigate threats, vulnerabilities, and assure access to critical capabilities needed to sustain land force operations.

To properly train space professionals, the Army developed the Space Operations Officer Qualification Course and the Army Space Cadre Basic Course. These two courses provide the necessary foundation for the Space Cadre. The Army has come a long way since the first Space Operations Officer Qualification class in 2001. Today, through USASMDC/ARSTRAT's Directorate of Training and Doctrine, we

conduct space training via resident, mobile training teams, and distributed learning venues to support initial skills and qualification training, leader development, lifelong learning and professional development in support of life cycle management.

The Army also leverages the high-quality space training developed and administrated by the Air Force. Finally, numerous space officers complete additional postgraduate studies at the Naval Postgraduate School, accredited civilian institutions, and training with industry. The Army is committed to growing, training, developing, tutoring, and advancing space professionals. In 2011, the Army Space Council assigned USASMDC/ARSTRAT the task to execute an Army-level initiative and incorporate space knowledge and leader development training into all Army Schools. We are leading this effort with support from the U.S. Army Training and Doctrine Command (TRADOC) and are researching and identifying gaps in space knowledge training at the Centers of Excellence and associated schools. Once completed, the analytical results will help us define the what and how of soldier space knowledge training and facilitate the integration of that space knowledge training into existing lessons and school curricula.

Our Battle Lab continues to find new ways to exploit space capabilities, to bring more space-based products to the tactical warfighter and integrate them with Army network capabilities. Via a Joint effort between Air Force Space Command and USASMDC/ARSTRAT, we have developed a way to provide situational awareness of Space capabilities to the tactical user, via a handheld tablet device, similar to an iPad. Prototype iSpace tablets are currently in the hands of deployed Army space professionals while specialized variants are being used by deployed Army Special Operations soldiers.

RESEARCH, TEST, AND INTEGRATE SPACE AND SPACE RELATED TECHNOLOGIES

Our final core task entails our materiel development function in which we seek to provide the warfighter with space and space related technologies that provide dominant advantages on the battlefield—essential enhancements for the day-after-tomorrow. We realize that fiscal challenges will stress all modernization efforts. As such, we have focused our science and technology research, development, and demonstrations on capabilities that return maximal advances in our combat effectiveness. Recognition of the inextricable dependence of our weapon systems and battle command capabilities on orbiting spacecraft specifically highlights our determined effort to develop affordable spacecraft and launch systems which, in turn, will enable assured access to global reach from space. Our focus on affordability ensures a feasible means to field sufficient numbers of space systems to completely and effectively complement our active combat brigades.

Despite the current and projected resource constrained environment, the Army recognizes the continued need to prioritize, leverage, and invest in promising space research and development technologies. As such, within our materiel development core task, we are striving to better utilize the Joint Capability Technology Demonstration (JCTD) Program. This will enable us to find, demonstrate, transition, and transfer the best operational concepts and technology solutions for transformational, Joint, and coalition warfare. Leveraging the JCTD program, I would like to briefly highlight three small satellite technology endeavors that have the potential to provide enhanced space capabilities to the ground commanders and warfighters.

- SMDC Nanosatellite Program-3 (SNaP–3): Constellations of highly affordable nanosatellites deployed in mission-specific, low earth orbits can provide a cost effective, beyond-line-of-sight data communications capability for users who currently have no access to satellite communications. SNaP–3, an Office of the Secretary of Defense (OSD) approved JCTD, seeks to utilize three of these small satellites to provide dedicated coverage to a wide range of under-served users in remote areas. Pending final approval of the JCTD, the Army will build and launch three nanosatellites to address the current shortfall. We are hopeful this initiative will transfer to a program of record in fiscal year 2014.
- Kestrel Eye Visible Imagery Nanosatellite: New technologies are enabling the production of low-cost nanosatellites which have ever increasing military utility. Kestrel Eye, an OSD approved JCTD, is an endeavor to manufacture an electro-optical near-nanosatellite-class imagery satellite that can be tasked directly by the tactical ground component warfighter. Weighing about 30 pounds and capable of producing 1.5 meter resolution imagery, Kestrel Eye's data will be down-linked directly to the same warfighter via a data relay system that is also accessible by other warfighters in theater without any continental United States relay pass-through or data filtering. At the low cost of about $1 million per spacecraft in a production mode, the

intent is to demonstrate a small, tactical space-based imagery microsatellite that could be propagated in large numbers to provide a cost effective, persistent capability to ground forces. Each satellite would have an operational life of greater than 2 years in low earth orbit. Pending final JCTD approval, the initial Kestrel Eye launch is scheduled for next year.

• Soldier-Warfighter Operationally Responsive Deployer for Space (SWORDS): Concurrent with the shrinking size and cost of militarily useful satellites is a need for an appropriately sized and priced launch system. SWORDS, an OSD approved JCTD, is an initiative to develop a very low cost launch vehicle. This launch system is designed to take advantage of low cost, proven technologies, and non-exotic materials to provide launch for small weight payloads to low earth orbit for about one million dollars per launch vehicle. SWORDS is low cost because it is very simple: it is an integrated tank/booster/engine design; it has a benign bi-propellant liquid propulsion system; and it uses existing launch support and launch site hardware.

CONCLUSION

The Army is and will grow more dependent upon the capabilities that space brings to the battlefield. In current and all future conflicts, space capabilities will be inextricably linked to warfighting. The Army will continue to rely on and advocate for space products and services provided by the DOD, other government agencies, our allies and coalition partners, and commercial entities in order to shoot, move, and communicate. The Army's goal is to continue to provide trained and ready space forces and capabilities to the combatant commanders and the warfighter, build future space forces, and research, develop, test, and integrate future space capabilities. Fully integrated capabilities will provide depth, persistence, and reach capabilities for commanders at the strategic, operational, and tactical levels. Assured space systems and well-trained and experienced space professionals significantly reduce the fog, friction, and uncertainty of warfare. Our use of and reliance on space is integral and absolutely critical to the Army's successful defense of this Nation. This committee's continued support is essential in enabling us to maintain and further improve our space capabilities and provide the best-trained space professionals to combatant commanders. The courageous warfighters that serve to protect the safety and welfare of our Nation deserve nothing less.

I appreciate having the opportunity to speak on these important matters and look forward to addressing any questions you may have. Secure the High Ground and Army Strong!

Senator NELSON. Thank you, General.

Mr. Winokur.

STATEMENT OF ROBERT S. WINOKUR, DIRECTOR OF OCEANOGRAPHY, SPACE, AND MARITIME DOMAIN AWARENESS, DEPARTMENT OF THE NAVY

Mr. WINOKUR. Thank you, Mr. Chairman, Senator Sessions. I appreciate the opportunity to be here in my role as Acting Oceanographer for the Navy and Director of Oceanography, Space, and Maritime Domain Awareness.

Our Navy requires access to a combination of joint interagency, commercial, and international satellite systems for information dominance and synchronized safe operations. These space-based assets provide critical communication paths, PNT signals, environmental data, and intelligence, surveillance, and reconnaissance (ISR) assets. Space capabilities enable effective command and control, responsiveness, and agility necessary for a globally engaged, superior naval force consistent with emphasis on forward operations and joint interoperability.

The Navy depends on others within DOD to acquire sufficient wideband communication satellites to meet the variety of needs in these bands. However, as the executive agent for narrowband sat-

ellite communications, it is the Navy that supplies the necessary narrowband capabilities to meet joint force requirements.

The increasing demand for narrowband satellite communication (SATCOM) access at ever-higher data rates requires moving beyond legacy ultra-high frequency (UHF) satellite capabilities. While the MUOS will carry a legacy UHF payload for near-term usage, most importantly, it will increase future user capacity by over 10 times through its wideband signal. MUOS will also connect users to the Defense Information Systems Network, resulting in worldwide tactical narrowband netted point-to-point and broadcast voice and data services in challenging environments.

The first of five MUOS satellites launched on February 24th is well on its way to meet its scheduled on-orbit capability in May. The second spacecraft is on track for a November 2012 delivery and has a tentative launch date of July 2013. Assembling and testing of the third spacecraft is nearly complete.

Additionally, the radio access facility in Hawaii and the Naval Satellite Operations Center in Point Magoo, CA, have received the necessary upgrades for initial operation of MUOS.

Navy optimized the UHF SATCOM constellation to ensure joint staff requirements are met in legacy UHF payload capacity, even in the event of an unplanned loss. Measures included enhancements in existing DOD systems, leases with commercial companies, and a memorandum of understanding with the Australian Ministry of Defense for use of channels on an Australian-hosted payload. Based on the improvements already employed, the recent successful launch of MUOS–1 and the statistical reliability analysis of the legacy UHF SATCOM constellation's lifespan, Navy does not foresee a need for additional legacy capacity.

The GPS is the Navy's primary source of precise PNT, data for platforms, munitions, combat, and C4I systems. Last summer, Navy awarded a multiyear contract for its follow-on shipboard PNT distribution system. The new GPS PNT service will replace decades-old, legacy systems incorporating the latest security architecture, redundant clocks, and anti-jam antennas.

Space-based operations are an essential element to Navy's global atmospheric and ocean numerical models, relying on partnerships with the Air Force, civil, and international organizations to meet our space-based environmental sensing requirements. To this end, the Navy is engaged in defining requirements for the follow-on to the Defense Meteorological Satellite Program.

By using a variety of space-based assets, we are providing greater maritime domain awareness, leading to more efficient defenses from threats to safety and commerce. Navy continues to engage the intelligence community as they explore future acquisitions and consider the capabilities of commercial vendors to meet Federal ISR needs.

In closing, I would like to reiterate that the Navy is heavily reliant upon space assets for success in the maritime domain. In the face of today's fiscal realities, this requires balancing investments and new acquisitions, training in the use of existing assets, and continued examination of alternatives to provide sound operations and acquisition options.

Mr. Chairman, we look forward to answering any questions you and the subcommittee may have. Thank you.

[The joint prepared statement of Mr. Winokur and Dr. Zangardi follows:]

JOINT PREPARED STATEMENT BY MR. ROBERT S. WINOKUR AND DR. JOHN A. ZANGARDI

INTRODUCTION

Mr. Chairman, distinguished members of the subcommittee, we are honored to appear before you today to address the Navy's space activities. Navy's forward and geographically-dispersed operations underlines the importance of a healthy satellite constellation and assured access to those capabilities that support getting the necessary information to leadership in a timely manner to inform decisions at tactical, operational, and strategic levels. The space constellation brings synchronization of guidance and objectives between the shore-based headquarters and the forward-deployed Fleet, incorporates the tactical picture of each asset forward into a global common operational picture for increased awareness, and allows orchestration of operations amongst the detached units.

The Defense Strategic Guidance, released in January 2012, directs a rebalancing toward the vast Asia-Pacific region, due to the United State's "inextricably linked" economic and security interests with countries in East and South Asia and the Western Pacific. The 30th Chief of Naval Operations, Admiral Jonathan Greenert, delivered his Sailing Directions in September 2011, directing the Navy to place warfighting principles and capabilities first, to operate forward, and to be ready to employ all Navy resources to accomplish assigned missions. The continued emphasis in forward operations combined with the re-emphasis on the global nature of U.S. security interests require Navy position itself to take full advantage of the critical benefits afforded from space. It also demands Navy continue to work with the other Services to develop and refine the necessary tactics, techniques, procedures, and capabilities to maximize the use of available constellations and maintain continual access in degraded or denied space environments. Navy continues to recognize the need for space expertise as a guide in developing our space capabilities, and therefore is routinely examining its Space Cadre community management and optimizing its training and exercise regimen to strengthen Navy's ability to maximize the access to, and use of, these critical satellite constellations.

Information Dominance and synchronized, safe operations in the vast domains of the global commons require access to a combination of joint, interagency, commercial, and international space systems providing our Navy commanders with critical satellite communications (SATCOM) paths; positioning, navigation, and timing (PNT) signals; environmental monitoring (EM) data; missile warning (MW); and intelligence, surveillance, and reconnaissance (ISR) reporting necessary for the full range of operations from humanitarian missions to combat operations in one or more theaters. Access to, and mastery in, operations utilizing this combination of space capabilities enables decisiveness, sustainability, responsiveness, and agility—critical requirements for a globally engaged, superior naval force.

MOBILE USER OBJECTIVE SYSTEM (MUOS)

SATCOM access is the backbone of space-based capabilities supporting Navy's geographically-dispersed, forward operations. It is the pathway across which commanders can provide updates and receive guidance from higher headquarters "on the beach" and synchronize operations with land-based and other distant Fleet assets. It is also an important path to disseminate critical MW, ISR, and EM information to forward-deployed ships, providing threat warning, situational awareness, and a solid foundation with which the operational or tactical commander can make sound decisions. Navy depends on others within the Department of Defense (DOD) to acquire sufficient wideband communications satellites to meet the variety of Navy missions requiring communications in these bands. As the Executive Agent for Narrowband Satellite Communications, Navy supplies the necessary narrowband capabilities to meet the total joint force requirements.

The increasing joint demand for narrowband SATCOM access at ever-higher data rates requires moving beyond antiquated legacy UHF satellite capabilities. The Mobile User Objective System, or MUOS, will use a wideband code division, multiple access (WCDMA) capability, similar to third generation (3G) cellular telephones, that will satisfy those demands by providing over 10 times the capacity of the current UHF Follow-On (UFO) satellite constellation. With this capability and the in-

creased capacity, MUOS will support Unified Commands and Joint Task Force Components, DOD and non-DOD agencies, and our coalition partners by providing worldwide tactical narrowband netted, point-to-point, and broadcast voice and data services in challenging environments, including double-canopy foliage, urban environments, high sea states, and all weather conditions.

Over the past year, the MUOS program made significant progress. The first MUOS satellite in the planned constellation of five satellites launched on February 24, 2012, and is scheduled for on-orbit capability in May 2012. Ground infrastructure improvements are completed for the initial MUOS capability, as is training of the operators at Naval Satellite Operations Center, who will be responsible for on-orbit maintenance and operation of the constellation. The second spacecraft is assembled and undergoing spacecraft level integrated testing. It is on track for a November 2012 delivery to the government and has a tentative launch date of July 2013, as assigned by the Air Force. Assembly and system level testing of the third spacecraft is nearly complete, and the program projects its on-time delivery for an anticipated fiscal year 2014 launch.

With the launch of MUOS 1, the Department of Defense (DOD) begins its transition to a new UHF SATCOM capability based on 3G cellular telephone technology; however it will take time to launch the full constellation and shift the thousands of DOD UHF SATCOM users to this new technology. This transition will be made smooth through a number of proactive measures to extend access to the legacy UHF signals. First, each MUOS satellite has a legacy UHF payload that will be accessible by current UHF radios and will remain available throughout the satellite's lifetime. Navy also optimized the UHF SATCOM constellation to significantly increase the number of available channels and implemented the Integrated Waveform, a software upgrade to UHF SATCOM tactical terminals and control systems, to optimize the use of legacy UHF satellite channels. Navy continues to leverage commercial legacy UHF capabilities through leases directly with commercial companies and through a Memorandum of Understanding with the Australian Ministry of Defense for use of channels on an Australian hosted payload. Navy has explored additional options using commercially hosted payloads, but based on the improvements already employed, the recent successful launch of MUOS 1, planned future launches of the subsequent MUOS satellites, and the projected lifespan of the legacy UHF SATCOM constellation, Navy does not foresee a need for any additional legacy capacity now or through MUOS's projected lifecycle.

The final piece in realizing the full capability of MUOS is the fielding of MUOS-capable Joint Tactical Radio System (JTRS) terminals and by upgrading existing legacy UHF software programmable terminals to give access to the WCDMA waveform. Due to cost overruns and schedule delays, the MUOS compatible terminals of the JTRS program were reduced to the Handheld, Manpack, Small Form Fit (HMS) Manpack radio and the Airborne, Maritime, Fixed Station (AMF) Small Airborne radio versions. Recently, the Office of the Secretary of Defense made Navy responsible for systems engineering and integration of the end to end MUOS capability to include ensuring compatible user terminals are developed. Navy has appointed the MUOS Program Manager as the government development and integration lead and is implementing additional early end to end testing of the new MUOS capability in order to maximize the successful operational deployment of MUOS-capable JTRS terminals when fielded. With this new direction, Navy expects the JTRS HMS program to have the HMS Manpack certified and ready for testing in late fiscal year 2013, in time to conduct the operational evaluation of the MUOS satellite system in fiscal year 2014.

With five programmed satellites on orbit, MUOS will be the common denominator for future narrowband command and control, enhancing the capability to communicate from the tactical edge to theater headquarters. MUOS will allow more comprehensive and coordinated support to regional engagement efforts, providing the capability to synchronize actions with other Services and agencies.

TACSAT-4

The level of importance that Navy places on SATCOM access directs the exploration of a variety of measures to counter anti-access and area denial efforts of potential adversaries. Navy is examining signal processing techniques that can be employed in the architectures of already on orbit satellites to maintain access to their signals in a degraded or denied space environment. Navy is also looking at technology that can be placed on satellites that are still under construction to give us an on-orbit capability.

On September 27, 2011, Navy launched Tactical Satellite 4 (TacSat-4) to examine another tenant of space resiliency, that of operationally responsive space launches.

TacSat-4 is a fourth-generation microsatellite funded by the Office of Naval Research and developed by the Naval Research Laboratory in response to a U.S. Marine Corps requirement for satellite communications "on the move" and Navy's requirement for rapid replenishment of SATCOM. Since launch, TacSat-4 has undergone, and continues to undergo, testing by the Navy, Marine Corps, Army, and Coast Guard, as well as the Canadian and British militaries, to better understand its true military utility in providing communications access to ground units in urban and mountainous terrain, ships and submarines on the high seas, and even units operating in the polar regions where traditional SATCOM satellites in geosynchronous orbits cannot reach. TacSat-4's inclined low-earth orbit, somewhat atypical for SATCOM satellites, is also being studied for its potential benefit for data exfiltration from ground and oceanographic sensors.

POSITIONING, NAVIGATION, AND TIMING (PNT)

The Air Force's NAVSTAR Global Positioning System (GPS) continues to be Navy's space-based signal source for precise PNT data for platforms, munitions, combat systems and command, control, communications, computer, and intelligence systems. Received and processed by Navy GPS receivers, it allows for precise navigation to ensure safe operations in, under, and above the seas. It provides accurate location data for guided munitions to ensure precise delivery to the target, minimizing inaccurate attacks that can often result in greater collateral damage. These, and many more benefits Navy enjoys from PNT data, underscore Navy's emphasis in maintaining user access to this capability, even in anti-access and area denial efforts of our adversaries.

Last summer, Navy awarded a multi-year contract to Raytheon Integrated Defense Systems for its follow on shipboard PNT system. The new system, GPS-based PNT Service (GPNTS), will replace legacy GPS user systems dating from the 1980s and 1990s. GPNTS will incorporate the latest GPS security architecture and feature redundant clocks and anti-jam antennas. Additionally, it will serve as a major stepping stone for Navy's transition to the new GPS M-code signal.

Navy is also undertaking an initiative to improve our critical shore-based timing services by implementing a common architecture that will improve assured time and frequency services. Additionally, Navy, as the DOD manager for Precise Time and Time Interval, is working closely with the Air Force to ensure the U.S. Naval Observatory's Master Clock is fully supportive of the new GPS III architecture.

ENVIRONMENTAL MONITORING

Navy provides DOD with global atmospheric modeling and global and regional ocean modeling. We rely on partnerships with the Air Force, civil, and international agencies to meet our space-based environmental sensing requirements. Meeting these requirements is critical to the planning for and execution of safe, effective military operations. To this end, the Navy is engaged in defining the requirements for the follow-on to the Defense Meteorological Satellite Program (DMSP).

As stated in last year's testimony, Navy deferred procurement of an altimeter satellite, GEOSAT Follow-On 2 (GFO–2), until fiscal year 2016, assuming risk in antisubmarine warfare and mine warfare areas in exchange for increased emphasis in areas deemed of greater importance to DOD. However, with the 2012 emphasis on forward operations in the Pacific and Indian Oceans, Navy has altered its planning assumptions and must reduce risk in antisubmarine warfare and mine warfare through an assured source of space-based altimetry data, critical data for battlespace awareness and planning undersea warfare operations. Navy is considering all options to meet this altimetry requirement, from GFO–2 to civil or international partnerships consistent with Presidential Policy Directive 4.

MISSILE WARNING AND INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

Space-based assets can provide unique access to information critical to decision making throughout the range of military operations, whether it is insight into potentially hazardous areas resulting from natural disasters or the preparatory activities of an emerging threat to U.S. and our partners' interests. The global maritime picture built by quilting together a variety of assets, including those that allow mapping ice boundaries in the polar regions and the EM assets that support other oceanographic studies, can result in greater maritime domain awareness and lead to more efficient defenses from seaborne threats to safety and commerce, as well as safer navigation for the world's merchant fleets.

Navy continues to engage the Intelligence Community as they explore future acquisitions and consider the capabilities of commercial vendors to meet the ISR needs of the U.S. Government. Navy's relationship building fosters better understanding

throughout the Intelligence Community of the unique ISR requirements in the maritime domain, improving the accuracy of factoring Navy requirements into acquisition decisions and the probability of them "making the cut." These requirements can vary significantly from the traditional ISR collections of terrestrial targets to which we have become accustomed and, thus, require extra emphasis and explanation. For example, terrain such as mountains and river crossings can help focus collections on mobile, land-based elements, but maritime vessels of interests have greater freedom of movement and, therefore, require a much broader area surveillance method and more frequent revisits to maintain a credible and reliable track. In support of this, Navy, under Presidential Policy Directive-4 (PPD–4), the National Space Policy, is working with partners to foster international collaboration using civil and commercial space systems to enhance global maritime domain awareness. The recommended program has three major facets: Harmonization, Operational Cooperation and Experimentation, and Influencing Technology Development, through which it will achieve the advantages of increased persistence, increased coverage, and reduced cost.

To complement the efforts to build requirements into future systems, Navy continues to leverage its Tactical Exploitation of National Capabilities Branch and various research labs to explore new methods in which we can use the current, traditional data collection systems in often nontraditional manners or in an atypical combination of sources to meet these unique requirements. These efforts are paying dividends, but more work and investment in the research and development of such techniques is necessary. As budgets continue to decline, it will be these efforts in non-traditional processing and exploitation, combined with ensuring future architectures take into account the unique maritime ISR requirements, that will give Navy the necessary, timely intelligence to make the right decision within realistic time constraints.

NAVY SPACE CADRE

Key to Navy's development and full exploitation of space-based capabilities is our Space Cadre. As Navy continues to operationalize space amongst the Fleets and develop its capabilities to maintain access to the critical functions our Nation's space constellations provide, Navy will rely on its Space Cadre to lead the development of tactics, techniques, and procedures (TTPs) unique to the maritime domain. Deployed forces need these TTPs to take full advantage of the benefits space provides and maintain critical warfighting functions despite the anti-access and area denial efforts of future adversaries. Development of this expertise requires formal education, intense training, and challenging exercises. Navy continues to integrate space awareness training into core training opportunities throughout the Information Dominance Corps and in pre-deployment training for Strike Group staffs. This broad training raises general awareness throughout the Navy of available capabilities and how to take full advantage of all DOD space assets.

From this baseline, Navy grows an experienced group of people identified as Space Cadre who receive advanced education in space operations, technology, and engineering and are placed in specific space-related jobs to assist in translating Navy requirements to the joint force. The unique needs of maritime domain operations are often not intuitively obvious to those more experienced in land-based operations, so placement of these "translators" at key acquisition and space operations billets ensures appropriate advocacy for the unique requirements for space-based capabilities to support maritime operations.

Finally, Navy is incorporating more demanding scenarios in Strike Group and other pre-deployment exercises to increase the Fleet experiences in operating in degraded or denied space environments. These exercises give the Fleet a chance to test TTPs and transform them from something read in a publication to a second-nature reaction to maintain access to those key space capabilities the Navy needs to execute our assigned missions.

CONCLUSION

The Navy is heavily reliant upon space for mission enhancement from SATCOM, PNT, MW, EM, and ISR assets to communicate with, and provide valuable information to, our commanders and leadership at sea and ashore to inform their decisions and guide maritime operations. This requires balancing investments in new acquisitions, additional training in the use of already available assets, and continued development of a Space Cadre core that can examine alternatives and provide sound operations and acquisition recommendations to leadership, especially within the bounds of today's fiscal realities. Navy will continue to consider the threat posed to these critical resources by those developing cutting-edge space denial technologies

and the probability of their use against the United States as we examine the balance between the cost, benefit, and investment timing into necessary capabilities to protect our access to space constellations and ensure our forward-deployed commanders have the tools necessary to maintain information dominance and decision superiority.

Mr. Chairman—thank you for the opportunity to share our efforts with you today. We look forward to answering any questions you and the subcommittee may have.

Senator NELSON. Thank you.

Dr. Zangardi.

STATEMENT OF DR. JOHN A. ZANGARDI, DEPUTY ASSISTANT SECRETARY OF THE NAVY FOR COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, INFORMATION OPERATIONS, AND SPACE

Dr. ZANGARDI. Good afternoon. Mr. Chairman and Senator Sessions, thank you very much for this privilege to speak before you today. I will keep my opening comments very brief.

At last year's hearing, I was asked when the Navy believed the MUOS space vehicle number 1 would launch. I stated at that hearing that the Navy's projection was February 2012. I am pleased to inform you that MUOS space vehicle number 1 was launched Friday, February 24, from Cape Canaveral, FL. The satellite is currently in a geosynchronous orbit in its test slot over the Pacific.

Deployments of the solar arrays and mesh antenna are complete. Payload testing has commenced and is ongoing. Both the UHF legacy package, test signals, and KA band signals are being received by the ground station. The MUOS Government and contractor team continues to execute the plan and the satellite's health and performance are as expected.

After a 90-day on-orbit check, it will be handed over to Navy and be ready for legacy UHF SATCOM operations and the initial testing of the new wideband code division, multiple access capability, otherwise known as the MUOS waveform.

The second satellite is assembled undergoing spacecraft level testing. Currently it is in its TVAC chamber. The second satellite is on track for November 2012 delivery.

Space vehicle number 2 has been tentatively given a July 2013 launch slot. We expect that to firm up here soon.

The remaining three satellites are under a fixed-price incentive contract and are tracking both to cost and schedule at this time.

The Navy will continue to focus on the successful roll-out of MUOS constellation. We will also continue to monitor the health of the UFO constellation to ensure essential UHF satellite communication services are provided to the warfighter.

Sir, that ends my comments and I stand by to answer your questions. Thank you.

Senator NELSON. Thank you.

Ms. Chaplain.

STATEMENT OF CRISTINA T. CHAPLAIN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Ms. CHAPLAIN. Chairman Nelson and Senator Sessions, thank you for asking us to share our views on the military space acquisition programs.

As I commented last year, the landscape for acquisitions in space has changed considerably over the past decade. If I were here 5 years ago, I would be talking about all the major programs having very large cost increases and schedule delays adding up to years. I would be talking about resistance to implementing best practices. I would also be talking about even a separate acquisition policy for space altogether. I would be talking about a lot of programs moving forward with a lot of technical and other kinds of unknowns, like requirements and cost. I would be talking about lax oversight. What we see today is that space programs do have some problems, but they are not to the same extent that we had a decade ago.

Some of the systems we have concerns about do include the GPS III program which had an 18 percent cost increase for the first two satellites. So that one is on our watch list. We have some concerns about newer programs such as the ground system that accompanies GPS III. Of course, we have some concerns about some of the user equipment programs that are lagging behind schedule like FAB–T.

On the other hand, we have seen some positive steps taken this year in programs like the Joint Space Operations Center mission system where they saw an acquisition strategy that was not maybe as executable and oversight-friendly as it could be, and they took steps to revamp the strategy and make it more executable.

In general, today I would say there are very different conditions than we saw 10 years ago. The best practices are being adopted. There is more of an emphasis on evolutionary development for systems. There is more of an emphasis on developing technologies before beginning programs. There is definitely more emphasis on instituting higher quality standards for programs and following them. Then there has also been a number of actions to strengthen and streamline leadership across DOD.

What we worry about today are some barriers to making all these things work together to the maximum extent possible, and the barriers that we worry about are much like what you talked about in your opening statement.

First is the disconnects between ground equipment, particularly user equipment, and the satellites themselves. We are seeing too many programs that the user equipment is just arriving years later than the satellites. You really have a situation where you are wasting expensive capability in space when that happens.

A second barrier is the rising cost of launch. There is no easy way to address this. In our report last year, what we stressed is the lack of good data on suppliers and costs. It just makes it more difficult to get your arms around the cost of launch and to reduce it.

A third barrier that we talk about in our statement is S&T planning. As you mentioned, two key programs have been proposed for termination, including the space test program and the ORS program. When you look at those being terminated and combined with some planning weaknesses that we reported earlier this year, it raises cause for concern about the way forward for S&T in space and how do we expect to make technological advancements in the future. We do not see enough coordination between DOD agencies and other agencies involved in space in terms of strategic planning for space S&T.

The last barrier fits in the bucket of coordination and leadership. It is exactly what you were talking about in your opening statement about programs all over Government. There is a lot of opportunity to optimize investments and work together better. Instead, we still see a lot of stovepiping in terms of programs being started and not enough looking at things from a Government-wide perspective and a very strategic perspective to see how investments in things like launch acquisitions, for example, could be maximized.

With that, I will conclude my statement. Our written statement is much more detailed. Thank you.

[The prepared statement of Ms. Chaplain follows:]

PREPARED STATEMENT BY CRISTINA T. CHAPLAIN

Chairman Nelson, Ranking Member Sessions, and members of the subcommittee: I am pleased to be here today to discuss the Department of Defense's (DOD) space acquisitions. Each year, billions of dollars are spent by DOD to acquire space-based capabilities that support military and other government operations—such as intelligence, reconnaissance and surveillance, and homeland security—and to enable transformation of the way DOD collects and disseminates information. The worst of DOD's space acquisition problems may be behind the department, as programs long plagued by serious cost and schedule overruns are finally being launched. Though acquisition challenges persist, they are not as widespread and significant as they were several years ago, and to its credit, DOD has taken an array of actions to reduce risks. The challenge DOD now faces is how best to keep its major space systems acquisitions on track in light of fiscal constraints. Operating in space is expensive and DOD is still in the process of replenishing legacy capabilities, such as missile warning, protected communications, and environmental monitoring. While upgrading existing satellite constellations amid declining budgets is a daunting challenge, there are significant barriers to ensuring investments are optimized, including fragmented leadership, the rising cost of launch, uncertainty about the future for technology advancements, and disconnects between the fielding of satellites with user equipment and ground systems needed to take advantage of expensive new capabilities. In addition to discussing the progress DOD has made this year, my testimony will focus on these challenges as they stand in the way of DOD fully realizing the benefits of satellite acquisition improvements.

The objectives of this testimony are to address: (1) the current status of space system acquisitions; (2) the results of Government Accountability Office's (GAO) space-related reviews this past year; (3) actions being taken to address DOD space acquisition problems; and (4) remaining challenges. In preparing this testimony, we relied on previous GAO reports on: (1) space programs; and (2) weapon system acquisition best practices as well as ongoing work on satellite control networks.[1] We also relied on work performed in support of our annual weapons system assessments, and analyzed DOD funding estimates to assess cost increases and investment trends for selected major space system acquisition programs. We obtained updates on improvement actions from the Office of the Secretary of Defense and Air Force. We also analyzed recent funding estimates for space programs. More information on our scope and methodology is available in the issued reports. The work that supports this statement was performed in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

BACKGROUND

The past decade has been troubling for defense space acquisitions. Despite years of significant investment, most of the DOD large space acquisition programs collectively experienced billions of dollars in cost increases, stretched schedules, and increased technical risks. Significant schedule delays of as much as 9 years have resulted in potential capability gaps in missile warning, military communications, and weather monitoring. Unit costs for one of the most troubled programs, the Space Based Infrared System (SBIRS), for instance, have climbed about 231 percent to

[1] See GAO related reports at the end of this statement.

over $3 billion per satellite. Moreover, the first satellite was launched about 9 years later than predicted. Similarly, by the end of fiscal year 2010, the U.S. Government had spent 16 years and over $5 billion to develop the National Polar-orbiting Operational Environmental Satellite System (NPOESS), but had not launched a single satellite. In February 2010, citing the program's cost overruns, schedule delays, and management problems, the White House announced that the NPOESS tri-agency structure would be eliminated and the program would be restructured by splitting procurements and responsibilities. Other programs, such as the Transformational Satellite Communications System, were canceled several years earlier because they were found to be too highly ambitious and not affordable at a time when the DOD was struggling to address critical acquisition problems elsewhere in the space portfolio.

THE CURRENT STATUS OF SPACE SYSTEM ACQUISITIONS

In 2011, we testified that though problems still existed on many programs, DOD was beginning to make progress by finally launching satellites that had been lagging behind schedule.[2] These included the Missile Defense Agency's (MDA) Space Tracking and Surveillance System, the Air Force's first Global Positioning System (GPS) IIF satellite and the first Advanced Extremely High Frequency (AEHF) satellite although AEHF had not yet reached its final planned orbit at the time we testified because of an anomaly with the satellite's propulsion system. At the same time, however, several programs still in development were at risk of cost and schedule growth, such as the Joint Space Operations Center Mission System (JMS).

Progress has continued since we testified last year. For instance:

- DOD launched the second GPS IIF satellite in July 2011, and the third is scheduled to launch in September 2012.
- DOD launched the first of the Navy's Mobile User Objective System (MUOS) satellites in February 2012, and the second is scheduled for launch in July 2013.
- The first of six SBIRS geosynchronous earth orbit (GEO) satellites successfully launched in May 2011, after a roughly 9 year delay.[3] The second SBIRS satellite is planned for delivery in spring 2012 and may launch late this year or early 2013.
- The Evolved Expendable Launch Vehicle (EELV) program continues to successfully launch DOD and National Aeronautics and Space Administration (NASA) satellites, and is planning 11 launches in 2012.
- The first AEHF satellite reached its intended orbit after having experienced propulsion trouble after launch. The second AEHF satellite is scheduled to launch in April 2012.

While these launches represent solid progress, there have been some drawbacks to the programs that have launched their first satellites. For instance, the second GPS IIF satellite experienced technical problems that could possibly shorten the satellite's operational lifetime. Also, though a MUOS satellite has been launched, the DOD estimates that over 90 percent of the first satellite's on-orbit capabilities will likely be initially underutilized because of delays in development of the compatible Joint Tactical Radio System (JTRS) terminals.

Moreover, other acquisition programs are experiencing cost and schedule growth, though not to the extent yet as those experienced in the last decades. For instance:

- The GPS III program is currently experiencing cost growth and the contractor is behind schedule. In November 2011, the contractor's estimated cost at completion for the development and production of the first two satellites was over $1.4 billion or 18 percent greater than originally estimated; the program office estimated the cost to be about $1.6 billion. The GPS III program has cited multiple reasons for the projected cost increases including reductions in the program's production rate; test equipment delays; and inefficiencies in the development of both the navigation and communication payload and satellite bus. The contractor is also behind in completing some tasks on schedule, but the program does not expect these delays to affect the launch of the first satellite.
- Though the first SBIRS satellite has launched, and the second is close to delivery, program officials are predicting a 1-year delay on production of the 3rd and 4th GEO satellites due in part to technical challenges, parts obsolescence and test failures. Along with the production delay, program offi-

[2] GAO, Space Acquisitions: DOD Delivering New Generations of Satellites, but Space System Acquisition Challenges Remain, GA0–11–590T (Washington, DC: May 11, 2011).

[3] Two highly elliptical orbit sensors have already been launched.

cials are predicting a $438 million cost overrun for the 3rd and 4th GEO satellites.

• The Defense Weather Satellite System (DWSS), which was the Air Force's follow-on to the restructured NPOESS, was terminated in fiscal year 2012. The restructuring of NPOESS and the subsequent cancellation of DWSS have resulted in a potential capability gap for weather and environmental monitoring.

Table 1 describes the status of the space programs we have been tracking in more detail.

Table 1: Status of Major Space Acquisition Efforts

Programs still susceptible to cost and schedule overruns	
GPS IIF (positioning, navigation, and timing)	The second Global Positioning System (GPS) IIF satellite, designed to upgrade timing and navigation accuracy and add a new signal for civilian use, launched on July 16, 2011, and the third is expected to launch in September of 2012. Approximately one month after they were enabled, the second IIF satellite's Cesium clock—one of three atomic frequency standard clocks onboard that provide GPS accuracy through redundancy—failed. An investigation identified design and manufacturing issues, and the GPS Directorate is exploring options, including replacing the Cesium clocks already installed on the remaining IIF satellites, 3 through 7. The cost and schedule impacts are as yet undetermined. According to the GPS directorate, the cost of the GPS IIF program, as of April 2011, was at $2.6 billion—more than triple the original cost estimate of $729 million. The IIF satellites' development challenges were mostly responsible for the 4 1/2-year delay in the launch of the first GPS IIF satellite to May 2010.
AEHF (communications)	On August 14, 2010, the Air Force launched the first of six planned Advanced Extremely High Frequency (AEHF) satellites (AEHF-1) to replenish the existing Milstar system with increased strategic and tactical capabilities for warfighters. Employing a novel combination of chemical and electric propulsion in a two-phase orbit raising procedure, AEHF-1 was expected to reach its operational orbit in about three months. However, an anomaly with one of the spacecraft's three propulsion systems delayed the arrival on orbit by about 13 months. The anomaly was detected when the spacecraft's Liquid Apogee Engine (LAE)—a bi-propellant system designed to provide the thrust for the spacecraft's initial orbit transfer maneuvers—faltered and was declared unusable. No longer able to use the more powerful LAE for the first phase of orbit raising as intended, the program office in conjunction with the contractor and user community, decided to achieve the intended orbit using AEHF-1's two remaining, less powerful propulsion systems. The alternate propulsion was engaged and the spacecraft's rate of ascent was calculated to conserve fuel and maintain its original 14-year operational life expectancy. AEHF-1 reached its intended orbit in late October 2011, and began undergoing what is expected to be about 100 days of testing. The problem with AEHF-1 was not identified on either AEHF-2, which has been delivered and is on schedule for an April 27, 2012 launch, or AEHF-3, which is currently in storage and expected to launch in the fall of 2013. The fourth satellite is under contract and scheduled to be available for launch in 2017. Plans to procure the last two AEHF satellites—tentatively expected to be available for launch in 2018 and 2019— were announced following the 2009 cancellation of the Transformational Satellite Communications System—the planned follow-on to AEHF.
MUOS (communications)	The first Mobile User Objective System (MUOS) communications satellite was launched on February 24, 2012, and is expected to begin on-orbit operations in May 2012—26 months later than planned at development start. While the delivery of the MUOS satellite's ultra-high frequency (UHF) communication capabilities is predicted to help address the potential capability gap caused by the unexpected failure of two legacy satellites, there is a risk the satellite's on-orbit capabilities will initially be significantly underutilized. Over 90 percent of MUOS's planned capability—including increases in the amount of data that can be transmitted and the ability to transmit both voice and data—is enabled by compatible Joint Tactical Radio System (JTRS) terminals and by a new waveform. Operational testing of the JTRS terminals has been delayed until February 2014, leading the government to form an independent review team to assess potential options for completing development of the MUOS waveform. Following a 2009 Navy-initiated review, the program developed new cost and schedule baselines. However, the MUOS acquisition program baseline has been under revision since December 2009, and has not yet been approved.

GPS III (positioning, navigation, and timing)	GPS is a constellation of multiple generations of GPS satellites that provide global position, navigation and timing capability to both military and civil users worldwide. In 2008 the GPS directorate established a program to develop the next generation of GPS satellites named GPS III. GPS III satellites are designed to have the capabilities found on GPS IIF satellites plus increases in jam resistance, accuracy, and design life; a new civil signal compatible with the European Galileo system; and a satellite bus capable of supporting future satellite capability additions. The GPS III program is to use an acquisition strategy designed to reduce risk and to avoid or correct problems that plagued the GPS IIF program and caused a more than 4 year delay in the launch of the first IIF satellite. The GPS III program plans to maintain stable requirements; have rigorous contractor oversight; and employ a structured systems engineering approach which includes features such as trade studies, advanced component development and prototype, and incremental delivery of mature technologies. One of the program's risk reduction efforts includes research on dual launch initiatives to support two satellites launching on one launch vehicle. The GPS program office attributes current cost growth issues to reductions in the program's production rate, test equipment delays, and inefficiencies in the development of both the navigation and communication payload and satellite bus. The program office and contractor have estimated the cost to complete the development and production of the first two GPS III satellites at $1.6 billion and $1.4 billion respectively, which is 18 percent or more than originally estimated. The first GPS III satellite is expected to be ready for launch in May of 2014.
Development initiatives getting under way	
JMS (space situational awareness)	Space Situational Awareness (SSA)—the knowledge and characterization of space objects and the environment on which space operations depend—is increasingly important to the protection of U.S. space forces from space weather effects, space debris, and attack. The Joint Space Operations Center Mission System (JMS) program is a key component of SSA and one of two major upcoming acquisition efforts (the other is Space Fence) expected to fill the growing need to replace SSA capability from fragmented legacy systems and to provide new, advanced SSA capability. The JMS program is designed to replace the Space Defense Operations Center (SPADOC) currently in use but nearing the end of its operational lifetime, and provide mission services to support and enable the command and control of space forces. In early 2011, the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics commissioned an independent program assessment of the JMS program which, at that time, had plans to use immature technologies and to deliver key capabilities in a single, large increment, versus smaller and more manageable increments. In May 2011, in response to concerns raised by the assessment, the Air Force announced the transfer of JMS to the management group responsible for most of the service's space-related acquisition and the implementation of a new tailored incremental information technology acquisition approach. According to officials at the new JMS program office, the revised approach is modeled on tenets from DOD's 2007 Defense Acquisition Transformation Report to Congress and includes plans to maximize the use of commercial-off-the-shelf and government-off-the-shelf solutions, to leverage investment in existing government prototypes and industry applications, and to utilize personnel from other services or federal labs who have expertise in relevant technologies and systems.

Space Fence (space situational awareness)	Space Fence is being designed as a system of geographically dispersed ground-based radars. It is intended to replace and expand coverage currently provided by the aging Space Surveillance System by using higher radio frequencies that will allow it to detect and track smaller Earth-orbiting objects. Like JMS, Space Fence is a key program to help meet the nation's SSA mission and represents the current largest investment in SSA at an estimated cost of about $3 billion to complete. Space Fence program officials have stated that Space Fence will be one of the largest phased array radars ever built. The size of the radar is expected to provide significant power for the transmission and reception of data but may also pose increased risk related to the affordable integration of technology components. To mitigate this risk, the Space Fence acquisition strategy includes maintaining competition through technology development and having two firms under contract doing parallel prototype development. This process allows program officials to evaluate contractor's designs and associated costs while moving Space Fence's four critical technologies and backup technologies toward maturity, before the program enters system development which is scheduled for later this year with the award of a single contract. Though earlier plans called for the first Space Fence site to achieve initial operational capability in 2015, estimates show that at current funding levels, this capability will not occur before 2017.
PTSS (ballistic missile defense)	The Precision Tracking Space System (PTSS) is being developed as an operational component of the Missile Defense Agency's (MDA) Ballistic Missile Defense System and, according to MDA, delays in fielding a PTSS constellation in fiscal year 2018 would significantly affect the implementation of the Phased Adaptive Approach (PAA) to defend Europe and the United States against regional ballistic missile attacks. We have on-going MDA work and have initial concerns regarding schedule optimism, concurrency, and potential cost estimates. We plan to issue a report on the results of our review in April 2012.
SBSS (space situational awareness)	On February 23, 2011, the Space Based Space Surveillance (SBSS) satellite began full operational duty. The satellite was launched in September 2010, to provide a follow-on capability to the Midcourse Space Experiment / Space Based Visible sensor satellite, which ended its mission in July 2008. According to program and contracting officials, SBSS' 24-hour, all-weather, all-geography capability provides an increase in space situational awareness—the ability to search, detect, and track objects in space—by a factor of three compared to ground based tools. Air Force stated that the timing of the SBSS launch and the magnitude of initial cost estimates for the proposed SBSS follow-on led to the decision not to include funding for this effort in their fiscal year 2012 budget request. In fiscal year 2013 the Air Force plans to initiate acquisition strategy plans for the SBSS follow-on, including preparing for the competitive award of a fixed price contract meeting or exceeding SBSS Block 10 requirements.

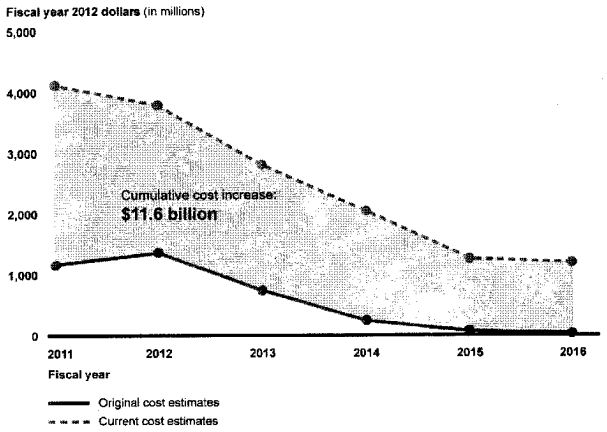
NPOESS/DWSS/ WSF (climate and weather monitoring)	The National Polar-orbiting Operational Environmental Satellite System (NPOESS) was planned to be a state-of-the-art, environment-monitoring satellite system that would replace two existing polar-orbiting environmental satellite systems—one managed by the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and the other by the Department of Defense (DOD)/U.S. Air Force. The NPOESS program was jointly managed by NOAA, DOD/ Air Force, and the National Aeronautics and Space Administration (NASA), and considered critical to the nation's weather forecasting and climate monitoring needs through the year 2026. In February 2010, the White House's Office of Science and Technology Policy restructured the NPOESS program to address continuing cost, schedule, management, and technical challenges. Furthermore, DOD/Air Force and NOAA/NASA were directed to plan and acquire their own replacement satellite systems. The Air Force initiated preliminary efforts on the Defense Weather Satellite System (DWSS) as its next-generation polar-orbiting environmental satellite system with primary earth coverage in the early morning. To reduce development risks and lower acquisition costs, the Air Force planned to leverage the billions of dollars invested in the NPOESS program. Furthermore, to ensure continued coverage, the Air Force had planned to have DWSS satellites available for launch in 2018 and 2021. However, in fiscal year 2012, DWSS was terminated per Congressional direction, and DOD/Air Force budgeted for a new program called the Weather Satellite Follow-on (WSF). Planned program activities include a requirements analysis and an analysis of alternatives. Until the DOD/Air Force transitions from its current Defense Meteorological Satellite Program (DMSP) satellites to a follow-on system, DOD/Air Force plans to continue utilizing the remaining DMSP satellites to meet its weather requirements.

Source: GAO analysis of DOD data and previous GAO reports.

Acquisition Challenges Have Reverberating Effects on Investment Portfolio

Even though DOD has finally overcome some technical and production difficulties and begun to launch high risk satellites such as SBIRS and AEHF, the department is still contending with the effects of their significant cost growth on its investment portfolio. Figure 1 compares original cost estimates to current cost estimates for the broader portfolio of major space acquisitions for fiscal years 2011 through 2016.

Figure 1: Comparison between Original Cost Estimates and Current Cost Estimates for Selected Major Space Acquisition Programs for Fiscal Years 2011 through 2016



Source: GAO analysis of DOD data.

Note: Includes Advanced Extremely High Frequency, Global Broadcast System, Global Positioning System II and III, Mobile User Objective System, Space Based Infrared System, and Wideband Global SATCOM. This chart does not include the Evolved Expendable Launch Vehicle, and planned new space acquisition efforts—such as Joint Space Operations Center Mission System, Space Based Space Surveillance Follow-on, the Weather Satellite Follow-on, or Space Fence—for which total cost data were unavailable.

A longstanding problem in DOD space acquisitions is that program and unit costs tend to go up significantly from initial cost estimates, and the gap between original and current estimates shows that DOD has fewer dollars available to invest in new programs or add to existing ones. In fact, estimated costs for the major space acquisition programs have increased by about $11.6 billion—321 percent—from initial es-

timates for fiscal years 2011 through 2016.[4] It should also be noted that the declining investment in the later years is the result of mature programs that have planned lower out-year funding, cancellation of a major space acquisition program and several development efforts, and the exclusion of several major space acquisition efforts for which total cost data were unavailable. These include the Space Fence, Space Based Space Surveillance, and the Defense Weather Satellite effort.

GAO SPACE-RELATED REVIEWS OVER THE PAST YEAR

Over the past year, we have reported on of the need for sound and sufficient information for the new DOD acquisition strategy for the EELV program; parts quality problems in major DOD, MDA, and NASA programs; and greater content and coordination in the space Science and Technology (S&T) strategy. We are also conducting a review of satellite operations and have briefed Defense authorization and appropriations committees on our findings. These reviews, discussed further below, highlight both the successes and challenges that have faced the DOD space community as it has completed or sought to complete problematic legacy efforts and deliver modernized capabilities.

Evolved Expendable Launch Vehicle Acquisition Strategy

DOD's EELV program serves a vital mission of placing critical national security and civilian satellites into their required orbits. It is also on the brink of major changes. In 2009, the Air Force and the National Reconnaissance Office (NRO) determined that the current approach for acquiring EELV launch vehicles was likely not the best business model and decided that a new acquisition strategy needed to be developed. This strategy favors committing the government to a longer span of purchases and to more certainty in the number of vehicles acquired to help stabilize the industrial base. Such a change is significant as the DOD and the NRO plan to spend about $15 billion to acquire launch services from fiscal year 2013 to 2017 and commercial companies other than the current provider, United Launch Alliance, would like to become launch service providers to the government. We were asked to review and assess whether DOD has the knowledge it needs to develop the new trategy, which has subsequently been released, and to identify issues that could benefit future launch acquisitions.

We found that DOD lacked critical knowledge needed to develop a new acquisition strategy.[5] For example, program officials, recent launch studies, and the prime contractor all cited a diminishing launch industrial base as a risk to the mission success of the program, but DOD analysis supporting this condition was minimal. Moreover, under the new acquisition strategy, contracting officials may have difficulty assessing fair and reasonable prices given limited availability of contractor and subcontractor cost or pricing data. Since the United Launch Alliance joint venture formed in 2006, financial and business systems needed to get insight into costs have been lacking. There was also considerable uncertainty about costs associated with mission assurance activities, even though there have been concerns about whether such activities are excessive. Moreover, we found that if the acquisition strategy commits the Air Force and the NRO to buy eight common booster cores per year for a 5 year period, which was anticipated at the time of our review, DOD may face an oversupply of vehicles. In addition to these findings, we have reported prior concerns about oversight for the EELV program, such as: (1) a prior decision to designate the program as in the sustainment phase rather than in the development phase essentially lifted the need for oversight reporting on costs and major changes; and (2) the DOD had not updated a life cycle cost estimate for the program despite significant changes being made to it.[6]

Among other actions, we recommended that DOD conduct an independent assessment of the health of the U.S. launch industrial base; reassess the block buy contract length given the additional knowledge DOD is gaining; not waive Federal Acquisition Regulations requirements for contractor and subcontractor certified cost and pricing data as DOD finalizes its strategy; and ensure launch mission assurance activities be sufficient and not excessive. Congress reinforced these and other GAO recommendations in the National Defense Authorization Act of 2012 by requiring that DOD redesignate the program as a major defense acquisition program (which would require the submission of certain kinds of data annually) and provide to Congressional defense committees a description of how its acquisition strategy will ad-

[4] Costs adjusted for inflation.

[5] GAO, Evolved Expendable Launch Vehicle: DOD Needs to Ensure New Acquisition Strategy Is Based on Sufficient Information, GA0–11–641 (Washington, DC: Sep. 15, 2011).

[6] GAO, Space Acquisitions: Uncertainties in the Evolved Expendable Launch Vehicle Program Pose Management and Oversight Challenges, GA0–08–1039 (Washington, DC: Sep. 26, 2008).

dress the recommendations of our EELV report issued in 2011.[7] The Act also requires us to submit an assessment of the information DOD provides, and additional findings or recommendations, as appropriate. The Air Force has taken actions to expand its knowledge about EELV since our 2011 audit work was completed and we look forward to assessing this progress.

Parts Quality for DOD, MDA, and NASA

Quality is paramount to the success of U.S. space and missile defense programs due to their complexity, the environment they operate in, and the high degree of accuracy and precision needed for their operations. Yet in recent years, many programs have experienced difficulties with quality workmanship and parts. Less visible problems have led to unnecessary repair, scrap, rework, and stoppage; long delays; and millions of dollars in cost growth. In some instances, entire missions have been endangered. As a result, we assessed the extent to which such problems affect related programs, their causes, and what initiatives have been undertaken in response.

We found that parts quality problems had affected all 21 programs we reviewed, in some cases contributing to significant cost overruns and schedule delays associated with electronic versus mechanical parts or materials.[8] We also found that if quality problems were discovered late in the development cycle they had more significant cost and schedule consequences: in one such case, an additional cost of at least $250 million and a 2-year launch delay. We found several causes of these problems: poor workmanship, undocumented and untested manufacturing processes, poor control of those processes and materials and failure to prevent contamination, poor part design, design complexity, and an inattention to manufacturing risks. Ineffective supplier management also resulted in concerns about whether subcontractors and contractors met program requirements.

Recognition of these difficulties has spurred agencies to adopt new policies, but they were still in early stages of implementation at the time of our review. Post-policy programs are not yet mature enough for parts problems to be apparent. To address current and future problems, agencies and industry have begun to collect and share information, develop testing guidance and criteria, manage subcontractors, and mitigate problems, although their impact has yet to be determined. In any event, significant barriers hinder such efforts, including broader acquisition management problems, workforce gaps, diffuse leadership in the national security space community, the government's decreasing influence on the electronics parts market, and an increase in counterfeited parts. Our reports over the past decade have made recommendations for addressing these broader barriers, such as stabilizing requirements before beginning product development, separating technology development from product development, and strengthening leadership. The DOD is in the process of adopting these recommendations. Because space agencies and the Missile Defense Agency were undertaking additional actions to address parts quality problems and they had recently established a broad range of coordination mechanisms, we recommended that the community undertake periodic assessments of progress being made to address parts quality problems. The agencies generally agreed with our recommendation.

Space S&T Strategy

The National Defense Authorization Act for Fiscal Year 2010 required DOD and the Director of National Intelligence (DNI) to jointly develop a space S&T strategy and it required us to assess the strategy submitted in April 2011.[9] We reported that a strong foundation in space S&T should help DOD and the intelligence community address the most challenging national security problems, reduce risk in major acquisition programs, maintain technological superiority over adversaries, maintain a healthy industrial base and mitigate vulnerabilities in space systems.[10]

We found that the strategy largely met the requirements of the authorization act, but it was not a rigorous, comprehensive strategic plan. Instead, it embraced the status quo without laying out a path for assuring effective and efficient progress. For instance, the strategy identified goals, but did not prioritize them. The strategy described existing reviews used to assess progress in space S&T but did not identify new metrics or performance measures to be used to assess achievement of the strategy's newly established goals. Nor did the strategy address fundamental challenges

[7] Pub. L. No. 112–81, §§ 838 & 839 (2011).

[8] GAO, Space and Missile Defense Acquisitions: Periodic Assessment Needed to Correct Parts Quality Problems in Major Programs, GA0–11–404 (Washington, DC: June 24, 2011).

[9] Pub. L. No. 111–84, § 911(b) (2009).

[10] GAO, Space Research: Content and Coordination of Space Science and Technology Strategy Need to Be More Robust, GA0–11–722 (Washington, DC: July 19, 2011).

facing the S&T community, such as human capital shortages, growing fiscal pressures, and the difficulty in transitioning space S&T to acquisition programs. We identified some strategic planning best practices such as identifying required human capital and required funding; prioritizing initiatives; and establishing ways to measure progress and processes for revising goals in the future. Additionally, we found that organizations involved in developing the strategy were active in creating its long- and short-term goals, but their participation in other of its aspects was more limited. DOD and DNI officials did not believe they were required to do more than they did, and also did not include other agencies active in space S&T that were not included by law in the strategy. We recommended that DOD enhance its next version of the strategy by developing a detailed implementation plan for achieving goals, addressing funding prioritization and other challenges, and enhancing coordination with other agencies involved in space technology development. DOD concurred with these recommendations.

DOD Satellite Operations

The Air Force and Navy operate separate satellite control networks within DOD through multiple operations centers, enabling their satellites to perform missions from launch to on-orbit operations and eventually through deactivation. Other Federal Government agencies, such as the NASA and the National Oceanic and Atmospheric Administration (NOAA), and commercial companies also operate satellites using various networks and operations centers. Combined, these networks assist the Nation's communications, missile warning, navigation, meteorological, environmental, and scientific satellites or missions.

DOD has efforts underway to modernize various satellite operations centers using proprietary and interoperable network architectures using standard protocols. For example, since 2006, the Air Force has operated a multi-mission operations center that uses a standard interface and telemetry, tracking, and commanding system which allows expedited transition of research satellites to operational satellites. In addition, in 2000, the Naval Research Laboratory initiated a web-based service concept designed to optimize software code reuse and allow faster delivery of mission capabilities, which could lower mission development costs and facilitate system maintenance. Considering the longstanding need to replace the Air Force's aging and costly satellite control capabilities, and the importance associated with satellite operations, it is important that DOD not miss an opportunity to improve satellite operations and create greater efficiencies by leveraging commercial practices and other satellite networks and associated infrastructure.

In ongoing work, we assessed DOD's satellite operations capabilities, specifically modernization efforts, compare DOD satellite operations concepts with those in other government entities and commercial industry; and, identify practices that could improve DOD satellite operations, consistent with mission requirements. We identified several challenges associated with DOD's modernization efforts. For example, DOD's ability to plan and implement upgrades may be limited by current budget uncertainties and plans to reallocate a portion of DOD's spectrum may affect its satellite operations. In addition, we found indications that the potential for unnecessary overlap and fragmentation still exists within satellite operations and associated infrastructure, including potential duplication of facilities and hardware. For instance, there are multiple, completely separate government satellite control networks that exist that depend on DOD's Air Force satellite control network, including military and civil networks, but none are interoperable. Finally, we have thus far found that although research and development in government satellite operations has led to the use of practices that, according to agency officials, have improved efficiency, there are other commercial practices that could provide further improvements to DOD's satellite network. For example, increased automation of routine satellite telemetry, tracking, and commanding functions could increase satellite operations efficiencies. We expect to issue our report based on this review later this fall.

ACTIONS BEING TAKEN TO ADDRESS SPACE ACQUISITION PROBLEMS

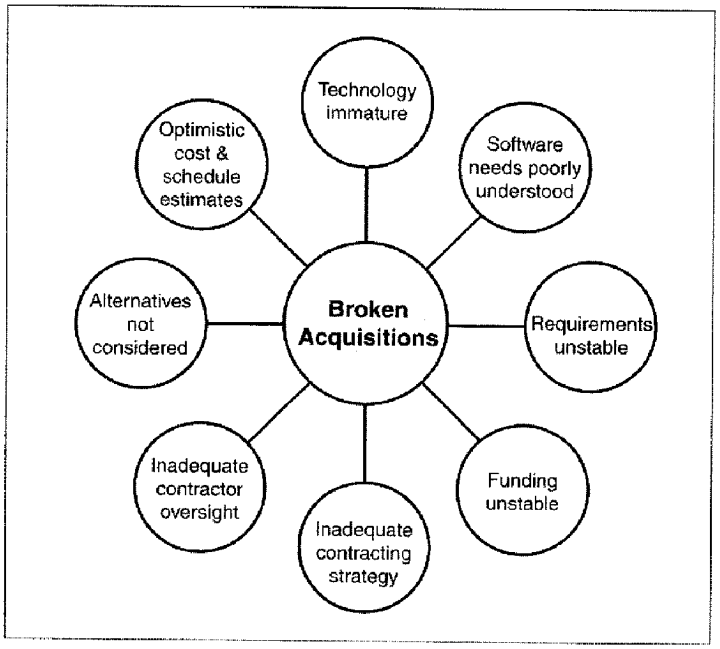
Though our reports over the year indicate there is more room for improvement, DOD continues to work to ensure that its space programs are more executable and produce a better return on investment. Many of the actions it has been taking are intended to address root causes of problems, though it will take time to determine whether these actions are successful and they need to be complemented by decisions on how best to lead, organize, and support space activities.

Causes of Acquisition Problems

Our past work has identified a number of causes of acquisition problems, but several consistently stand out. At a higher level, DOD has tended to start more weapon programs than is affordable, creating a competition for funding that focuses on ad-

vocacy at the expense of realism and sound management. DOD has also tended to start its space programs before it has the assurance that the capabilities it is pursuing can be achieved within available resources and time constraints. There is no way to accurately estimate how long it would take to design, develop, and build a satellite system when critical technologies planned for that system are still in relatively early stages of discovery and invention. Finally, programs have historically attempted to satisfy all requirements in a single step, regardless of the design challenges or the maturity of the technologies necessary to achieve the full capability. DOD's preference to make larger, complex satellites that perform a multitude of missions has stretched technology challenges beyond current capabilities in some cases. Figure 6 illustrates the negative influences that can cause programs to fail.

Figure 6: Negative Influences that Can Cause Programs to Fail



Source: GAO.

Our work has recommended numerous actions that can be taken to address the problems we identified. Generally, we have recommended that DOD separate technology discovery from acquisition, follow an incremental path toward meeting user needs, match resources and requirements at program start, and use quantifiable data and demonstrable knowledge to make decisions to move to next phases. We have also identified practices related to cost estimating, program manager tenure, quality assurance, technology transition, and an array of other aspects of acquisition program management that could benefit space programs.[11] DOD has generally concurred with our recommendations, and, as described below, has undertaken an array of actions to establish a better foundation for acquisition success.

Actions to Improve Space and Weapon Systems Acquisitions

As we reported last year, DOD has implemented or has been implementing a number of actions to reform how space and weapon systems are acquired, both through its own initiatives as well as those required by statute. Among other actions, DOD intends to follow incremental or evolutionary acquisition processes for space programs versus pursuing significant leaps in capabilities involving tech-

[11] GAO, Space Acquisitions: DOD Poised to Enhance Space Capabilities but, Persistent Challenges Remain in Developing Space Systems, GA0–10–447T (Washington, DC: March 10, 2010).

nology risk, and has done so with the only new satellite program undertaken by the Air Force in recent years—GPS III and more recently with Joint Space Operations Center Mission System, which supports space situational awareness activities. DOD and the Air Force are also working to streamline management and oversight of the national security space enterprise. For example, all Air Force space system acquisition responsibility has been assigned to the office responsible for all other Air Force acquisition efforts, and options for streamlining the many space committees, boards, and councils is under ongoing review. These and other actions being taken that could improve space system acquisition outcomes, that we have not assessed, are described in table 2.

Table 2: Actions Being Taken That Could Benefit Space System Acquisition Outcomes

Category	Actions
National policy	• In June 2010, the President of the United States issued the new National Space Policy which establishes overarching national policy for the conduct of U.S. space activities. The policy states that the Secretary of Defense and the Director of National Intelligence are responsible for developing, acquiring, and operating space systems and networks to support U.S. national security and enable defense and intelligence operations. The policy helps to clarify the Secretary of Defense's roles and responsibilities for coordinating space system acquisitions that span DOD and federal agencies, such as those for space situational awareness. • In January 2011, the Secretary of Defense and the Director of National Intelligence issued the National Security Space Strategy to build on the National Space Policy and help inform planning, programming, acquisition, operations, and analysis.
Acquisitions	• We expressed concern over DOD's tailored national security space acquisition policy—initially issued in 2003—primarily because it did not alter DOD's practice of committing to major investments before knowing what resources will be required to deliver promised capability. Instead, the policy encouraged development of leading-edge technology within product development, that is, at the same time the program manager is designing the system and undertaking other product development activities. In 2009, DOD eliminated the space acquisition policy and moved the acquisition of space systems under DOD's updated acquisition guidance for defense acquisition programs (DOD Instruction 5000.02). In October 2010, the Under Secretary of Defense for Acquisition, Technology and Logistics issued a new space acquisition policy to be incorporated into that instruction that introduces specific management and oversight processes for acquiring major space systems, including retaining the requirement for independent program assessments to be conducted prior to major acquisition milestones.
Management and oversight	• In June 2008, the Undersecretary of Defense for Acquisition, Technology and Logistics created the Space and Intelligence Capabilities Office (SIO) to oversee all major DOD space and intelligence related acquisitions, including space-based communications programs, space control activities, space launch ranges, and all related ground systems. The SIO is to develop and recommend policies, investment strategies, and programs that improve, streamline, and strengthen DOD component space and intelligence related system acquisition, organization, technology and development activities. • In May 2009, Air Force leadership signed the Acquisition Improvement Plan which lists five initiatives for improving how the Air Force obtains new capabilities.[a] One of these initiatives relates to establishing clear lines of authority and accountability within acquisition organizations. In August 2010, the Secretary of the Air Force transferred space system acquisition responsibility from the Under Secretary of the Air Force to the Assistant Secretary of the Air Force for Acquisition, thereby assigning all Air Force acquisition responsibility to one office. As part of this realignment, the Program Executive Officer for Space, who previously reported to the Undersecretary of the Air Force, now reports to the Assistant Secretary of the Air Force for Acquisition. • In August 2010, the Secretary of Defense announced the elimination of the Office of the Assistant Secretary of Defense for Networks and Information Integration (ASD/NII) as part of a broader effort to eliminate organizations that perform duplicative functions or that have outlived their purpose.[b] The elimination of this organization may help to reduce the problems associated with the wide range of stakeholders within DOD responsible for overseeing the development of space-based capabilities. • In November 2010, the Deputy Secretary of Defense authorized the disestablishment of the National Security Space Office (NSSO).[c] The elimination of this office may also help to streamline national security space system acquisition management and oversight. Furthermore, the Deputy Secretary of Defense revalidated the Secretary of the Air Force as DOD Executive Agent for Space and directed the creation of a Defense Space Council (DSC)—chaired by the DOD Executive Agent for Space and with representatives from across DOD—to inform, coordinate, and resolve space issues for DOD. According to DOD, the council will be looking at streamlining the many defense and national security space committees, boards, and councils by reviewing more than 15 space-related organizations and making recommendations on their cancellation, consolidation, dissolution, or realignment under the DSC.

Category	Actions
Program management assistance	• The Space and Missile Systems Center—the Air Force's primary organization responsible for acquiring space systems—resurrected a program management assistance group in 2007 to help mitigate program management, system integration, and program control deficiencies within specific ongoing programs. This group assists and supplements wing commanders and program offices in fixing common problems, raising core competencies, and providing a consistent culture that sweeps across programs. According to the, at the time, Global Positioning System (GPS) Directorate Commander, this group was an integral part of the overall process providing application-oriented training, templates, analyses, and assessments vital to the GPS IIIA baseline review. According to a senior program management assistance group official, the group has provided assistance to other major programs, including GPS ground control segment (OCX), Space Based Infrared System (SBIRS), and Space Based Space Surveillance (SBSS).
Workforce	• Another initiative in the Air Force Acquisition Improvement Plan is to revitalize the acquisition workforce by, among other things, increasing the number of authorized positions and providing for additional hiring, examining the proper mix of military and civilian personnel, and establishing training and experience objectives as part of the career paths for each acquisition specialty and increasing the availability of specialized training. As we reported in 2010, the Air Force was continuing efforts to bring space operators and space system acquirers together through the Advanced Space Operations School and the National Security Space Institute. The Air Force anticipated that this higher-level education would be integral to preparing space leaders with the best acquisition know-how.
Cost estimating	• The Air Force took actions to strengthen cost estimating. For example, we recommended that the Secretary of the Air Force ensure that cost estimates are updated as major events occur within a program that could have a material impact on cost, and that the roles and responsibilities of the various Air Force cost-estimating organizations be clearly articulated.[d] An Air Force policy directive now requires that cost estimates for major programs be updated annually, and lays out roles and responsibilities for Air Force cost-estimating organizations. Additionally, the Joint Space Cost Council—formed in 2007 with membership across industry and military and civil government agencies—is actively working to improve cost credibility and realism in estimates, budgets, schedules, data, proposals, and program execution. For example, one initiative has developed a standard work breakdown structure that is being vetted through industry and government.
Military standards	• Over the last several years, the Air Force Space and Missile Systems Center has taken action aimed at preventing parts quality problems by issuing policy relating to specifications and standards. According to officials, it is requiring the GPS III program development contractor to meet these specifications and standards. • In February 2011, the Air Force's Space and Missile Systems Center, Missile Defense Agency, NASA, and the National Reconnaissance Office signed a memorandum of understanding (MOU) in February 2011 to encourage additional interagency cooperation in order to strengthen mission assurance practices. The MOU calls on the agencies to develop and share lessons learned and best practices to ensure mission success through a framework of collaborative mission assurance. Objectives include developing core mission assurance practices and tools; clear and executable mission assurance plans; a robust mission assurance infrastructure and guidelines for tailoring specifications and standards for parts, materials, and processes; and, establishing standard contractual language to ensure consistent specification of core standards and deliverables.

Source: GAO analysis of DOD data and previous GAO reports.

[a]The Secretary of the Air Force and Chief of Staff of the Air Force issued the Air Force Acquisition Improvement Plan to recapture acquisition excellence by rebuilding an Air Force acquisition culture that delivers products and services as promised—on time, within budget, and in compliance with all laws, policies, and regulations. The plan consists of five initiatives: (1) revitalize the Air Force acquisition workforce, (2) improve the requirements generation process, (3) instill budget and financial discipline, (4) improve major Air Force systems source selections, and (5) establish clear lines of authority and accountability within acquisition organizations

[b]The ASD/NII's responsibilities included serving as the principal staff assistant on non-intelligence space matters; information technology, including National Security Systems; information resource management; and sensitive information integration. The ASD/NII also served as the principal staff assistant for issues such as command and control and net-centric capabilities.

[c]As part of this direction, the Deputy Secretary of Defense authorized the establishment of a jointly manned space office to restructure and replace the NSSO. The NSSO supported the Secretary of the Air Force who, as the DOD Executive Agent for Space, was responsible for developing, coordinating, and integrating plans and programs for space systems and the acquisition of DOD space major defense acquisition programs, and was responsible for executing the space major defense acquisition programs, when delegated that authority by the Under Secretary of Defense for Acquisition, Technology and Logistics. The specific roles and responsibilities of the DOD Executive Agent for Space are defined in Department of Defense Directive 5101.2, DOD Executive Agent for Space (June 3, 2003).

[d]GAO, Space Acquisitions: DOD Needs to Take More Action to Address Unrealistic Initial Cost Estimates of Space Systems, GAO-07-96 (Washington, D.C.: Nov. 17, 2006).

Congress and DOD have taken major steps toward reforming the defense acquisition system in ways that may increase the likelihood that weapon programs will succeed in meeting planned cost and schedule objectives.[12] In particular, DOD policy and legislative provisions place greater emphasis on front-end planning and establishing sound business cases for starting programs. For example, the provisions require programs to invest more time and resources to refine concepts through early systems engineering, strengthening cost estimating, developing technologies, building prototypes, holding early milestone reviews, and developing preliminary designs before starting system development.[13] These provisions are intended to enable programs to refine a weapon system concept and make cost, schedule, and performance trade-offs before significant commitments are made. In addition, DOD policy re-

[12] GAO, Defense Acquisitions: Strong Leadership Is Key to Planning and Executing Stable Weapon Programs, GA0–10–522 (Washington, DC: May 6, 2010).

[13] Weapon Systems Acquisition Reform Act of 2009 (WSARA), Pub. L. No. 111–23; DOD Instruction 5000.02, Operation of the Defense Acquisition System (2008).

quires establishment of configuration steering boards that meet annually to review program requirements changes as well as to make recommendations on proposed descoping options that could reduce program costs or moderate requirements. Fundamentally, these provisions should help: (1) programs replace risk with knowledge; and (2) set up more executable programs.

While DOD has taken steps to implement the provisions, it is too soon to determine if Congress's and DOD's reform efforts will improve weapon program outcomes. For example, in June 2011 we reported on the Joint Requirements Oversight Council's (JROC) efforts to ensure trade-offs among cost, schedule, and performance objectives, as directed by the Weapon Systems Acquisition Reform Act.[14] We found that the JROC did not always consider tradeoffs or influence tradeoff decisions, military services did not consistently provide high quality resource estimates to the JROC, and JROC did not consistently prioritize requirements and capability gaps. We recommended that the JROC establish a mechanism to review analysis of alternatives results earlier in the acquisition process, require higher quality resource estimates from requirements sponsors, prioritize requirements across proposed programs, and address potential redundancies during requirements reviews. The Joint Staff partially concurred with our recommendations and generally agreed with their intent, but differed with us on how to implement them.

REMAINING CHALLENGES

The actions that the Office of the Secretary of Defense and the Air Force have been taking to address acquisition problems are good steps. But there are still significant barriers to ensuring investments are optimized, including fragmented leadership, the high cost of launch, uncertainty about the future for technology advancements, and disconnects between the fielding of satellites with user equipment and ground systems needed to take advantage of expensive new capabilities. In particular:

- Leadership. In past years, we have reported that a major challenge to leadership is that the community's authorities and responsibilities are spread across the department, and there is no single authority responsible for these programs below the President. Both the DOD and Air Force have taken a number of steps to streamline and clarify leadership for space. Time will tell whether these steps will help resolve issues such as a difficulty holding any one person or organization accountable for balancing needs against wants, for resolving conflicts among the many organizations involved with space, and for ensuring that resources are dedicated where they need to be dedicated. The department is still struggling with disconnects between programs that need to be linked together, such as a satellite program and its user equipment program. At a higher level, we have reported that it still appears as if agencies involved in space acquisitions do not coordinate to the extent that they can in such areas as launch acquisitions and space S&T planning.[15]
- Launch costs. A factor influencing how space programs are designed is the price of launch, which can range anywhere from around $100 million to well over $200 million. With prices being so high, programs often seek to maximize the "real estate" on board a satellite by including more capabilities than can sometimes be handled by a single program or within the time period desired for the program. Moreover, the Air Force recently developed a new launch acquisition strategy designed in part to contain launch prices, but given remaining knowledge gaps, achieving this outcome is uncertain. At the same time, potential new providers promise lower costs for launch, but none of them have been certified to launch the larger national security satellites, and it is uncertain whether their prices can stay low as they work to meet standards and expectations set by government agencies. The dilemma of high launch costs, in our view, makes it more important for the Air Force to gain insight into costs and pricing behind its new strategy and to have a complete understanding of the industrial base and related vulnerabilities as well as mission assurance activities and related costs. It would also behoove agencies to work together, not only to bring in new entrants which they are now doing, but in setting a future course for launch. S&T planning, for example, has been cited as a weak area for

[14] GAO, DOD Weapons Systems: Missed Trade-off Opportunities During Requirements Reviews, GA0–11–502 (Washington, DC: June 16, 2011).

[15] GAO, 2012 Annual Report: Opportunities to Reduce Duplication, Overlap and Fragmentation, Achieve Savings, and Enhance Revenue, GA0–12–342SP (Washington, DC: Feb.28, 2012).

launch, even though investments in new propulsion and vehicle concepts have the potential to evolve capabilities and lower costs.

• S&T and related investments. Recent proposed funding cuts have raised questions about how future technology advancements will be achieved in space. The Space Test Program (STP) was targeted for termination in the fiscal year 2013 budget. STP was created in 1965 to serve as an integrator to provide launch opportunities for experimental satellites. This program enabled new technologies to get on orbit, and pave the way in an affordable manner for new space capabilities. STP has spawned many current and valuable space programs, most notably GPS. With the cancelation of this program, the Secretary of the Air Force has stated that the organizations that develop these new space technologies, including academic institutions, government laboratories, and others, will be required to shoulder the burden of launch costs, estimated at around $50 million per year. DOD has also proposed cancellation of the Operationally Responsive Space (ORS) program. ORS was intended to provide short-term and low-cost tactical capabilities to warfighters. The ORS program's long-term goals were to reduce the cost of space development by fostering low cost launch methods as well as common design and interface methods. Average spending by the ORS program was about $100 million per year from fiscal years 2007 through 2011. While there are still investments available for the Air Force Research Laboratory and other organizations involved in S&T, as we mentioned earlier, planning for these investments has not been robust or very strategic. Another potential challenge to future space capability innovations is the Efficient Space Procurement (ESP) initiative, formerly known as the Evolutionary Acquisition for Space Efficiency (EASE). ESP is intended as a way to reduce costs for DOD space programs while improving acquisition outcomes by buying satellites in "block buys" instead of individually, accruing cost savings which are to be reinvested into a modernization program to evolve capabilities for future increments of that satellite program. At this time, it is unclear how this approach will ensure there will still be a focus on making significant leaps in technology or what the next generation of space systems will look like and be able to come into fruition.

• Disconnects between fielding satellites, ground systems, and user equipment. DOD faces challenges in synchronizing capabilities offered by new satellite programs with the ground control stations that are necessary for receiving and processing information from the new space systems, and in some cases, the user terminals that deliver this information to users.[16] When space, ground and user segments are not synchronized, there is the potential for wasted on-orbit capability and delays in the ability of users to take advantage of new systems. As long as this condition exists, the improvements being made to acquisition practices on the satellite side will be minimized. A few examples are highlighted below in table 3.

[16] GAO, Defense Acquisitions: Challenges in Aligning Space System Components, GA0–10–55 (Washington, DC: Oct. 29, 2009).

Table 3: Examples of significant disconnects between satellites, ground systems, and user equipment acquisitions

SBIRS	The first Space Based Infrared System (SBIRS) satellite was launched in May 2011 and carries scanning and staring sensors designed to provide early missile warning capabilities. However, DOD will not be able to fully utilize the data collected from the staring sensor because the ground segment software that is to process the sensor's data is not planned to be fully functional until at least 2018. This means that complete, usable data from the staring sensor will not be available until about 7 years after the satellite is on orbit.
GPS Ground System	Modernizations to the Global Positioning System (GPS) have also faced synchronization challenges between the GPS III satellites, which are currently under development, a concurrently developed new ground control system, and new military user equipment that will be able to utilize the capabilities of the new satellites. The new GPS ground control segment (OCX) is being developed to take advantage of the modernized capabilities of the GPS III satellites. OCX is required for full operation of the new GPS satellites, but the contractor does not plan to deliver the first increment of OCX until August 2015—-15 months after the first planned GPS III satellite launch. Because of this disconnect, the GPS directorate is funding the development of a separate GPS launch and checkout system that is to provide an earlier command and control capability for the first GPS III satellite, but it unclear at this time when this capability will be delivered. This gap-filler capability will not enable the new capabilities offered by GPS III satellites, such as a jam resistant military signal and three new civil signals, so most of these capabilities will be unused until OCX Block 2 is delivered in 2016.
GPS User Equipment	DOD is planning to field new GPS user equipment on a variety of air-, ground-, and sea-based platforms to utilize the modernized military signal made available by the newer GPS satellites. Although the availability of the new signal on satellites would be operational within the next few years, user equipment is not expected to be fully fielded to the warfighters until many years later, possibly as late as 2025. As a result, the military services' ability to achieve a joint navigation capability, an essential element of conducting future military operations, as well as benefit from the jam-resistant and stronger new GPS signals may not be fully realized until a decade after the first GPS III launch.
FAB-T	The Air Force's Advanced Extremely High Frequency (AEHF) and the Family of Advanced Beyond Line-of-Sight Terminals (FAB-T) programs have experienced a problems with synchronization of various system components which will provide protected communications for nuclear and conventional forces as well as many airborne assets and ground command posts. As one of the primary user terminal programs associated with AEHF, FAB-T has experienced numerous problems and the delivery of terminals is not currently aligned with the AEHF satellite program. Specifically, current estimates show that FAB-T will reach its initial operational capability in 2017, 3 years after AEHF is scheduled to reach its initial operating capability. In the meantime, the Air Force plans to conduct an independent alternative with reduced requirements to mitigate risk.
Joint Space Operations Center Mission System	Another area where synchronization in system development may pose problems is the Air Force's Joint Space Operations Center Mission System (JMS) and Space Fence programs. JMS is to process data about space assets gathered by the Space Fence and other Space Situational Awareness (SSA) programs, and will increase DOD's ability to track objects in space from about 10,000 objects with the current system to over 100,000 objects. According to the Space Fence program office, JMS needs to be available when the Space Fence is fielded because the amount of data Space Fence will generate exceeds existing command and control system performance limits. JMS recently underwent a change to its acquisition strategy, dividing the program's development into two increments to reduce risk and more rapidly deliver needed capabilities. The first Space Fence radar site is scheduled to provide initial operational capability by the end of fiscal year 2017, and to avoid a synchronization problem, JMS needs to be operational by this time.

Source: GAO analysis

CONCLUDING REMARKS

After more than a decade of serious acquisition difficulties, DOD is starting to launch new generations of satellites that promise vast enhancements in capability. Moreover, given the Nation's fiscal challenges, DOD's focus on streamlining leadership, fixing problems, and implementing reforms is promising. But there are still significant barriers to achieve acquisition success that need to be addressed to maintain space superiority in an era of fiscal austerity. All of the barriers-leadership fragmentation, launch costs, S&T planning, and disconnects between space and ground assets-require action from the Air Force and the Office of the Secretary of Defense as well as the participation and cooperation of all the military services, the intelligence community, and other agencies such as NASA and NOAA. Moreover, though successful launches are being experienced, problems within ongoing development efforts such as GPS III, indicate that space acquisitions are still at risk of significant cost and schedule problems, and attention to reforms must be sustained.

Chairman Nelson, Ranking Member Sessions, this completes my prepared statement. I would be happy to respond to any questions you and members of the subcommittee may have at this time.

CONTACTS AND ACKNOWLEDGMENTS

For further information about this statement, please contact Cristina Chaplain at (202) 512–4841 or chaplainc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals who made key contributions to this statement include Art Gallegos, Assistant Director; Maricela Cherveny; Laura Hook; Angela Pleasants; Roxanna Sun; Bob Swierczek; and Alyssa Weir.

RELATED GAO PRODUCTS

2012 Annual Report: Opportunities to Reduce Duplication, Overlap and Fragmentation, Achieve Savings, and Enhance Revenue, GA0–12–342SP (Washington, DC: February 28, 2012).

Evolved Expendable Launch Vehicle: DOD Needs to Ensure New Acquisition Strategy Is Based on Sufficient Information, GA0–11–641 (Washington, DC: September 15, 2011).

Space Research: Content and Coordination of Space Science and Technology Strategy Need to Be More Robust, GA0–11–722 (Washington, DC: July 19, 2011).

Space and Missile Defense Acquisitions: Periodic Assessment Needed to Correct Parts Quality Problems in Major Programs, GA0–11–404 (Washington, DC: June 24, 2011).

DOD Weapons Systems: Missed Trade-off Opportunities During Requirements Reviews, GA0–11–502 (Washington, DC: June 16, 2011).

Space Acquisitions: DOD Delivering New Generations of Satellites, but Space System Acquisition Challenges Remain, GA0–11–590T (Washington, DC: May 11, 2011).

Defense Acquisitions: Challenges in Aligning Space System Components, GA0–10–55 (Washington, DC: October 29, 2009).

Global Positioning System: Challenges in Sustaining and Upgrading Capabilities Persist. GA0–10–636. (Washington, DC: September 15, 2010).

Polar-Orbiting Environmental Satellites: Agencies Must Act Quickly to Address Risks That Jeopardize the Continuity of Weather and Climate Data. GA0–10–558. (Washington, DC: May 27, 2010).

Defense Acquisitions: Strong Leadership Is Key to Planning and Executing Stable Weapon Programs, GA0–10–522 (Washington, DC: May 6, 2010).

Space Acquisitions: DOD Poised to Enhance Space Capabilities but, Persistent Challenges Remain in Developing Space Systems, GA0–10–447T (Washington, DC: March 10, 2010).

Space Acquisitions: Government and Industry Partners Face Substantial Challenges in Developing New DOD Space Systems. GA0–09–648T. (Washington, DC: April 30, 2009).

Space Acquisitions: Uncertainties in the Evolved Expendable Launch Vehicle Program Pose Management and Oversight Challenges. GA0–08–1 039. (Washington, DC: September 26, 2008).

Defense Space Activities: National Security Space Strategy Needed to Guide Future DOD Space Efforts. GA0–08–431 R. (Washington, DC: March 27, 2008).

GAO'S MISSION

GAO, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the Federal Government for the American people. GAO examines the use of public funds; evaluates Federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

OBTAINING COPIES OF GAO REPORTS AND TESTIMONY

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's website (www.gao.gov). Each weekday afternoon, GAO posts on its website newly released reports, testimony, and correspondence. To have GAO e-mail you a list of newly posted products, go to www.gao.gov and select "E-mail Updates."

ORDER BY PHONE

The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's website, http://www.gao.gov/ordering.htm.

Place orders by calling (202) 512–6000, toll free (866) 801–7077, or TDD (202) 512–2537.

Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.

CONNECT WITH GAO

Connect with GAO on Facebook, Flickr, Twitter, and YouTube. Subscribe to our RSS Feeds or E-mail Updates. Listen to our Podcasts. Visit GAO on the web at www.gao.gov.

To Report Fraud, Waste, and Abuse in Federal Programs
Contact:
Website: www.gao.gov/fraudnet/fraudnet.htm
E-mail: fraudnet@gao.gov
Automated answering system: (800) 424–5454 or (202) 512–7470

CONGRESSIONAL RELATIONS

Katherine Siggerud, Managing Director, siggerudk@gao.gov, (202) 512–4400, U.S. Government Accountability Office, 441 G Street NW, Room 7125, Washington, DC 20548

PUBLIC AFFAIRS

Chuck Young, Managing Director, youngc 1 @gao.gov, (202) 512–4800, U.S. Government Accountability Office, 441 G Street NW, Room 7149, Washington, DC 20548

Senator NELSON. Shall we begin with about 6-minute questions?

Senator SESSIONS. Fine.

Senator NELSON. Secretary Creedon, as we indicated—and in your testimony you made some reference to it as well—the administration is working to develop some multilateral understanding, starting with Europe, on how to conduct space operations, given the congestion in space, that we have to do something.

From DOD's view, are you satisfied that the current track does not hinder military operations in space?

Ms. CREEDON. Senator, DOD and DOS in February announced that they were going to work together and seek a code of conduct. The code of conduct is an opportunity, we think, to get all the space-faring nations together and look at how to address shared concerns, debris mitigation, radio frequency interference, joint situational awareness, and work together in a way that benefits our national security interest.

We have just begun this journey. In fact, the very first meeting of experts will be in June, and from then on, we will go down this path and work on getting an agreement that really is in our best interest, set norms for responsible behavior, and in some period of time, hopefully, get a conduct that is in our national security interest.

This is not going to be a quick process. It is probably going to be at least a year, maybe 2. We think it is worth it in the long run to go down this road and try and obtain a voluntary agreement. It is not legally binding and it will not limit our ability to either develop systems or to defend ourselves.

Senator NELSON. Could you give us an idea, let us say, of just one aspect of the code of conduct that you would be working on?

Ms. CREEDON. One of the most important is probably debris mitigation. One of the elements that we would expect to be in a final code of conduct would be setting norms for debris mitigation. It would establish the requirement that as countries launch satellites, as they do any sort of experimentation, that they minimize the amount of debris created. This was very important as we all discovered when the Chinese conducted their ASAT test and made a sub-

stantial amount of debris. Debris creation hurts everybody, and this is probably one of the main focuses of this agreement.

Senator NELSON. So there would be some sort of protocol for disintegration of out-of-date, out-of-service units within space. Is that one of the things that would be included? Is that how you would say that?

Ms. CREEDON. That would be one of the norms that a country makes sure that a satellite that has died does not stay in orbit. One of it would be as you launch satellites, that you minimize the amount of debris that is created. Even a coordinated space situational awareness would help because then it would allow advanced opportunities to maneuver satellites so you did not have collisions like the Iridium satellite that occurred several years ago that collided with the Russian space satellite.

Senator NELSON. Moving on the spectrum issue, Madam Secretary, in February DOD almost lost a block of spectrum through a legislated auction to pay for a tax offset. Can you explain the importance of DOD spectrum in general and how any movement from it should be paid for and coordinated?

Ms. CREEDON. Yes, sir. Spectrum is essential to almost everything that DOD does, ISR, communications, command, and control, navigation. It goes on and on and on. DOD needs spectrum to function. Making sure that spectrum is available is absolutely essential. As we look at supporting the efforts to utilize spectrum more efficiently if DOD is going to move out of different areas of spectrum, it is going to take a while to understand exactly what other areas are available. Are these other areas technically compatible with requirements? What is the cost to move, and what is the timeframe to move? In some instances, there might be some systems that would never be able to move. In any sort of an auction, they would have to be allowed to stay.

Senator NELSON. In any event, we have it under control where this is not going to happen again, as far as we know.

Ms. CREEDON. We certainly hope not. DOD is also right now looking at a long-term strategy for spectrum allocation that should help in terms of both understanding the requirements and understanding where we can move.

Senator NELSON. In your statement, you stress the importance of resiliency and the ability to rapidly reconstitute critical satellite capacity if hostile action or a collision would occur. It sounds like you might want me to tee up a question here on why this is so important. Did DOD propose in the fiscal year 2013 budget to cancel the ORS program? If so, do you agree with that decision?

Ms. CREEDON. DOD did propose to cancel the office. On the other hand, DOD does recognize the successes of the office, both the ORS–1 SAT and the TacSat-3, and it is those successes that have enabled DOD to say now is the time to take the idea of ORS, normalize it across all programs, and then move the capability to the Air Force primarily, to have the Air Force then work with all the Services to make sure that all space programs have this notion of resiliency and redundancy built into them.

Senator NELSON. Being able to bounce back from some sort of a lights-out situation is critically important. Do you think that we have it adequately handled right now?

Ms. CREEDON. Not yet, but it is certainly something that is on the radar, if you will, and it is certainly something that DOD is working very hard to accomplish. I might, at some point, turn over the answer to General Shelton as the programmatic person to really address more of the specifics of how the satellites themselves are looking more at how to build in this concept of resiliency and redundancy into future space programs.

Senator NELSON. Even though my time has expired, General Shelton, anything you would like to add to that?

General SHELTON. Mr. Chairman, I would completely agree on spreading the ORS concepts across all of our programs. In fact, a lot of the activities at Kirtland Air Force Base that occurred with a dedicated office will continue because there were organizations in place that supported the ORS office there. There are also offices at the Space and Missile Systems Center in Los Angeles that will continue to provide that kind of support. So I am confident that that concept will continue.

As far as resiliency across all of our programs, we just completed all this research and development (R&D) work, and we are in the production phase of many of our foundational capabilities. However, we are looking at alternative architectures for the future, and I believe those alternative architectures will produce some of the resilience that we would like to have. The question is when can you afford to implement those, and that will be a hard decision we will face in the coming years.

Senator NELSON. Thank you.

Senator Sessions.

Senator SESSIONS. Thank you very much.

General Shelton, with regard to ORS and the need, as Secretary Creedon mentioned, for resiliency, for the record is it not true that currently we do not plan to have any satellites in reserve that could be immediately launched if one of our satellites is disabled for some reason?

General SHELTON. Senator, that is true. We do not build satellites as spares and store them on the ground. If we have capability that is in storage, it is because we have had good fortune in a satellite lasting longer or we did not have the launch ready at the time we had the satellite ready, by and large.

Senator SESSIONS. I guess my question—I am not sure what we thought as ORS development. But one of the things that we understood was that we would be able to launch a capable, maybe not highly sophisticated, satellite that would meet our basic needs in pretty short order if one were disabled, recognizing that there are quite a number of countries, would you not agree, that have the capability to disable a U.S. satellite?

General SHELTON. Senator, there are quite a few.

Senator SESSIONS. More will probably come along in the future. Was that originally part of the idea, to your knowledge?

General SHELTON. It was part of the concept that we would develop rapid launch capability, rapid assembly of satellite capability. But the idea that we would have a stock, a storage of satellites and boosters waiting—that decision had not been made. So there was conceptual work to be done as part of ORS, but no decision on how

to actually develop a concept of operations to take advantage of what might have been developed.

Senator SESSIONS. I think it is a matter worthy of thinking about whether we need that capability. I do not know. You may could use every satellite that you have, and you might as well put them in space would be one argument. But also, if there was a danger of a satellite that just failed for one reason or another in a critical area, we might need immediate response.

General Formica, the Space and Missile Defense Command is an important part of our defense system. first, thank you for your leadership, and second, how do you see your budget this year? The Air Force space budget is pretty substantially reduced. What about SMD?

General FORMICA. Mr. Senator, thank you. I appreciate it. It is an honor to serve at Space and Missile Defense Command.

Our budget in fiscal year 2013 right now is holding its own, about the same as we had in fiscal year 2012. We have sufficient budget to be able to provide our operational capability, to do capability development, and to do the material development functions that we have. If funded, we will benefit from the JCD program which will be funding not directly given to Space and Missile Defense Command/Army Forces Strategic Command (SMDC/ARSTRAT).

Senator SESSIONS. The GAO representative mentioned terminated programs and sort of asked the question how do we advance without S&T. Some of the S&T programs have been reduced. Maybe, General Shelton, General Formica, do you have any comment about that? Does that concern you?

General SHELTON. Senator, it does.

Senator SESSIONS. First, let me just say that I know that you support the budget request that you have been given. You have had a chance to review it. But I know that it was clear to both of you that there is a limited amount of money. So I am asking you do you have concerns or are their worries to tell us honestly what they might be with regard to S&T because what the experts tell us—experts or the old hands or whatever you call them—when budgets get cut, S&T is one of he first casualties, and we do not want to go too far in that regard. So would you give us your best judgment about what kind of risk we may be taking there?

General SHELTON. Yes, sir. First, a couple of statistics. The S&T budget space-related for Air Force Research Laboratory (AFRL) is going to be $242 million in fiscal year 2013. The budget for Defense Advanced Research Projects Agency (DARPA) for space-related S&T, roughly $160 million. In the Navy, roughly $27 million. In the Army, roughly $22 million. There is still substantial space-related S&T despite the cancelation of the space test program.

Senator SESSIONS. All right. How much would you say it has been reduced? You mentioned those numbers, but is that a reduction from current expenditures, any of those accounts?

General SHELTON. We had roughly $50 million in the space test program in fiscal year 2012. We have $10 million in fiscal year 2013 remaining, largely to conduct the launch of Space Test Program-2 (STP–2) as one of our new entrants into the EELV pro-

gram. So it is not totally decimated, but by the same token, to be honest with you, that $10 million is really only for that launch.

Senator SESSIONS. So you do not have more for other launches that might occur. But the space test you mentioned—is that included in your $240 million?

General SHELTON. It is all space-related S&T.

Now, how we develop the priorities for that is important. We meet every year with AFRL, my leadership, AFRL's leadership. We establish 174 technology needs across the entire enterprise. We do the same thing with DARPA, establish priorities that we want them to work on. So we get a voice in how that money is spent. It is not the same as having the space test program directly under me, but we certainly have a voice.

Senator SESSIONS. Would you say that we may be cutting it close here, or are you just perfectly happy with where we are?

General SHELTON. Senator, I wish we could spend more money on it. I truly do. But again, the BCA called for reductions. That is one of the places where we felt like we could take reductions.

Senator SESSIONS. I understand the choices you make. Every defense agency, every congressional group that sits, and every President has a responsibility to the future, as well as to the immediate DOD. If we do not spend our money now to perhaps develop the systems that are serving us so well now for the future, then we fail too. So I hope that you will be candid with us if you see threats in that area of our budget.

I guess I could ask the Navy and the Army too. Maybe GAO. Ms. Chaplain, do you have any comment on that? You expressed some concern about it.

Ms. CHAPLAIN. Yes. I have a couple of comments. I do acknowledge that there is still funding going to some of these labs, and it is a good amount of funding. But what we have not seen is very robust strategic planning about what are our goals for technology advances and how are we going to achieve them and how are we going to optimize these investments because they will probably have more budget pressure over time.

The thing with the space test program I would like to emphasize is that it provided an avenue for different kinds of players to test technologies, universities, small businesses, those who do not really get to be able to participate in some of these bigger programs all the time. So you might be losing that opportunity.

Then the third thing is that DOD would like to go on a multiyear approach to some of its bigger programs, like AEHF and SBIRS-High. There is an assertion there that whatever savings are gained from that will be reinvested in S&T, but we have not really seen a robust plan there for the path forward. Where do we go after programs like AEHF and SBIRS? We have not seen that path yet and how are we going to get there because you have to start now especially given the budget situation.

Senator SESSIONS. I think that is a good challenge. I think we do need a good plan.

Thank you, Mr. Chairman. My time is up.

Senator NELSON. Thank you, Senator Sessions.

Secretary Creedon, does DOD have in place a policy for coordination of space activities within the interagency structure?

Ms. CREEDON. Yes, sir. There is a White House-led process called—it is an interagency process. All of the entities that have any interest in space participate in this process. It gets together to meet periodically depending on when there are issues. For instance, one of the meetings was in January and February about dealing with the space code of conduct, and that is where the interagency got together and said, yes, this is something that is important and we are going to go work on. So it is there. It exists and it is pretty good.

Senator NELSON. Is it? So it is at least somewhat successful in breaking down the stovepipe approach to get cross-fertilization and cross-cooperation within the interagency system?

Ms. CREEDON. It is and it is also a good forum if there are issues that need specific resolution or specific input or guidance. It serves that function as well.

Senator NELSON. Does it function pretty much automatically or does it have to be enforced?

Ms. CREEDON. Because it is run by the White House, enforcement generally is not an issue. When the White House calls a meeting, everybody shows up.

Senator NELSON. So there is some force behind it then when that occurs that way.

General Shelton, I understand that you effectively canceled the space test program and the ORS program due to lack of funding. I think we both feel that there ought to be some sort of backup system in place, and I wonder if the information we have is accurate.

General SHELTON. That is part of the President's budget request for fiscal year 2013, Senator. It was after 5 years of ORS, we felt like we had taken away quite a few lessons learned, and it was time to mainstream those concepts throughout all of our programs but yet continue things like hosted payload opportunities, further resiliency concepts, those kinds of things. So we will centralize the intellectual capital, if you will, in the Space and Missile Systems Center long-range planning staff. We will continue to have the kind of support we have at Kirtland today out of the Space and Missile Systems Center. So we will continue the conceptual work. It does not end.

Senator NELSON. You are making do with what you have, but if you had your druthers and if you had the additional funding, would you prefer to have kept the programs going?

General SHELTON. Senator, that is a tough question. We wish we had fiscal year 2012 level funding across the board to tell you the truth.

Senator NELSON. I suspect that there are opportunities to give up those things that you would like and those things that you would want, but it is a tough choice when it is something you need.

General SHELTON. It does make for very difficult decisions. We did protect the foundational space capability, missile warning, GPS, satellite communications, all those things that are foundational for our brothers and sisters in all services that we highly depend on not only for warfighting capability, but for national capability as well. All of that was protected. Hard choices had to be made.

Senator NELSON. In terms of just missile warning, what is your biggest concern in strategic missile warning right now, General?

General SHELTON. Senator, in strategic missile warning, we are not in the place where we would like to be and being able to take full advantage of our latest satellite, SBIRS Geosynchronous Earth Orbit-1. It has two sensors. It has a scanning sensor and a staring sensor. The scanning sensor we can take advantage of today. The staring sensor, which provides a wonderful capability and our testing has been fantastic. In fact, we are seeing probably a 25 percent or more sensitivity, better sensitivity than we had expected out of that satellite. What that allows you to do, of course, is much dimmer targets, lower classes of missiles, lots of things that infrared capability will give you. We are not able to take full advantage of that in real time.

Now, we are taking advantage of that in the intelligence agencies by shipping the data out to them, but that is a reactive kind of thing instead of being able to see it in real time.

Senator NELSON. General Formica, I understand that SMDC/AFSTRAT completed a successful test of the Advanced Hypersonic Weapon (AHW) which is one of the several designs under development as part of U.S. Strategic Command's (STRATCOM) conventional prompt global strike requirement. Obviously, congratulations are in order.

Can you explain this successful test and how it was coordinated with other Army functions at Redstone and perhaps elsewhere?

General FORMICA. Mr. Chairman, thank you. Of course, we are very proud of the success of the AHW test, and I am very proud of the civilians and the military personnel that worked hard to bring that test to successful completion.

The technology for the AHW test really began with the work at Sandia Laboratory and then was matured at Redstone Arsenal in technology development with the Aviation and Missile Research, Development, and Engineering Center (AMRDEC), and the SMDC/AFSTRAT engineers. That brought for successful technology, and the AMRDEC's contribution was really the development of the thermal protection system which was fundamental to the success of the technology.

The test itself took the efforts of the Navy as AHW was launched from the Pacific Missile Range Facility in Hawaii. It landed at the Army's Reagan Test Site, Kwajalein Atoll, having traveled 2,100 nautical miles, and took advantage of Army, Navy, and MDA test assets. So it required the collaboration both in technology development and in test operations of several organizations, many of them Redstone-based. It took the leadership of the OSD and prompt global strike, and it would require the same kind of cooperation and collaboration as we move forward.

Senator NELSON. It is nice when you get this kind of cooperation to get the result that you have had. Please share the congratulations with the other participants as well. Thank you.

General FORMICA. Thank you, Mr. Chairman.

Senator NELSON. Senator Sessions.

Senator SESSIONS. Thank you.

Ms. Creedon, in your statement you talk about the code of conduct with the Europeans over space as just the beginning, which

is a bit troubling to me because it does have treaty-type implications. I would like to be confident that the U.S. Government, DOD is not making commitments with regard to what we plan to do that will bind us and maybe make it impossible for us to effectively maintain our space and missile defense capability that we need because we need to be able to dominate space really.

So can you give me some reassurance on that? What is the nature of the beginnings and where do you see it going?

Ms. CREEDON. Senator, we are just beginning the discussions that we hope will lead to a voluntary code of conduct.

Senator SESSIONS. Is this mainly driven by the debris question?

Ms. CREEDON. Debris is a major aspect of this. We are also looking at making sure that there is not radio frequency interference with satellites. There are a number of responsible behaviors that we hope this code will identify and then set what would be the norms for which responsible space-faring nations would conform their conduct.

Senator SESSIONS. One of the things that seems to concern itself with is an arms race. As one wise observer at one of our hearings said when asked, "are we going to have war in space," he said, "we have had war on the land. We have had war on the water. We have had war in the air. I suspect we will have war in space one day."

I think it is hard to write a piece of paper that says we are not going to defend our assets or utilize capabilities we have to save lives and defend America's sovereignty and security.

So I guess there is some emphasis, I understand, in the talks about preventing an arms race in space. Is that involved in this, and if so, we need to be very careful about it.

Ms. CREEDON. Sir, one of the fundamental tenets of this discussion of the code of conduct would be the inherent right of self-defense reserved to every country that would be a voluntary participant in this code. So that is also one of our major goals. If we are not successful as we go through the discussions over the course of the next year or so in negotiating a code of conduct that is in our national security interest, then, frankly, we would not sign it. It is not about limiting capabilities. It is about responsible behavior. It is not a treaty. It is not an arms control treaty. It is not any sort of a legally binding undertaking. It would be a voluntary code of conduct trying to get other space-faring nations to, in many respects, adapt the behavior that, frankly, we have in terms of being a responsible space-faring nation.

Senator SESSIONS. I would hope we would all be responsible utilizers of space, and I think pressure should be put on nations to behave in responsible ways. I certainly do not think there is anything wrong with that, but I am not sure you always gain a lot by formalizing written agreements that can be turned around and be used against the United States since we are the premier space utilizer.

The DOD Joint Staff analysis provided to the House Armed Services Committee states that if the United States, "were to make a good faith effort at implementing the requirements of the draft code," it could likely have an adverse impact on military operations. Have you recognized that statement, and is what you are

doing designed to make sure that we do not adversely impact our operations?

Ms. CREEDON. Yes, sir. One of the decisions that we made when we decided to go for the code of conduct was informed by the analysis that was tasked by the OSD about a year ago to the Joint Staff and to STRATCOM to look at this underlying document that the EU had put together and to provide guidance to us as to what needed to be modified, changed, eliminated, added so that it would, in time, be a document that would be in our national security interest. We have used the work of the Joint Staff to begin these negotiations which will kick off at a fairly low level, but will kick off for the first time in June.

Senator SESSIONS. I have doubts about whether it is that wise or not. So you are contemplating that we would actually sign a document?

Ms. CREEDON. That would be the goal.

Senator SESSIONS. "We" who? Would it be DOD, or DOS, or the President, or who?

Ms. CREEDON. It would be the United States, and the goal would be to sign an agreement at some point if it is in our national security interest to do so. If it is not, we will not.

Senator SESSIONS. Would you consult Congress before you were to sign such an agreement?

Ms. CREEDON. Of course. Between meetings and some briefings and discussions, already, I think, we have had on the order of about six or seven discussions with various committees now, and we would absolutely keep Congress informed—all the committees—as to where we are in the progress and if we are making progress or if we are not.

Senator SESSIONS. Europeans ceded their sovereignty to Brussels. They do not worry about those things too much. But most Americans do and they want to maintain our legitimate range of actions, and we have burdens around the world that the Europeans do not feel and do not carry and we need capabilities that are not so important to them that could be for us. I would just urge you to be very cautious before you sign agreements that could in any way complicate our ability in the future to take reasonable actions for our national interest or to support our allies in that fashion. So it will be something, I think, Congress will be interested in and watching.

Thank you, Mr. Chairman.

Senator NELSON. Thank you, Senator.

General Shelton, I think we are all so painfully aware of the lack of competition in space launch and the recent critical GAO report on the use of a single vendor. I understand now that the Air Force has issued a new entrant criteria based on Air Force mission assurance standards. Can you describe what efforts you are currently undertaking to bring new launch entrants to the Air Force, what payloads you are providing for launch to the new entrants, and what would be the timeframe for something to materialize to create this kind of a potential competition?

General SHELTON. Senator, we have done two things. We came up with a new entrant strategy and a new entrant guide, a certification guide, both in October of last year, and that is a funda-

mental part of our reacquisition of EELV capability that is in the very near future here. Those new entrants—their maturity really is going to drive the rapidity that we can bring them on board.

We have reserved two missions that we will not compete with the EELV contractor, Discover-2 and STP–2. Those two missions will be set aside. They will be competed. Any new entrant will be able to compete, and if they show that they have the maturity, they have the technical capability to launch those missions, we will go on contract with them. That will be a step along the path toward certification for any new entrant.

But again, for a national security payload, something that is a national treasure, we will be very cautious as we bring them on board and we launch a national security payload on top of a new entrant.

Senator NELSON. This is essentially the same question I asked to Secretary Creedon, General Shelton. Can you explain the importance of Air Force spectrum in general and how any movement from it should be paid for and coordinated so that there are not unfortunate implications to your budget?

General SHELTON. Secretary Creedon said it very well, that we are heavily dependent on the radio frequency spectrum for almost every operation. In the case of the part of the spectrum that is being talked about now in terms of repurposing, we have satellite operations in that part of the spectrum and are very concerned that vacating that part of the spectrum would be both long-term and expensive, anywhere from somewhere around the neighborhood of $240 million all the way up to $2 billion, depending on which option you chose. So we are watching this very closely and are very concerned.

There are three things that we are concerned about that would have to come together simultaneously to make this work. First, is finding alternative comparable spectrum. Second, is having enough time to plan for vacating that part of the spectrum. Third, having the resources, either through the auction or appropriations. I could not pay for it today. If somebody came to me with a $2 billion bill to vacate part of the spectrum, I could not pay it.

Senator NELSON. I understand.

General Formica, the same question of you.

General FORMICA. Yes, Mr. Chairman. As Secretary Creedon and General Shelton have said, the spectrum is obviously a requirement for Army operations. The area of the spectrum that we are talking about principally would affect radar and satellite communications for the Army, and it is our interest in this that we would continue to have the spectrum capabilities that would enable us to do military operations without an increased cost to the Army.

Senator NELSON. So all of you agree it is not a very good payfor for some other program that is not otherwise paid for.

General SHELTON. Certainly the promise of the auction would produce quite a bit of money if the projections are right, but it is how that money then gets rolled back into repurposing.

Senator NELSON. General Formica, unlike the ORS cancelation, I understand you continue to invest in small tactical satellites that can be rapidly fielded. Do you see a future in small rapidly respon-

sive satellites for our Army's soldiers, and if so, what is your vision for such a program?

General FORMICA. Mr. Chairman, we are absolutely trying to move forward with technology demonstration for nanosatellites. We have demonstrated nanosatellite capability for digital communications relay in what we call SMDC–1, which had its initial test flight last year. We are developing nanosatellite capability for imagery in what we call Kestrel Eye. Those two programs, which would be an augmentation to the national and joint space capabilities that are already provided to our soldiers, would be envisioned to provide rapidly responsive satellite capability at the tactical level. That is why this joint technology demonstration program is so important to us.

We are encouraged that they have received support at OSD, and again, we look forward to favorable consideration by Congress in funding those.

Senator NELSON. I understand that you operate the wideband global satellite. Are you experiencing problems with bandwidth based on the use of more unmanned systems, and as that continues, will that make matters even more challenging?

General FORMICA. Mr. Chairman, we do operate five wideband satellite operation centers around the globe. By the way, I am very proud of the soldiers that operate those centers 24 hours a day, 7 days a week, to bring capabilities to our warfighters.

Managing bandwidth is always a challenge in the wideband satellite operation centers.

With respect to unmanned systems, we do not currently manage the bandwidth that allows the unmanned systems to transmit down to the ground station, but we do manage the bandwidth for the dissemination of that data, processed data, once it leaves the ground station and goes out to Army users.

Future capabilities in the wideband satellite system will, in fact, enable us to manage bandwidth for the direct downlink to the ground station.

Senator NELSON. Thank you.

Senator Sessions.

Senator SESSIONS. General Shelton, an unclassified excerpt from the executive summary of a Joint Staff operations assessment dealing with the draft EU code says, "if the United States were to make a good faith effort at implementing the requirements of the draft code, there could be operations impact on U.S. military space operations in several areas."

Has that been communicated in detail to the negotiators who are working on this?

General SHELTON. Absolutely, Senator. We are in lockstep with Secretary Creedon's office, with STRATCOM, and others in making our views heard as well.

Senator SESSIONS. Now, could you explain why there would be operational impacts on the military and intelligence community and under what authority DOD and the Intelligence Community would express those restrictions?

General SHELTON. I do not know that I quite follow the question, Senator.

Senator SESSIONS. Can you tell us in this session some of the operational impacts that might occur based on some of the drafts that have been floated out there?

General SHELTON. Just as an example, if somebody were to prescribe distances from satellites, that might be something that would be tough to live with. If someone were to say absolutely zero debris, that might be something that would be tough to live with. So those kinds of restrictions we would want to watch very closely. We are all about minimizing debris. It does not take a very big object in space moving at orbital velocities to destroy a fragile satellite. But we want to preserve our freedom of action in space through any kind of code of conduct, and I know that is exactly where the OSD is on this as well.

Senator SESSIONS. Have we ever had a situation in which a satellite has been damaged by debris?

General SHELTON. We have.

Senator SESSIONS. How many times?

General SHELTON. We know of a couple of times. It is very difficult to do the forensics. It might be a small enough piece of debris that it was not even in our satellite catalog. So you have to go backwards and try to figure out if that is exactly what happened.

A very famous case is a paint chip that got embedded in the windshield of the Space Shuttle. So it can be a very hazardous environment.

Senator SESSIONS. I remember this from high school, I think, this science fiction novel, and everybody on the Earth had been killed and these people had plotted and they had this rocket that they were going to fly to Mars or somewhere. Everybody that made it on the rocket was going to survive. They took off and ran into a Sputnik and all were killed. [Laughter.]

So that is typical science fiction.

But I guess it is possible that we can have those kinds of events, but it is a big space up there, a lot of space in space. We cannot alter everything we do based on that.

We do a pretty good job of tracking that so you can avoid those areas. Is that not correct, General Shelton?

General SHELTON. To the best of our ability. We can get down now to about an object the size of 10 centimeters or so. We are going to get better. We will get down to about a baseball-sized object with some capability we have planned.

Senator SESSIONS. All right, good.

Thank you all for your work. We know, as the chairman and I both have learned, just how critical your work is to the men and women who are at risk on the ground in Iraq and Afghanistan, on ships and airplanes. They need these capabilities. We are reaching a point where a determined hostile power could neutralize a considerable portion of it, I would think. In the scheme of all the expenditures we make, we do not need to be in a position where we are not able to respond to that and maintain that advantage. So I hope that our research, science, technology, testing, and your thinking about the future will not put us in a position where we have overlooked some danger to our capabilities and comprise our security.

So thank you for what you do.

I would have to say, for the most part, what has been achieved by space science on missile defense exceeds what most people thought was possible 25 years ago. It is just unbelievable the capabilities that we have now achieved. As that science improves, there are probably ways to neutralize those capabilities by hostile powers.

Thank you for what you do.

Thank you, Mr. Chairman, for your leadership.

Senator NELSON. Thank you, Senator.

Madam Secretary, is it fair to say that the agreement that we are looking for is one of developing stewardship over space, recognizing that there are those who still discard paper or trash or something without regard to the implications for the environment, let alone for aesthetics? But we are not dealing with aesthetics here. We are dealing with the reality of people just not necessarily caring or not being encouraged to care for space the same way we want to encourage it and take care of our environment on earth. Is that a fair way of saying it? It is dangerous as well.

Ms. CREEDON. Yes, sir. That is a large part of it. There are other aspects that we hope could be achieved in the code as well, things that would say improve the ability to understand other activities and other actions. So if someone was going to move a satellite, there would be an understanding of why that satellite was moved. So part of this is to reduce the risks of not only mishaps but mistrust and misconduct, misperceptions. Just improve the overall understanding in situational space as well.

Senator NELSON. There are some that are better actors than others. Is that fair to say?

Ms. CREEDON. That would be a true statement.

Senator NELSON. Mr. Winokur, the Navy is proposing to develop a radar altimeter with NOAA to place on a European Space Agency satellite as a means to save on the cost of developing a standalone satellite. What are your plans with the fiscal year to develop this system, and what will happen if it is not developed in time for the satellite launch? Will it be a day late and maybe a dollar short?

Mr. WINOKUR. Thank you, Mr. Chairman. Yes, we definitely will be a day late and a dollar short.

The Navy had plans to launch its own radar altimeter satellite which measures sea surface height which, in turn, supports our tactical anti-submarine warfare operations. Unfortunately, due to fiscal pressures, we terminated or deferred those plans for what we call GFO–2.

Our mitigation strategy was to work with our civilian colleagues at NOAA and, in turn, their colleagues and, in fact, U.S. allies and some of the European space agencies to see if we can partner and leverage what is called Jason-3. So the Navy plan is to use, frankly, residual dollars in a one-time only funding transfer to NOAA to help keep Jason-3 on schedule. We are very concerned about the potential for an altimeter gap, and without the Navy funding, it is likely that Jason-3 will slip a minimum of a year. It has already slipped, frankly.

Our goal is to work for a calendar year 2014 launch. We have had serious conversations with NOAA that if maybe funds become available, and that would give the Navy a voice at the table and

a say, actually an assured access to the data. So we think this is a reasonable mitigation plan for the Navy to get what we need at a minimum cost.

Senator NELSON. Mr. Zangardi, I am going to ask you the same question that was asked of Secretary Creedon. Can you explain the importance of preserving your operating spectrum in general and how any movement from it should be paid for and coordinated from your perspective, the Navy's?

Dr. ZANGARDI. Yes, sir. Secretary Creedon answered the question quite well, and I would echo her comments and General Shelton's and General Formica's comments.

Both the Navy and the Marine Corps use spectrum for land, air, and space operations with communications systems, sensors, radars, navigation, and guidance systems. Spectrum access is critically important to the Navy and Marine Corps warfighter. Further erosion will reduce operational capabilities and endanger possibly military personnel. We see, as we move forward into the future, a greater reliance upon spectrum.

Coming from the acquisition side of the Navy, I tend to look at it in terms of cost, schedule, and performance. In terms of schedule, we need time to assess any impact of a spectrum move. In terms of cost, we have to understand the cost. What will it cost to move it? There is a performance piece here. So if you move the system, what is the impact to the performance of that particular system?

Senator NELSON. I think everybody can see what we are clearly doing. We are setting the record so that we do not have to go through this unexpectedly at some time in the future without having the backup testimony available to explain why somebody cannot just pull the spectrum away and think it is okay.

On commercially hosted payloads, Mr. Winokur, your testimony describes the work that you are undertaking with the commercial sector for ISR. Are you able to describe your activities in these areas? For example, are you utilizing hosted payloads on a commercial satellite?

Mr. WINOKUR. No. At this point, the Navy is not planning on using a specific hosted payload for ISR purposes. What we are doing is leveraging the funding that is available through the National Geospatial Agency (NGA) for access to some of the commercial data that is provided through synthetic aperture radar providers and some of the electro-optical systems. Our goal actually is to leverage available commercial systems, develop unique Navy-specific applications using the available data, and leverage NGA resources to the maximum extent possible.

Senator NELSON. Dr. Zangardi, congratulation is coming your way as well on launching MUOS last month, and I am happy the system is finally being fielded. I understand the next one will be in 2013 to make the system operational at that time.

My question to you is when will we have ground terminals deployed that can use the advanced signal of the system. The GAO indicates that it could be as late as 2014. Do you agree with that? Do you have another point of view?

Dr. ZANGARDI. Yes, sir. I have been around both the Joint Tactical Radio System (JTRS) program which is developing the radio

or terminal that will port this waveform and around the MUOS program for many years.

We have made significant progress in the past year synchronizing the MUOS SATCOM program with its waveform development and JTRS Manpack Terminal Integration by establishing one lead JTRS MUOS manager working with the Navy, Army, and JPEO JTRS. We project that the MUOS waveform will be certified and ready for porting into the Handheld, Manpack, Small Force Fit Manpack Radio by September 2012.

JTRS Manpack terminal appliques will start rolling off the production line in late 2013. That being said, we expect to have our over-the-air certification test or multi-service operational test and evaluation conducted in early calendar year 2014 from MUOS, and that will require 50 Navy JTRS Manpack radios.

The Multi-Service Operational Test and Evaluation (MOT&E) requires two MUOS satellites plus the ground stations. So we are dependent upon launching the next MUOS satellite in July 2013 for it to be operational by our MOT&E. Following a successful MOT&E, we will continue delivery of the Manpack terminals across all the Services, and we anticipate using more of the advanced signal of MUOS as we move to 2014.

Also inherent within the MUOS satellite is a legacy UHF package, similar to the UFO satellites that are currently flying. That package provides a graceful transition period between the existing SATCOM capability and our future MUOS capability.

Senator NELSON. Thank you.

Senator Sessions.

Senator SESSIONS. Thank you, Mr. Chairman.

The chairman will be back in just a minute, and I have another meeting that I have to attend.

So I want to thank all of you for your presentation. This is something I take very seriously. I hope that you will cooperate with our staff. We want to be sure that we are frugal and we do not waste a dime because we do not have a dime to waste. This is really so, really so.

There will be demands for expenditure cuts time and time again, and all of you want to be good DOD members. But I would just urge you to stand your ground when something is really important, and if we ask about it here, you will have to tell us even if it requires you to be somewhat at odds with somebody's superior because that is the deal. Right? You come here. You have to tell us your best judgment. We are asking your best judgment.

But it is not going to be a pretty sight because we are, indeed, borrowing about 40 cents of every dollar we spend. The trends do not get better. They actually get worse, and the budget that the House has put forward would eliminate the sequester on DOD, the one they announced yesterday, and maybe even reduce some of the cuts you were looking at already. But regardless, they would not go forward with the next sequester, and they would yet have the same savings, but they find them across the whole budget and not targeting DOD as the sequester now does.

I could ask you what the impact of the sequester would be, but I know, General Shelton, you told me what I am hearing from everyone, including Secretary Panetta, and that is that you think you

can sustain the cuts that have been required, $480-something billion, but another $500 billion would be devastating to many of the programs that we now depend on.

So that is our challenge. Keep looking for ways to maintain our capabilities at less cost. I know you will do that, and if something is critically important and does not need to be eliminated, you will have to tell us and maybe we in Congress can say, well, some other program ought to pay a little bit more price and maybe we can save this critical program. So that is what I would like to share with you.

The chairman will be back in a few moments; thank you for standing by. [Pause.]

Senator NELSON. Dr. Zangardi, the Director of Operational Test and Evaluation (DOT&E) reported that in 2011, the Navy recently experienced a mean time between failures of 892 hours instead of the required 1,400 hours of the Navy Multiband Terminal (NMT) system. What actions are you taking to remedy this situation, and when do you expect to have the full rate of production at the terminals? I think you can sense that we are concerned about making certain that there is a connection with the terminals for full utilization.

Dr. ZANGARDI. Yes, sir. We pay very close attention to NMT.

So first off, the demand signal from the fleet for the Navy multiman terminal is high. They want it now. The current antennas, the WSC–6, for example, requires significant maintenance. We recently conducted a gate review or it was just a general in-depth review of the program in January, and as part of that, we—myself and the program manager—came over here and briefed each of the four defense committee staffs on the program and it was exactly on this point here.

The DOT&E found that NMT is operationally effective, but that it is not operationally suitable. The systems reliability tested below threshold, and the key reasons included operational availability, for sure, and long lead times for system maintenance. So the maintenance drivers were basically failure diagnosis timelines and logistics delays of spare parts.

Let me give you a brief example. We also believe we have solutions in place for these.

On one of the shore facilities, the power supply for a fan failed during the test. The system continued to work. However, it was logged as a failure of the system because there was a part failure. So that counted against it. The system operated. Communications continued, but it was a failure. Most of the failures that occurred during this OT&E were like this.

We believe we have corrected the issues, and for all the systems that are being procured in the future and all of those that are coming off the assembly line, the contractor will be putting in place the fixes at no cost to DOD.

The lessons learned for failure diagnosis are being incorporated into the on-board diagnostic tools and technical documentation, as well as updating all the training curriculum. Naval Supply is working to optimize sparing levels, and we expect to see continued improvements in this area, in other words, get the parts out there in

time. So part of the new program is really what happens when you have outed so you can anticipate and optimize the sparing levels.

We believe that NMT is currently on track to conduct a follow-on OT&E event in June of this year. We anticipate that the full rate production decision will be in the fall of this year. Currently, the program is in a low-rate initial production.

Senator NELSON. I understand that TacSat-4 is proving to be a success meeting warfighters' requirements for a small, rapidly fieldable satellite that can communicate in urban and mountain terrain. I understand that the ORS office helped launch this satellite.

Do you think these satellites are proving their utility for the investment that has been made so far?

Dr. ZANGARDI. Yes, sir. I would like to hold off on providing you an assessment on that until the Joint Military Utility Assessment is completed later this year, and we can provide you formal feedback from DOD as to whether or not it is operationally effective or useful.

Senator NELSON. Okay. Thank you.

[The information referred to follows:]

The Joint Military Utility Assessment report is scheduled to be released on August 1, 2012. After reviewing the report, the Department of Defense will be able to provide the committee with formal feedback regarding the usefulness and operational effectiveness of TacSat-4.

Senator NELSON. Ms. Chaplain, we seem to be finally putting satellites in orbit, but it seems that talking to them on the ground is now a challenge. So my understanding is that we are delayed in the ground terminals, as we have just heard a little bit here, terminals for GPS III, MUOS, SBIRS, and AEHF. The problem is so bad with AEHF that the contract for its ground terminal, called the FAB–T, is being restructured, leaving the B–52 and B–2, our nuclear bombers, with only a very low frequency capacity. I understand that we may have a Nunn-McCurdy breach on the FAB–T program.

If you would, please provide us with your overall recommendation for remedying this DOD-wide problem, and can you give the committee legislative drafting assistance to avoid it from happening in the future?

Ms. CHAPLAIN. Yes, of course, we love providing assistance where you guys need it on writing legislation. [Laughter.]

We have done work in this area, even on this problem, in particular, and we had a number of recommendations. DOD has been taking actions, but I think a couple things are still outstanding.

First, is making sure that the ground programs and the user programs do adopt best practices and, most importantly, understand the complexity of what they are trying to achieve when they set out to do it. I think with JTRS and FAB–T that understanding was not quite there.

The second thing is having good insight into the synchronizing between user ground systems and satellites throughout the life of a program, and that would include activities within DOD but also insight on your part. I know DOD has started some of the activities on their part, but the more they can conduct enterprise-level reviews on this issue, the better.

On your part, if Congress could require some reporting that illustrates the status of these programs, the ones that are linked together, on a regular basis, you would have insight, and then when you see the disconnects coming down the road, you can do something about it. Too often it just appears as a surprise when it is already too late. We have launched a satellite and everyone is happy, and then everybody realizes, uh-oh, it is not going to be fully utilized for a couple years. So having that kind of insight is very important really early on.

Senator NELSON. Thank you.

I am going to ask you the same question about preserving the operating spectrum in general and how any movement should be paid for and coordinated from your vantage point from the GAO.

Ms. CHAPLAIN. I think it is hard to even understand the cost without knowing where you would move to. That is the first question that has to be answered.

Another thing I think that has not been discussed today is really how difficult it would be to get satellites to move to a new spectrum. All the satellites that are out there cannot just get a simple fix to move to spectrum, and you just cannot simply replace them all. That would just be a tremendous, tremendous cost. Even with ongoing programs like GPS III, to go into that program now and change the requirement for spectrum would create a lot of disruption and a lot of cost increases and schedule delays, and that is not a program where we want to see more of that.

Also, when we talk about the word "resilience" in terms of space policy, I look at it as very applicable in this situation because the particular spectrum that they rely on for satellite control networks is one of the optimum pieces of spectrum for maintaining resiliency. When satellites have trouble and they are spinning out of orbit, the wideness of the spectrum allows DOD to correct satellites that are having issues. So it is important to remember that these certain types of spectrum that are being used for satellite control is there for a reason.

Senator NELSON. Thank you.

I think lurking in the background of this whole hearing is how DOD can be innovative in the design, cost, and launch of satellites. The ORS program was supposed to be the competition in DOD like DARPA to do that. In your opinion, was the business case or model for ORS working? If Congress could fund it, would you concur that it should be funded?

Ms. CHAPLAIN. Yes. We try not to be advocates for programs, but we certainly have always endorsed the goals of the ORS program. I think some of them have not really been brought out today. In addition to developing smaller and more responsive satellites, there were other goals in that program: to lower the cost of launch, to standardize design methods, and to standardize satellite buses. So while maybe you would not have a whole barn full of satellites ready to, you might have a barn full of pieces that you could put together in rapid order.

In moving forward, if the program is canceled, I just do not see yet the way forward for how lessons learned are going to be incorporated elsewhere in DOD. There had been resistance to that program and what it was doing, and we did not see the big programs

making progress to adopting these kind of philosophies. I would like to just see a formal plan for how ORS is going to be evolving in other places in DOD if it is going to be canceled.

Senator NELSON. Thank you.

Just a general overall question. What do you see today as the largest single acquisition challenge to space systems?

Ms. CHAPLAIN. I think it is something we have been talking a lot about today, and that is: affordability. It creates a lot of good challenges because it makes you find ways to do things more efficiently. It incentivizes you to adopt things like best practices, but at the same time, it has raised a lot of questions about where are we going next and how are we going to pay for it. When you look across the portfolio of defense space systems, there really are not many that you would say should be cut. They all provide very, very important capabilities.

So when you make these kinds of decisions, they really do need to be made with a Government-wide perspective and with the idea that agencies are going to coordinate more to optimize the investments they do have. We do not see enough of that kind of strategic thinking across Government and that coordination that is really focused on optimizing investments. There is coordination. It happens here and there, but we just do not see it in a concerted way when it relates to the issue of affordability.

Senator NELSON. Thank you.

We have asked a number of questions and received a number of answers; but are there questions that have not been asked yet that you would have answers to that if you had been asked, you would offer us answers? In other words, what have we not touched on today that perhaps we should have or something that we should know that we have not explored? Anything in particular? Or do you think we have done just enough? If there is something else that you would like to offer, we certainly want to give you the opportunity.

General SHELTON. Senator, we have touched on this, and I said this privately to you earlier. But there is undoubtedly a foundational level of space capability that regardless of force structure size in DOD, regardless of almost any other decisions made from a budget perspective, that space capability has to continue. If we are going to continue to fight wars the way we fight wars today, and in this era of information-enabled warfare, there is such a heavy dependence on space capabilities that I think that that foundational layer just has to continue.

Senator NELSON. General Formica, anything you would like to add?

General FORMICA. Mr. Chairman, I would obviously echo General Shelton's comments. They are very consistent with what I said in my opening statement and consistent with the approach we bring. We are reliant on space. There is no going back. If we are going to shoot, move, and communicate, we require space systems. I would absolutely endorse General Shelton's foundational basis.

I do appreciate the opportunity to appear today, sir.

Senator NELSON. This is more than parity for us. We have to stay ahead of the game. We cannot just be catching up or trying

to stay at par with the rest of the world or otherwise our defenses are down. Is that fair to say?

General SHELTON. I would agree with that, and that is exactly what we try to do. Even though we talk about going from the R&D to the production phase, those capabilities are very, very good.

General FORMICA. Mr. Chairman, I would just add, those are the critical enablers that will allow us to get better. Especially as we look at force reductions and other efficiencies, it is those critical space enablers that will make a difference.

Senator NELSON. We cannot state definitively that it is always just about money because it is about other matters as well. But adequate funding is going to be important to our progress as well. That is why, I think, it is important to get the funding right. But in the process, we need to be sure, and I know GAO and Ms. Chaplain are interested, as we all are, in making sure that we get it right, for whatever dollar we spend, that we get the result that we are seeking or otherwise we are not maximizing or optimizing what opportunities we have.

Mr. Winokur, any comments that you might like to add?

Mr. WINOKUR. I think the only thing I would add, Senator, is actually picking up on one of the comments you made in your introductory remarks. So if you allow me to wear my Oceanographer-of-the-Navy hat, we are very concerned about affordable, next-generation weather satellites. We in the Navy are very dependent on the civil community and the Air Force since we do not fly our own weather environmental satellites. From our perspective and from a national perspective, I think affordable, next-generation weather satellites become very critical not only from a DOD perspective, but from a national perspective as well. So I think that would be the one thing I would add.

We in the Navy are working very closely with the Air Force, as I mentioned in my introductory remarks about defining our needs, and we are working closely with NOAA as well and defining our needs to them so we can leverage their capability and planning.

Thank you.

Senator NELSON. Dr. Zangardi?

Dr. ZANGARDI. Yes, sir. Thank you for this opportunity to give you a last remark.

We are clearly heavily reliant on space, and given the current budget environment, it is becoming increasingly important to focus our efforts on delivering our space programs on time and on budget. I think we have made great strides over the past few years to move the Navy programs in that direction.

I would like to say that since I have been in this role, I have seen great cooperation among the Services. I find that we work very well together in trying to bring these future capabilities to bear for the warfighters.

Thank you, sir.

Senator NELSON. Last, but not least, Madam Secretary?

Ms. CREEDON. Thank you, Senator Nelson.

One of the things that I have really gotten to participate in and I think has gotten better since I went to DOD—and nothing to do with me, it is just getting better—about 18 months ago, DOD stood up the Defense Space Council, and it is chaired by the Secretary

of the Air Force. He is chairing this in his role as the Executive Agent for space for DOD. The Defense Space Council brings all of the various aspects of DOD together, all of the Services, and the Comptroller's Office. It brings together the intelligence side, so NRO, and the policy, the General Counsel's Office. It brings everybody together to work on and to stay focused on the space systems, space budget, space architectures.

I have to say I have been very impressed with how this group, which meets notionally monthly, 4 to 5 weeks, something like that, really has taken on some pretty difficult issues and is looking at a lot of the space issues in a very holistic manner. So right now, the Defense Space Council is undertaking two very large architecture studies to look at how you coordinate across the various Services for various requirements.

I think this addresses a little bit what you had raised earlier about, are we looking at making sure that the money is utilized, that there is good cooperation and coordination, at least within the national security space community. Obviously, it does not address so much outside, but it is really a very good body and it has really taken on some very difficult topics of discussion, including ORS, as it works through the various space issues. It is taking a growing role in budgets. So I have been very impressed with this organization and its efforts since I have been there.

Senator NELSON. It is encouraging to know that there is that effort at coordination and collaboration because if there is any quick way to lose opportunity or to miss optimization, it is everyone going off on their own way. It will increase the costs, I think decrease the efficiency and efficacy of being able to put something together in a far more comprehensive and cost-effective way. I appreciate that that is being undertaken.

I thank you all for your presence here today and for your responses. If there is something at some point that we ought to have a behind-closed-doors session, let us know that and we would be glad to follow through on that. So I guess we will come back to make a decision about that a little bit later.

Thank you all very much. I appreciate your testimony.

The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR E. BENJAMIN NELSON

FUNDAMENTAL SPACE CAPABILITIES

1. Senator NELSON. General Shelton, you have mentioned that we must preserve our core fundamental space capabilities in this tight budget environment. Can you list what they are?

General SHELTON. The core fundamental space capabilities are Nuclear and National Survivable Satellite Communications; Launch Detection and Missile Tracking; Position, Navigation, and Timing; Space Situational Awareness and Battlespace Awareness; and Defensive Space Control and Assured Access to Space.

GLOBAL POSITIONING SYSTEM III

2. Senator NELSON. General Shelton, in your written statement you mention that the development of Global Positioning System (GPS) III is on cost and on schedule. In the Government Accountability Office (GAO) written statement, the GPS III program is identified as an acquisition program that is "experiencing cost and schedule growth, though not to the extent yet as those experienced in the last decades." What

are the challenges of the GPS III program and what are you doing to stay on cost and on schedule?

General SHELTON. The major challenges on the program are to ensure that we remain focused on addressing parts requirements, test equipment, detailed design, and first time integration complexities. The government accounted for these risks in the original estimates and budgeted accordingly.

The government has added significantly more risk reduction activities and systems engineering rigor in the GPS III development program than in past acquisition reform programs. The program is resolving technical and manufacturing issues in the development phase so they are not carried forward into production. We expect our significant upfront investments in systems engineering, worst-case analyses, industry-leading parts standards, and comprehensive hardware testing will prevent expensive rework and retest of flight vehicles in the production flow. GPS III SV–1 is still projected to be available for launch in 2014, as per the original Acquisition Program Baseline (APB). The program is fully funded to the government Independent Cost Estimate (ICE).

AIR FORCE RESEARCH LABORATORY

3. Senator NELSON. General Shelton, the GAO's written statement indicates that the planning efforts for investments at the Air Force Research Laboratory (AFRL) are not very strategic. How does AFRL interface with Air Force Space Command (AFSPC) to produce current and future AFSPC science and technology (S&T) requirements for space systems and capabilities?

General SHELTON. AFRL routinely interfaces with AFSPC primarily through the command's S&T Corporate Process which produces strategic investment strategies. The annual process begins with an AFSPC data call to all combatant commands, major commands, and selected operational units (e.g., National Air and Space Intelligence Center and the Joint Space Operations Center). AFSPC uses the responses to identify capability gaps and technical needs, which are then prioritized based on both the Space Superiority Core Function Master Plan and potential impact to future capabilities.

In addition to the space S&T processes discussed above, there are additional opportunities to coordinate and collaborate through Air Force and Department of Defense (DOD)-level S&T programs as well as space management forums such as the Air Force Space Board; the Air Force, National Reconnaissance Office (NRO), and National Air and Space Administration (NASA) Summit; and the Defense Space Council.

4. Senator NELSON. General Shelton, what interfaces exist between AFRL and AFSPC to provide S&T solutions to the AFSPC S&T needs?

General SHELTON. AFRL routinely interfaces with AFSPC primarily through the command's S&T Corporate Process which produces strategic investment strategies. The annual process begins with an AFSPC data call to all combatant commands, major commands, and selected operational units (e.g., National Air and Space Intelligence Center and the Joint Space Operations Center). AFSPC uses the responses to identify capability gaps and technical needs, which are then prioritized based on both the Space Superiority Core Function Master Plan and potential impact to future capabilities.

In addition to the space S&T processes discussed above, there are additional opportunities to coordinate and collaborate through Air Force and DOD-level S&T programs as well as space management forums such as the Air Force Space Board; the Air Force, NRO, and NASA Summit; and the Defense Space Council.

SPACE BASED INFRARED SYSTEM

5. Senator NELSON. General Shelton, the first Space Based Infrared System (SBIRS) Geosynchronous Earth Orbit (GEO) was launched in May 2011 with both scanning and staring sensors. The GAO written statement states that the ground segment software that is to process the sensor's data is not planned to be fully functional until at least 2018. What is the plan for processing the sensor data between now and 2018?

General SHELTON. The first SBIRS GEO satellite is undergoing a rigorous operational certification process. Preliminary test results show the space vehicle is meeting or exceeding performance requirements. The staring sensor is undergoing preliminary calibrations—at the payload level it is detecting targets 25 percent dimmer than expected and the data are being shared with the research and development

and technical intelligence communities. The DOD funded initiatives, separate from the program of record, will deliver interim capabilities to process the data from the staring sensor in fiscal year 2015/2016. The sensor will contribute to the most stressing missile warning/missile defense performance requirements with full mission operations after acceptance of the final SBIRS Increment 2 ground system in fiscal year 2018. While our ground system certification for the staring sensor is several years away, we will still take advantage of the sensor data with many off-line tools.

SPACE TEST PROGRAM

6. Senator NELSON. General Shelton, the Space Test Program (STP) is being terminated but the President's budget includes $10 million for the program in fiscal year 2013. What will these funds be used for?

General SHELTON. The $10 million allocated for the STP are for program support ($0.28 million), launch vehicle and launch services ($1.74 million), and on-orbit satellite operations ($8.03 million). This level of funding is required to complete funded missions and execute contract termination liabilities.

7. Senator NELSON. General Shelton, the Air Force has mentioned that the STP–2 mission is a candidate for a new entrant into the Evolved Expendable Launch Vehicle (EELV)-class launch arena. How much funding is included in the fiscal year 2013 budget request for the launch vehicle and satellite for this mission?

General SHELTON. In support of the STP–2 mission, $172 million in fiscal year 2012 funds is for purchase of the launch vehicle and $16 million in fiscal year 2013 funds is for payload integration and operations. The manifest for STP–2 is not finalized; therefore, satellite costs for this mission are not available.

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

SEQUESTRATION

8. Senator SESSIONS. Secretary Creedon, Dr. Zangardi, Mr. Winokur, General Shelton, Lieutenant General Formica, and Ms. Chaplain, the Budget Control Act requires DOD in January 2013 to reduce all major accounts over 10 years by a total of $492 billion through sequestration. This will result in an immediate $55 billion reduction to the fiscal year 2013 defense program. The Secretary of Defense has been quoted on numerous occasions that the impact of these cuts would be "devastating" and "catastrophic", leading to a hollow force and inflicting serious damage to our national defense. Yet, the Military Services must begin this month with some type of guidance on developing a Service budget for fiscal year 2014. What are some of the specific anticipated implications of sequestration to defense space programs?

Ms. CREEDON. If the sequester is enacted, it will hollow out the force. It will lead to a disruption of DOD's investment program which would impact defense space programs across-the-board.

Dr. ZANGARDI and Mr. WINOKUR. DOD has not begun planning for sequestration with the hopes that Congress will work out a larger deficit-reduction plan. Any planning for sequestration would be a government-wide effort guided by the Office of Management and Budget (OMB). If sequestration occurs, automatic percentage cuts are required to be applied without regard to strategy, importance, or priorities.

General SHELTON. OMB has not issued planning guidance; therefore, AFSPC has not yet begun detailed planning for sequestration.

General FORMICA. The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command has not received direction from the Department of the Army to plan or budget for sequestration. As such, we have not assessed the potential impact or altered our fiscal year 2014 budget plan. However, if sequestration does occur, I expect that the implementation would negatively impact our space operations and capabilities.

Ms. CHAPLAIN. We have not done work to project the impact of possible sequestration on DOD's projects and activities. Importantly, the execution and impact of any spending reductions will depend on the legal interpretations and actions taken by OMB. As such, we are not in a position to provide you with an informed response. Generally, in terms of risks of cuts to the DOD space budget, most of the space-based capabilities DOD is pursuing—for example, protected communications, missile warning, positioning, navigation, and timing—are critical to ongoing military operations.

We have in the past criticized across-the-board cuts—primarily across-the-board rescissions. This approach can result in protecting ineffective programs while cutting muscle from high-priority and high-performing programs. Across-the-board cuts are not substitutes for making tough and informed choices about the foundation of government.

9. Senator SESSIONS. Secretary Creedon, Dr. Zangardi, Mr. Winokur, General Shelton, Lieutenant General Formica, and Ms. Chaplain, what programs would have the most significant impact to operations or readiness?

Ms. CREEDON. DOD is not planning for the effects of sequestration. As OMB has not put out sequestration planning guidance, no planning has begun.

Dr. ZANGARDI and Mr. WINOKUR. DOD has not begun planning for sequestration with the hopes that Congress will work out a larger deficit-reduction plan. Any planning for sequestration would be a government-wide effort guided by OMB. If sequestration occurs, automatic percentage cuts are required to be applied without regard to strategy, importance, or priorities.

General SHELTON. Since sequestration would apply to all programs, it will have an impact on Air Force operations and readiness. Sequestration also would likely have a negative impact on the space industrial base.

General FORMICA. Within the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, an assessment has yet to be conducted. However, I would expect our operational capabilities to be degraded.

Ms. CHAPLAIN. See answer to question #8.

10. Senator SESSIONS. Secretary Creedon, Dr. Zangardi, Mr. Winokur, General Shelton, Lieutenant General Formica, and Ms. Chaplain, would sequestration lead to contract cancellations, terminations, cost increases, or schedule delays?

Ms. CREEDON. DOD is not currently planning for sequestration. OMB has not directed agencies, including DOD, to initiate any plans for sequestration.

Dr. ZANGARDI and Mr. WINOKUR. DOD has not begun planning for sequestration with the hopes that Congress will work out a larger deficit-reduction plan. If sequestration happens, automatic percentage cuts are required to be applied without regard to strategy, importance, or priorities.

General SHELTON. Yes, we anticipate sequestration would force program restructures, schedule delays, and reduced procurement quantities.

General FORMICA. Within the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, we have not been directed by the Department of the Army to assess sequestration-caused contract cancellations, terminations, cost impacts, or possible schedule delays. But, I would expect an impact on our materiel development programs.

Ms. CHAPLAIN. See answer to question #8.

11. Senator SESSIONS. Secretary Creedon, Dr. Zangardi, Mr. Winokur, General Shelton, Lieutenant General Formica, and Ms. Chaplain, is DOD currently conducting any planning in your areas of responsibility? If so, can you describe the plan?

Ms. CREEDON. DOD is not planning for the effects of sequestration. As OMB has not put out sequestration planning guidance, no planning has begun.

Dr. ZANGARDI and Mr. WINOKUR. DOD has not begun planning for sequestration with the hopes that Congress will work out a larger deficit-reduction plan. If sequestration happens, automatic percentage cuts are required to be applied without regard to strategy, importance, or priorities.

General SHELTON. OMB has not issued planning guidance; therefore, AFSPC has not yet begun detailed planning for the effects of sequestration.

General FORMICA. I am not aware of any DOD sequestration planning that impacts U.S. Army Space and Missile Defense Command/Army Forces Strategic Command assigned space responsibilities.

Ms. CHAPLAIN. See answer to question #8.

12. Senator SESSIONS. Secretary Creedon, Dr. Zangardi, Mr. Winokur, General Shelton, Lieutenant General Formica, and Ms. Chaplain, how will you assess the risk of each cut?

Ms. CREEDON. Sequestration will lead to disruption of DOD's investment programs which would impact DOD programs across-the-board.

Dr. ZANGARDI and Mr. WINOKUR. DOD has not begun planning for sequestration with the hopes that Congress will work out a larger deficit-reduction plan. If sequestration happens, automatic percentage cuts are required to be applied without regard to strategy, importance, or priorities.

General SHELTON. If AFSPC is directed to plan for sequestration, we will follow the risk assessment methodology provided by the Office of the Secretary of Defense in the Defense Planning Guidance and by the Air Force in the Air Force Planning and Programming Guidance.

General FORMICA. When directed to review programs under sequestration, we will assess risk to our ability to provide space capabilities to the force. I do expect we would experience a degradation in capabilities.

Ms. CHAPLAIN. See answer to question #8.

13. Senator SESSIONS. Secretary Creedon, Dr. Zangardi, Mr. Winokur, General Shelton, Lieutenant General Formica, and Ms. Chaplain, has any planning commenced to date to assess the impact of such sequestration reductions, such as prioritizing programs in preparation for reprogramming actions or terminations?

Ms. CREEDON. DOD is not planning for the effects of sequestration. As OMB has not put out sequestration planning guidance, no planning has begun.

Dr. ZANGARDI and Mr. WINOKUR. DOD has not begun planning for sequestration with the hopes that Congress will work out a larger deficit-reduction plan. If sequestration happens, automatic percentage cuts are required to be applied without regard to strategy, importance, or priorities.

General SHELTON. OMB has not issued planning guidance; therefore, AFSPC has not yet begun detailed planning for the effects of sequestration.

General FORMICA. To my knowledge, no sequestration impact planning has commenced.

Ms. CHAPLAIN. See answer to question #8.

FAMILY OF ADVANCED BEYOND LINE OF SITE TERMINALS

14. Senator SESSIONS. General Shelton, the Family of Advanced Beyond Line of Site Terminals (FAB–T) has experienced significant delays and for the third year in a row, procurement has had to be deferred to address development issues. According to GAO, the programs software development schedule is still unrealistic and the Air Force announced that it would be terminating its FAB–T contract and was going to seek alternative providers. How much margin do you have in meeting U.S. Strategic Command's (STRATCOM) required delivery date?

General SHELTON. AFSPC is working with the Office of the Secretary of Defense, the Joint Staff, and STRATCOM to de-scope the FAB–T requirements to support just presidential and national secure teleconferencing for ground terminals and airborne platforms such as the E–4B and E–6B. We are collectively developing a revised strategy to ensure critical warfighters' needs are met.

15. Senator SESSIONS. General Shelton, is the Air Force developing contingencies in the event FAB–T cannot meet that need date?

General SHELTON. Yes. The Air Force is proceeding with a solicitation for a potential alternative source development effort with production options for the FAB–T air and ground command post terminals. Also, the Advanced Extremely High Frequency system is backward compatible with existing Milstar command post terminals.

16. Senator SESSIONS. General Shelton and Ms. Chaplain, is it true that unless significant savings can be achieved through the restructuring, FAB–T is likely to breach Nunn-McCurdy unit cost thresholds?

General SHELTON. No. The new acquisition strategy incorporates fixed price contracts to limit the risk of cost growth on the program. AFSPC is working with the Air Force Cost Analysis Agency and the Office of the Secretary of Defense Cost Assessment and Program Evaluation (CAPE) to develop ICE. These independent assessments will enable an accurate determination of Nunn-McCurdy thresholds.

Ms. CHAPLAIN. An independent review team noted in October 2010 that the FAB–T program would likely breach critical Nunn-McCurdy unit cost thresholds; however, a breach has yet to be reported by the program. Several factors make it difficult to determine how close the program is to breaching the Nunn-McCurdy thresholds. First, the program is currently being restructured, to include a revised acquisition strategy. Second, a new APB which reflects these changes and their projected costs has yet to be approved. And third, while program officials stated that a recent ICE showed substantial program cost growth, it did not reflect the contents of the new acquisition strategy. Until these factors are addressed, it is difficult to know whether FAB–T will breach Nunn-McCurdy unit cost thresholds. Complicating matters, the FAB–T program plans to convert its current cost reimbursement ter-

minal development contract to a firm-fixed-price (FFP) contract, negotiate fixed-price production efforts with the current contractor, and award a second, competing FFP terminal development contract with production options to an alternate source. However, the proposals provided by the current contractor reflect higher development and production costs and the price of the contract with an alternate source is not known at this time. A new ICE is expected to be conducted by July 2012 and a revised APB is expected to be completed by August 2012.

17. Senator SESSIONS. General Shelton and Ms. Chaplain, what is being done to address FAB–T affordability and should requirements be reexamined?

General SHELTON. AFSPC completed a thorough review of the FAB–T requirements and is in the process of briefing the results to the Joint Requirements Oversight Council (JROC). This summer, the command will request production proposals from the current contractor and from an alternative source to validate costs.

Ms. CHAPLAIN. The FAB–T program has recently undertaken significant program restructuring efforts. Although initially directed to terminate the existing terminal development contract, the program office was redirected to evaluate the possibility of changing the development contract type from cost reimbursement to firm-fixed price and negotiating fixed-price production efforts with the current contractor. In addition, the program office is to complete development of the full set of requirements in the current capabilities development document—both command post terminals and airborne wideband terminals. To lock in production prices, the Air Force plans to award a FFP contract for terminal production near the beginning of fiscal year 2013, although the program of record is not expected to be ready to enter low-rate initial production until fiscal year 2014. At the same time, the program office plans to award a second FFP contract for terminal development, with more limited requirements and capabilities—command post terminals only—to an alternate contractor by the end of fiscal year 2012. In either case, the Air Force is focusing on delivering a presidential national voice conferencing capability in fiscal year 2015. To assess the deferment of this capability and others, the JROC has directed the Air Force to support a Joint Staff functional capability board in developing a decision brief outlining the impacts of this decision. In fiscal year 2013, the Air Force plans to decide whether to continue production with the current or alternate contractor, tying knowledge points together for both contractors and assessing overall program risk for delivering presidential national voice conferencing capability in fiscal year 2015.

Our work has long shown the need to follow acquisition best practices—of achieving a match between requirements and resources in programs and of not pursuing overly ambitious and lengthy product developments. There must be an early, solid business case with a rational balance between requirements, costs, and schedule. Given that the current contractor is pursuing development of the full set of requirements and the alternate contractor is to develop a more limited capability, it is unclear how these solutions can be compared for a production decision or how this strategy will provide better value to the government.

RELOCATION OF SPECTRUM

18. Senator SESSIONS. Ms. Creedon, in February, Deputy Secretary of Defense Lynn sent a letter to Chairman Levin expressing concern with a revenue raising proposal to relocate and auction 1755–1780 MHz and 3550–3650 MHz Federal bands within a 3-year timeframe. According to the Deputy Secretary of Defense, setting arbitrary timelines of 3 years "contradicts existing law" and does not provide sufficient time for DOD to conduct sufficient analysis and determine cost. Dr. Lynn stated that "a failure to address these concerns could cause significant adverse impacts to military training, operations, and combat readiness and/or cause DOD to incur unacceptably high implementation costs." I know you have a lot of experience with this issue from your time on this committee. Can you share some of your thoughts on recent proposals to relocate national security spectrum?

Ms. CREEDON. In order to make balanced decisions about relocating, national security stakeholders require adequate time to conduct operational and cost-feasibility analyses to ensure national security and other Federal capabilities are preserved, while supporting the economic benefits spectrum provides to the Nation. These studies are critical to prevent adverse effects on operational capabilities and avoid high implementation costs.

To relocate national security capabilities while maintaining mission effectiveness, DOD requires alternate spectrum with comparable technical characteristics, cost re-

imbursement for modifying complex weapons systems, and adequate time to make the transition.

19. Senator SESSIONS. Secretary Creedon, do you believe existing law regarding Federal relocation of spectrum is adequate to ensure that DOD will not be unfairly taxed and that warfighters will have access to comparable spectrum?

Ms. CREEDON. Section 1062 of the National Defense Authorization Act for Fiscal Year 2000, Public Law (PL) 106–65, is very important to protecting warfighting capabilities. This statutory requirement is intended to ensure DOD is provided access to comparable spectrum, certified by the Secretary of Defense, the Chairman of the Joint Chiefs of Staff, and the Secretary of Commerce, before surrendering use of any given spectrum. Legislation mandating spectrum reallocations and auctions without time for certification of alternate spectrum with comparable technical characteristics would place PL 106–65 at risk, and pose risk to national security operations.

20. Senator SESSIONS. Secretary Creedon, recognizing that there are compelling interests for increasing spectrum efficiency, do you believe there is a need for any additional protections to ensure that DOD is not unfairly taxed and that if required to move, DOD will be able to recover the cost of doing so?

Ms. CREEDON. Under current statutes, relocation of Federal systems to comparable spectrum bands is funded by the proceeds from the spectrum auction. These statutes also outline the steps required to establish timelines to vacate spectrum. However, in order to make balanced decisions about relocating, national security stakeholders require adequate time to conduct operational and cost-feasibility analyses to ensure national security and other Federal capabilities are preserved, while supporting the economic benefits spectrum provides to the Nation.

PRECISION TRACKING SPACE SYSTEM

21. Senator SESSIONS. Ms. Chaplain, Missile Defense Agency (MDA) programs are also a part of your GAO portfolio. Do you have any concerns with MDA's strategy for the Precision Tracking Space System (PTSS) or MDA leading the acquisition of a major space system?

Ms. CHAPLAIN. We issued a report on MDA's Ballistic Missile Defense System in April 2012. In this report we note that the new acquisition strategy for PTSS is at risk due to concurrency in the development of its satellites. While a laboratory-led contractor team is still in the development phase of building two development satellites, MDA plans to have an industry team develop and produce two engineering and manufacturing development satellites. The PTSS program plans then have industry compete for the production of the follow-on satellites. While the strategy incorporates several important aspects of sound acquisition practices, such as competition and short development time frames, acquisition risks remain because the industry-built development satellites will be under contract and under construction before on-orbit testing of the lab-built satellites. As such, the strategy may not give decisionmakers full benefit from the knowledge to be gained about the design and function of the lab-built satellites derived from on-orbit testing before making additional major commitments.

22. Senator SESSIONS. Ms. Chaplain, while they have yet to conduct an ICE, MDA claims PTSS will be low in cost close to the $200 million per satellite range. Do you have any confidence in this estimate?

Ms. CHAPLAIN. In our March 2011 report, we reported that the MDA cost estimates we reviewed were not sufficiently credible and did not meet the characteristics of high-quality cost estimates based on GAO's Cost Estimating and Assessment Guide founded on best practices in cost estimating. We also made recommendations that MDA take steps to ensure that their cost estimates are high quality, reliable cost estimates that are documented to facilitate external review. In follow-on meetings with MDA, program officials outlined several steps that MDA intended to take to improve the quality of their cost estimates. However, in the results of our latest April 2012 review, we have yet to see the steps implemented.

We cannot assess whether the $200 million cost of each PTSS satellite is credible or be sure of what costs are included or excluded until we have the opportunity to review the cost estimate.

For example, based on information provided by program officials, MDA plans to use a medium EELV to launch two PTSS satellites at one time. According to Air Force officials, the cost of launching a medium EELV would be about $142 to $179 million, depending on which launch vehicle is used and excluding some propellants,

transportation, and launch capability costs. Without reviewing the PTSS cost estimate, we cannot be sure whether launch costs are included in the estimate. In addition, as we noted in our 2011 report, one of the criteria for a credible cost estimate is having an independent cost assessment. DOD's CAPE group is expected to complete its ICE for PTSS the end of fiscal year 2012, which will help provide an important independent view of PTSS costs.

23. Senator SESSIONS. General Shelton, what is the military utility of the PTSS?

General SHELTON. AFSPC is engaged in a joint study with MDA to understand the full potential of applying the capabilities inherent to PTSS to the command's missions. The inherent capabilities may provide significant utility to the Space Situational Awareness, Missile Warning, and Battlespace Awareness missions.

24. Senator SESSIONS. General Shelton, do you believe the development and deployment of PTSS should be a priority?

General SHELTON. PTSS, if deployed, will likely be a significant contributor to the Nation's missile warning mission, and there is potential for PTSS to support the Space Situational Awareness and Battlespace Awareness missions through its inherent capability. AFSPC and MDA are engaged in a joint study to understand the full potential of PTSS to support these missions.

25. Senator SESSIONS. General Shelton, given the Air Force expertise in space acquisition, do you believe Air Force Space or MDA would be best suited for managing this acquisition?

General SHELTON. As the designated lead major command for PTSS, AFSPC is engaging with MDA in a hybrid program office which will take advantage of the expertise in both organizations. I believe this arrangement positions the MDA and AFSPC team for success.

MOBILE USER OBJECTIVE SYSTEM

26. Senator SESSIONS. Dr. Zangardi, what is the current status of the Navy's Mobile User Objective System (MUOS) program?

Dr. ZANGARDI. MUOS–1 launched on February 24, 2012, and the manufacturer is currently conducting on-orbit test and checkout of all spacecraft systems, which is executing to plan with spacecraft health and performance nominal and on schedule to complete in late May 2012. The testing includes activation of both the legacy Ultra High Frequency (UHF) and the new Wideband Code Division Multiple Access (WCDMA) payloads. The Navy will complete its Technical Evaluation in June 2012 followed by Multi-Service Operational Test and Evaluation (MOT&E), which is planned to be complete by late summer 2012. After completion of MOT&E, MUOS–1 will be available to support legacy UHF Satellite Communications (SATCOM) operations.

MUOS–2 is assembled, undergoing spacecraft level testing, and on track for a November 2012 delivery. The remaining three satellites are tracking to cost and schedule with assembly and system level testing of MUOS–3 nearly complete. The MUOS Radio Access Facility (RAF) in Wahiawa, HI, and the Navy Satellite Operations Center (NAVSOC) at Pt. Mugu, CA, are complete. Both sites have the initial software build and an interim authority to operate as a standalone system. Both sites are being used for on-orbit operations of MUOS–1. The RAFs in Northwest (Chesapeake), Virginia; Geraldton, Australia; and Niscemi, Italy, are on track for completion by June 2013 to support the launch of MUOS–2 in July 2013. The Navy expects the MUOS system to reach Full Operational Capability in 2016 and operate as the primary DOD UHF SATCOM system through 2026 and beyond.

27. Senator SESSIONS. Dr. Zangardi, according to a recent review by GAO, new baseline cost estimates for MUOS have not yet been approved. When do you plan to have a new acquisition baseline established?

Dr. ZANGARDI. The new MUOS APB was signed by the Navy Service Acquisition Executive on April 4, 2012. The signed APB has been forwarded to the Milestone Decision Authority, the Under Secretary of Defense for Acquisition, Technology, and Logistics, for signature.

28. Senator SESSIONS. Dr. Zangardi, how likely are we to experience a capability gap and what is being done to mitigate the potential for gaps in coverage?

Dr. ZANGARDI. Navy conducted a statistical analysis of the reliability of the UHF Follow-On (UFO) satellite constellation and, when combined with the launches of

legacy UHF payloads on MUOS satellites, determined that DOD legacy UHF SATCOM Chairman Joint Chiefs of Staff (CJCS) mandated requirements are projected to be met through 2018. MUOS satellites were designed to enable a graceful transition from legacy UHF SATCOM capability to a revolutionary new SATCOM Wideband Code Division Multiple Access capability, which uses cellular telephone technology to provide a ten-fold increase in UHF SATCOM capacity and throughput to the warfighter.

To mitigate against unplanned losses of additional UFO satellites, Navy has implemented several mitigation activities to extend the service life of the existing constellation and increase on-orbit capacity. As a result, the current legacy UHF SATCOM provides the warfighter with approximately 459 more accesses (111 more channels) worldwide than required by the CJCS capacity requirement. This additional capacity is equivalent to three UFO satellites and provides a buffer against unplanned losses in the future. Additionally, each MUOS satellite carries a legacy UHF SATCOM payload that provides capacity equivalent to that provided by one UFO satellite. Commander, STRATCOM, recently signed out a letter to the DOD Chief Information Officer confirming their position that the MUOS legacy UHF payloads were added to the MUOS satellites as one of many UFO resiliency measures.

[Whereupon, at 4:25 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MARCH 28, 2012

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

DEPARTMENT OF DEFENSE NUCLEAR FORCES AND POLICIES

The subcommittee met, pursuant to notice, at 2:29 p.m. in room SR–222, Russell Senate Office Building, Senator E. Benjamin Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Nelson, Reed, Sessions, and Cornyn.

Majority staff member present: Jonathan S. Epstein, counsel.

Minority staff member present: Daniel A. Lerner, professional staff member.

Staff assistant present: Hannah I. Lloyd.

Committee members' assistants present: Carolyn Chuhta, assistant to Senator Reed; Ryan Ehly, assistant to Senator Nelson; Lenwood Landrum, assistant to Senator Sessions; and Dave Hanke and Grace Smitham, assistants to Senator Cornyn.

OPENING STATEMENT OF SENATOR E. BENJAMIN NELSON, CHAIRMAN

Senator NELSON. Let me bring today's hearing to order. This hearing will receive testimony from the Department of Defense (DOD) as it pertains to nuclear matters for fiscal year 2013. First, I want to thank all of our witnesses for being here today. I know taking time from your schedule is not the easiest thing to do, but we appreciate very much your doing that.

We're going to have a closed session on the Long-Range Strike Bomber program. It will be in Senate Security, room SVC–217, and to accommodate the closed session we'll try to wrap up by 3:30 p.m. here; and after Senator Sessions and I give some brief comments we thought it might be best to just go straight to some questions.

But before I begin, I have a letter to Senator Sessions and to me from eight of our fellow Senators supporting sustainment for our Intercontinental Ballistic Missiles (ICBM), that I ask consent to

enter into the record. I think you may have a copy of the letter as well. Without objection, it will be.

Senator SESSIONS. No objection.

[The information referred to follows:]

United States Senate

WASHINGTON, DC 20510

March 28, 2012

Chairman Ben Nelson
Senate Armed Services Committee
Subcommittee on Strategic Forces
228 Russell Senate Office Building
Washington, DC 20510-6050

Ranking Member Jeff Sessions
Senate Armed Services Committee
Subcommittee on Strategic Forces
228 Russell Senate Office Building
Washington, DC 20510-6050

Dear Chairman Nelson and Senator Sessions:

As members of the Senate ICBM Coalition, we write today to submit for the record our views on the United States nuclear deterrent as part of the nuclear posture hearings of the Senate Armed Services Committee and its Strategic Forces Subcommittee. This testimony comes at a critical juncture. As the Administration plans to implement the reductions required by New START, we want to highlight the importance of maintaining a robust fleet of stabilizing, deterring, and affordable Intercontinental Ballistic Missiles (ICBMs).

For decades, America's nuclear triad of heavy bombers, ballistic missile submarines, and land-based missiles has protected the United States from harm by deterring the threat of nuclear war. From a Cold War peak of 13,600 deployed nuclear weapons, the United States and Russia have worked on a bilateral basis to first limit the growth of nuclear forces, and then to reduce them. Today, as a result of this work, we have eliminated nearly nine-tenths of these weapons while maintaining the construct of strategic deterrence.

Even as these efforts and the end of the Cold War have made our relationship with Russia more stable and transparent, we still face significant strategic threats that must be confronted and deterred. Around the world, adversaries and near-peer competitors alike are developing and refining nuclear and ballistic missile capabilities. North Korea has conducted two nuclear tests and continues work to extend the range of its ballistic missiles. Iran is widely suspected to be pursuing a nuclear weapons program, and publicly acknowledges its ballistic missile program. China is expanding its nuclear forces, and Russia is developing next-generation weapons. As a result, instead of deterring one nuclear power, we and the allies under our nuclear umbrella are now challenged with deterring the volatile threats of nuclear-armed rogue states, proliferation, and nuclear terrorism – sometimes all at once. Therefore, in order to have a truly effective deterrent, we must maintain sufficient strategic forces to deter these threats simultaneously.

In the face of these threats, the mutually supporting characteristics of the current nuclear triad create a powerful and unbreakable deterrent that ensures we retain the capability to hold the widest array of military targets at risk. Hedging against technological failure or targeted attrition over time, they ensure our policymakers have options in times of crisis. That is why the U.S. Strategic Command, the Strategic Posture Commission, and the Nuclear Posture Review all agree that a dyad or a monad structure could be destabilizing in unpredictable ways.

Despite the proven success of our nuclear force structure and the threat of finding ourselves embroiled in conflict with a nuclear-armed adversary, advocates for arms control are calling for additional unilateral reductions. It is deeply ironic that some of the steps suggested by these advocates would have the unintended consequence of eliminating the stabilizing features that make our force structure so effective.

The most stabilizing part of this structure is the ICBM force. As Lieutenant General Frank Klotz, the former commander of the Air Force's Global Strike Command put it in 2009, the "Minuteman III force presents any potential adversary with an almost insurmountable challenge should he contemplate attacking the United States. In this case, numbers do matter...and the ICBM thus contributes immeasurably to both deterrence and stability in a crisis."

The United States today has 450 land-based missiles deployed across five states and 34,600 square miles, with 150 missiles each at Malmstrom Air Force Base, Montana; Minot Air Force Base, North Dakota; and F.E. Warren Air Force Base, Wyoming. Some have argued that the static positioning of the ICBM fleet makes it more vulnerable to attack. In fact the broad dispersion across sovereign U.S. territory, the spacing of silos within each missile wing, and sheer numbers of the ICBM force make a preemptive or disarming attack realistically impossible. An adversary would need complete confidence that it could destroy 450 separate targets to risk a disarming first strike. Without a 100 percent success rate, the surviving force would pose an assured response because of the inherent robust and redundant capabilities of the ICBM.

Historically, arms control supporters have argued against the ICBM force on the grounds that missiles loaded with multiple warheads posed attractive targets for an enemy first strike. However, the newest Nuclear Posture Review publicly announced that the United States would begin to download the ICBM force to one warhead per missile, a wise step recommended by the ICBM Coalition. Additional reductions to delivery vehicles in general and to the ICBM force in particular would require greater warhead loading of the remaining missiles, perversely reversing this stabilizing trend.

Another perverse incentive that might be created by efforts to decrease the size of our nuclear forces too quickly is that of targeting civilian populations. The size and composition of our strategic force is and always must be based on careful military analysis of what is required to hold at risk a sufficient number of our potential adversaries' strategic military targets to accomplish deterrence. Those who call for arbitrary lower numbers sometimes fail to realize that, as a matter of policy and law, the United States does not target population centers for their own sake. We only hold at risk legitimate military targets, which require more delivery vehicles and warheads to destroy than unhardened civilian population centers.

In addition to the flawed strategic logic of arms control advocates calling for unilateral nuclear disarmament, the other primary driver of calls for further reductions to the nuclear triad is the long-term cost of modernizing and recapitalizing the force. But the Minuteman III force is modernized through 2030 and represents the most cost-effective deterrence system the United States possesses. The Congressional Research Service (CRS) determined that the sea-based leg

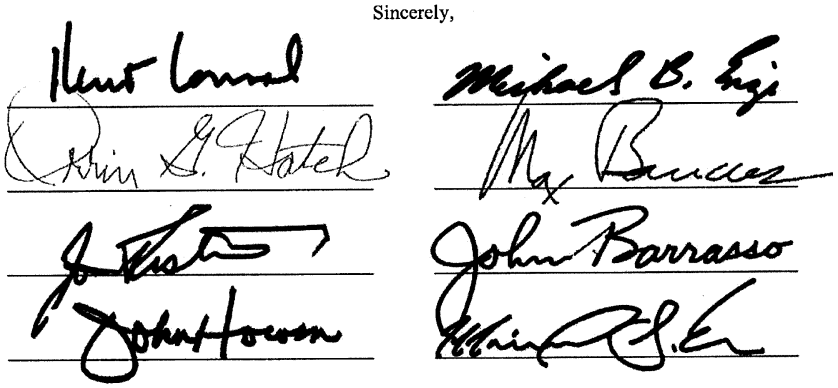
of the triad, which relies heavily on expensive technology demanded by a difficult operating environment, accounts for 61 percent of the cost of our strategic forces. Bombers offer dual capability but require heavy operational costs to maintain crew skills. In contrast, ICBMs are the most cost-effective leg of our triad, costing less than one-third as much per delivery vehicle than the other two legs.

In short, the ICBM force is the least expensive leg of the triad, even as it provides the preponderance of our nation's alert force – around 90 percent, according to U.S. Strategic Command. A robust, dispersed, sovereign-based, and single-warhead loaded ICBM force dramatically decreases the risk of nuclear war by providing a stabilizing and visible constant in our nuclear posture. This is why we support the continued deployment of 450 ICBMs.

We recognize that the Administration has stated an intention to reduce the number of deployed ICBMs to a range of 400 to 420 missiles as part of a wider New START Treaty compliance effort. If those plans proceed, we respectfully ask that you urge the Administration to maintain at least 420 deployed ICBMs and preserve all 450 ICBM silos in warm status. Any reductions must be made in a careful, incremental way to avoid the threat of introducing instability. We further urge that any reductions be spread equally between each of the three operational ICBM bases. This dispersion will maximize the stabilizing nature of the ICBM force and provide the maximum effective deterrent. Meanwhile, maintaining all 450 silos ensures reversibility and flexibility, key watchwords of the Department's new strategic guidance.

As the Senate Armed Services Committee hears from General Kehler and the Strategic Forces Subcommittee hears from Generals Kowalski and Chambers, Admiral Benedict, and Assistant Secretaries Madelyn Creedon and Andrew Weber, we thank you for taking into consideration our perspective on the important contributions the land-based deterrent makes to our national security. We look forward to continuing to engage this committee and all of our colleagues on these issues as the Senate considers proposals for implementing the New START Treaty, maintaining the nuclear triad, and ensuring the continued success of strategic deterrence in the future.

Sincerely,



Senator NELSON. Also with that, let me make just a couple of short comments before I turn it over to Senator Sessions for some comments as well. The 1251 report was revised in section 1043 of the National Defense Authorization Act (NDAA) for Fiscal Year 2012 to include additional data and make it part of the President's annual budget submission.

I have a letter to Chairman Levin, dated March 2, 2012, signed by Secretaries Chu and Panetta, that states that they can't submit a unified DOD-Department of Energy (DOE) 10-year plan. Instead, DOD will submit its 10-year plan "in the coming weeks"; and then

"over the next several months" DOD and DOE will submit a plan consistent with the spending levels of the Budget Control Act.

I ask that this letter be entered into the record as well.

Senator SESSIONS. No objection.

[The information referred to follows:]

March 2, 2012

The Honorable Carl Levin
Chairman
Committee on Armed Services
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The Departments of Defense (DoD) and Energy (DOE) will submit the annual report on the plan for the nuclear weapons stockpile, complex, delivery systems, and command and control system, as required by section 1043 of the National Defense Authorization Act (NDAA) for FY12. This letter provides an update on the status of the report, as well as a plan for continued engagement with Congress on these important issues.

The President is committed to maintaining a safe, secure, and effective nuclear arsenal. To do so, the stockpile must be supported by a safe and effective physical infrastructure and a highly capable workforce with the scientific and technical skills to complete critical near-term stockpile maintenance actions on schedule. Over the past three years, the Administration has worked with Congress to develop a sustainable, bipartisan commitment to a safe, secure, and effective nuclear deterrent to defend and protect the United States and our allies against any potential adversary.

With the President's historic budget requests and long-term plan, the Administration sought to reverse years of declining investments in, and inattention to, the nuclear weapons complex. To demonstrate its commitment to the National Nuclear Security Administration (NNSA) the DoD transferred $5.7 billion for FY11-15 and later augmented this with an additional $2.2 billion to be allocated over the FY12-16 period in annual increments.

Under the Budget Control Act (BCA) of 2011, P.L. 112-25, we now face new fiscal realities. Adding to the fiscal challenge is the fact that the funds appropriated to the NNSA Weapons Activities in FY12 were $416 million less than the President's request and the funds for the Naval Reactors account were $74 million below the request. These fiscal realities do not weaken our commitment to the safety, security, and effectiveness of the nuclear deterrent, but must inform our programmatic decisions. As a result, we worked aggressively to develop a program and budget request for NNSA for FY13 that makes hard choices, but maintains funding for the most critical programs and capabilities.

The President's budget request for FY13 includes $7.6 billion for NNSA Weapons Activities, $363 million above the amount appropriated for FY12. While this budget request meets immediate military requirements by funding the core elements of the weapons activities, it also includes some programmatic modifications needed to operate within the constraints specified in the BCA. These modifications include stretching out the life extension programs,

deferring construction of Chemical and Metallurgical Research Replacement facility (CMRR) for at least five years, and using existing facilities to meet near-term plutonium needs. In addition, the President's budget request includes $1.1 billion for the Naval Reactors program, $9 million above the FY12 appropriated level. This budget request funds base operations and maintains work on the OHIO-class Replacement, the refueling overhaul of the land-based prototype, and the disposition of spent fuel.

Due both to the realities and the timing of the passage of the BCA, the NNSA appropriation for FY12 and other constraints, the Administration cannot at this time submit a definitive, comprehensive ten-year nuclear weapons and Naval Reactors program and budget for NNSA, as outlined by section 1043 of the NDAA for FY12. Instead, we will submit two separate reports to meet this statutory requirement. First, DoD will submit to Congress the DoD portion of section 1043 report in the coming weeks. Then, over the next several months, DoD and DOE will conduct the analysis necessary to develop a responsible plan that ensures the continuation of required programs and capabilities, while meeting the new requirements of the BCA. This analytic work will be complete by summer 2012 to support the preparation of the FY14 budget request for NNSA as well as the remaining requirements of section 1043.

This timeline will enable our Departments to conduct the thorough analysis required to ensure that critical capabilities are available when needed, that programs are affordable, and that tradeoffs within the program are rigorously analyzed. As our Departments conduct this in-depth analysis, several Nuclear Weapons Council-approved programmatic priorities will guide our work (in no particular order):

- ensure the safety and viability of the nuclear weapons stockpile and complex, while taking account of new fiscal realities;
- ensure the safe and reliable operation of reactor plants in nuclear-powered submarines and carriers, and move forward with the OHIO-class Replacement reactor design, refueling overhaul of the land-based prototype, and the timely disposition of spent fuel;
- meet DoD's threshold requirements for the B61 Life Extension Program (LEP) with the first production unit in 2019;
- complete production of the W76-1 LEP to meet operational requirements;
- continue the Phase 6.1 study for the W78/88 LEP;
- support the W88 arming, fuzing, and firing first production unit to meet operational requirements; and,
- continue design and construction of the Uranium Processing Facility (UPF) but defer or delay some program scope and reuse some capital equipment in the near term.

Our teams are prepared to meet with you to discuss this process in more detail. Maintaining the commitment to the necessary investments in these programs and capabilities is critical to the future health of our nuclear deterrent and requires the support of Congress. We appreciate your understanding and look forward to continuing to work closely with you. Copies of this letter have also been provided to the President of the Senate, the Speaker of the House, the Chairmen of the congressional defense committees, the Energy and Water Development Appropriations sub-Committees, the Senate Committee on Foreign Relations, and the House Committee on Foreign Affairs.

Steven Chu
Secretary of Energy

Leon E. Panetta
Secretary of Defense

cc:
The Honorable John McCain
Ranking Member

Senator NELSON. Congress is now left without the long-term data to determine whether we are making the investments to ensure our DOD delivery platforms and DOD infrastructure are on a sustained path for modernization. I'm hopeful that Assistant Secretaries Creedon and Weber can explain what happened and when Congress might see the funding data requested in section 1043.

The W76 warhead refurbishment was decremented some $80 million in the National Nuclear Security Administration (NNSA) budget to help cover cost increases for the B61 refurbishment. Of

course, Admiral Benedict, we want to know, does that affect our posture? Also, how does the 2-year delay in the *Ohio* replacement submarine affect your program?

The B–52 fleet is not getting the Combat Network Communications Technology (CONECT) system upgrade to overhaul its aging analog controls and help it retarget. General Kowalski, can you help explain the implications on our force posture?

The B–2 and B–52 are not getting terminals to communicate with the Advanced Extremely High Frequency (AEHF) satellite for nuclear command and control. This was a U.S. Strategic Command (STRATCOM) requirement. So, General Chambers, I guess we ask what is the fix and will it suffice over the long haul?

NNSA has decided to defer the Chemistry and Metallurgy Research Replacement (CMRR) facility at Los Alamos to help store and test plutonium. The laboratory director has flatly stated he cannot meet DOD's 50 to 80 pit requirement for the W78 warhead life extension. So, Secretary Weber, can you help us explain its impacts to DOD readiness? I hope you're not going to change the 50 to 80 pit requirement to meet the NNSA decision, which might be one of the options that could be looked at.

Finally, Secretary Creedon has had more time before this committee than almost anybody else here recently. To my knowledge, Congress has yet to see any changes to the nuclear force structure as a result of the New Strategic Arms Reduction Treaty (New START). We thought that was coming in the fiscal year 2013 budget, but we haven't heard anything about that, and hopefully you will be able to help us with that.

Now, having said all those things, there's still more to be said, I'm sure. So I'm turning to my good friend and co-chair, Senator Sessions, for any comments that he might wish to give.

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS. Thank you, Mr. Chairman. It's been such a great pleasure to work with you. Maybe this will be our last one together.

Senator NELSON. Maybe.

Senator SESSIONS. Last markup, but not the last roundup, for Senator Nelson.

The purpose of today's hearing is to assess the fiscal year 2013 request for the sustainment and modernization of the triad of nuclear delivery vehicles. Unlike NNSA's budget, I applaud DOD. You have done a good job of maintaining a clear commitment to modernization despite tough budget times.

While the DOD budget is not immune to cuts, the key elements of the plan appear to be intact. Risk will increase with this budget and, while I have not yet concluded whether all of these risks are acceptable, I look forward to hearing from the witnesses why they believe the increased risk and the possibility of not meeting future STRATCOM requirements is manageable.

The sustainment and modernization of the triad will not be cheap and will require long-term sustained commitments spanning future Congresses and administrations. Last year the cost for just 10 years was projected to be over $120 billion. While the most re-

cent estimate has not yet been provided, I am unaware of any major changes in the plan that would significantly alter that.

Nevertheless, our next generation nuclear capabilities must be affordable and every effort must be made to ensure each dollar is spent wisely. A robust triad of nuclear delivery vehicles is essential and I believe that uncontrollable costs perhaps more than anything else could be a threat to our ensuring it in the future. I think that's what Admiral Mullen meant when he said the greatest threat to our national security is our deficit, because the numbers are so bad and so serious that it's forcing cuts in areas that we would rather not.

Mr. Chairman, I will just briefly conclude and note that we have much to do. I would offer my remarks for the record, and I look forward to hearing from the witnesses. I believe that DOD has every right to be deeply engaged in the production of the weapons you will use, and I think we need transparency on the producing side and we need influence and leadership from the consumer side.

Thank you, Mr. Chairman.

[The prepared statement of Senator Sessions follows:]

PREPARED STATEMENT BY SENATOR JEFF SESSIONS

Thank you very much, Mr. Chairman, I join you in welcoming our distinguished panel of witnesses. We have a number of witnesses and plan to move to a closed session, so in the interest of time I will keep my remarks brief.

The purpose of today's hearing is to assess the fiscal year 2013 request for the sustainment and modernization of the triad of nuclear delivery vehicles. Unlike the National Nuclear Security Administration budget, I applaud the Department of Defense (DOD) for maintaining its commitment to modernization. While the DOD budget was not immune to cuts, the key elements of the plan appear to remain intact. Risk will increase with this budget and while I have not yet concluded whether all of these increased risks are acceptable, I look forward to hearing from our witnesses why they believe the increased risk and the possibility of not meeting future U.S. Strategic Command requirements is manageable.

The sustainment and modernization of the triad will not be cheap and will require a long-term sustained commitment spanning future Congresses and administrations. Last year the cost of just the next 10 years was projected to be over $120 billion and while the most recent estimate has not yet been provided, I am unaware of any major changes to the plan that would significantly alter that funding requirement. Nevertheless, our next-generation nuclear capabilities must be affordable and every effort must be made to ensure that each dollar is being spent wisely. A robust triad of nuclear delivery vehicles is essential and I believe that uncontrollable cost more than anything else is the greatest threat to ensuring its future. I look forward to better understanding the steps each of you are taking to insist that your programs are delivered on time and within cost.

Section 1043 of the National Defense Authorization Act for Fiscal Year 2012 requires the President each year to provide Congress with a report and 10-year funding requirement for nuclear modernization efforts at both DOD and the Department of Energy (DOE). This report which replaces the old 1251 report is intended to ensure that strategy and budgets are aligned. While we learned just a few weeks ago how fungible DOE views the modernization strategy, I hope the same is not true for DOD and I look forward to hearing from our witnesses when the administration intends to provide the 1043 report to Congress.

DOD, at the direction of the White House, recently completed a 90-day study to look at force posture in support of a follow-on arms control agreement. I happen to agree with a recent assessment by John Bolton, that "Instead of dealing with real nuclear threats like Iran and North Korea, [the President is] going to magic shows and talking about a world without nuclear weapons, which would be a much less safe world for the United States." This administration has already undercut its commitment to modernizing the nuclear weapons complex which was a prerequisite for considering additional reductions. For the President to even consider additional reductions in a fiscal environment that he has concluded is not suitable for making the necessary infrastructure investments is irresponsible and counter to our na-

tional security interests. I look forward to hearing from our witnesses what was considered in the 90-day study and if they believe additional reductions would be feasible without the modernization efforts that experts have unanimously recognized as critical to the future viability of the weapons complex at any level.

I thank the witnesses for joining us today and look forward to their testimony.

Senator NELSON. Thank you, Senator Sessions.

Let me first start with Secretary Creedon. Number one, the New START force structure. Can you tell us when we can expect to see the nuclear force structure sent to Congress from the New START treaty? Do you have a timeframe?

STATEMENT OF HON. MADELYN R. CREEDON, ASSISTANT SECRETARY OF DEFENSE FOR GLOBAL STRATEGIC AFFAIRS

Ms. CREEDON. Sir, the central limits of the New START treaty have to be met within 7 years from entry into the force, which occurred in February 2011. So at the outset, DOD and the Services are focused on getting rid of those assets that would count under the treaty, but are, as we refer to them, phantoms. In other words, they're previously retired and can be retired now without any initial impact on the actual active forces.

So this would include 50 previously retired Peacekeeper silos, 50 previously retired Minuteman III silos, and B–52H bombers that are at Davis-Monthan. So that's the initial focus, addressing these phantoms, systems that are no longer in active service.

After that, then we'll move on to what the active reductions will be. The assumption at the moment is that the active reduction decisions will be made at the end of the year, but in the context of the fiscal year 2014 budget.

[The prepared joint statement of Ms. Creedon and Mr. Weber follows:]

PREPARED JOINT STATEMENT BY HON. MADELYN R. CREEDON AND HON. ANDREW C. WEBER

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, and members of the subcommittee, we are pleased to have the opportunity to join Lieutenant General Kowalski, Major General Chambers, and Rear Admiral Benedict in discussing a critical topic—U.S. nuclear forces and policy.

This statement constitutes the combined testimony of our organizations—the Office of the Assistant Secretary of Defense (ASD) for Global Strategic Affairs (GSA) in the Office of the Under Secretary of Defense for Policy and the Office of the ASD for Nuclear, Chemical, and Biological Defense Programs (NCB) in the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (AT&L).

Our offices are responsible for policy development, acquisition management, and oversight for nuclear weapons for the Office of the Secretary of Defense. As the ASDs for GSA and NCB, we also serve as the advisor and executive secretary, respectively, to the Nuclear Weapons Council (NWC) on all areas dealing with nuclear deterrence.

GSA is responsible for policy development in a number of areas, including: nuclear deterrence; countering the proliferation of weapons of mass destruction; strategies for defending against the threat of ballistic missiles; and addressing the emerging challenges the Nation faces in the cyber and space domains. GSA leads the Department of Defense's (DOD) efforts to execute the President's vision to take concrete steps toward a world without nuclear weapons while maintaining a safe, secure, and effective nuclear deterrent for the Nation. We also lead DOD's work with U.S. Government departments and agencies and our international partners to strengthen deterrence around the world.

NCB plays a key role in managing the U.S. nuclear deterrent and leading DOD's efforts to acquire the warheads for nuclear systems in order to meet the operational needs of our Armed Forces. Two of the ASD(NCB)'s main responsibilities are the

missions of providing the United States and its allies with a safe, secure, and effective nuclear deterrent capability and determining the nuclear survivability of U.S. military forces. In addition to these missions, NCB leads DOD's efforts to counter nuclear terrorism through activities such as the 4-year initiative to secure all vulnerable nuclear materials worldwide, the Nuclear Security Summit, and the Global Initiative to Combat Nuclear Terrorism.

As the January 2012 DOD strategic guidance makes clear, the United States will field nuclear forces that can—under any circumstances—confront an adversary with the prospect of unacceptable damage, both to deter potential adversaries and to assure U.S. allies and security partners that they can count on the United States' commitment to our shared security.

Today, we would like to touch on several topics: the global nuclear balance; our implementation of the New START treaty and its implications for U.S. nuclear forces and policy; our work to strengthen regional deterrence and assurance for our allies and partners; work underway to ensure a future nuclear force structure in line with the President's vision; the important role the budget will play in meeting this vision; efforts that DOD and the NWC are undertaking to ensure that we have the forces we require for the foreseeable future, including revitalizing the nuclear infrastructure, meeting DOD stockpile requirements, and modernizing delivery systems and command and control; nuclear physical security; and international efforts to counter nuclear threats.

THE GLOBAL NUCLEAR BALANCE

Let us first set the scene by discussing the nuclear arsenals around the world. In September 2009, the Obama administration publicly stated that the U.S. nuclear arsenal included 5,113 weapons, not including weapons awaiting dismantlement. That arsenal, although sizeable, has shrunk significantly from a high point of approximately 31,000 warheads in 1967.

Russia has approximately 4,000 to 6,500 nuclear weapons, according to unclassified estimates, of which approximately 2,000 to 4,000 are non-strategic—or "tactical"—nuclear weapons. Russian strategic nuclear warheads are reported under the New START treaty, and the limits on its deployed strategic nuclear weapons are monitored through onsite inspections, but we lack confidence in estimates of Russian tactical nuclear weapons.

Russia maintains a robust nuclear warhead production capability to remanufacture warheads regularly rather than conduct Life Extension Programs (LEP). Russia is also working to modernize delivery systems, including a mobile variant of the Topol intercontinental ballistic missile (ICBM) and new Borey-class missile submarines with Bulava submarine-launched ballistic missiles (SLBM). Under the New START treaty, Russian forces will be limited to 800 total and 700 deployed strategic delivery systems. Russia will also be limited to 1,550 deployed strategic warheads to comply with the central limits of the New START treaty.

We do not have arms control insight into China's nuclear capabilities. China appears to be increasing the size of its nuclear arsenal, which today consists of a few hundred nuclear weapons. We know that China has a broad range of missile-development programs, including an effort to replace some liquid-fueled systems with more advanced solid-fueled systems. China is also pursuing a sea-based deterrent with the construction of the Jin-class submarine.

Of course, the list of the world's declared nuclear powers includes two of our North Atlantic Treaty Organization (NATO) allies. The United Kingdom and France each have a few hundred nuclear weapons. France is upgrading its nuclear capabilities by replacing legacy delivery aircraft with the Rafale and by fielding the new M51 SLBM. The United Kingdom is focused on replacing its *Vanguard*-class strategic ballistic missile submarines and is collaborating with the United States on a new common missile compartment to be used on both the *Vanguard*-class and the U.S. *Ohio*-class replacement submarine.

In recent years, the situation has grown more complicated as other states seek nuclear weapons of their own or enhance their existing nuclear arsenals. Today, India and Pakistan are each estimated to have fewer weapons than China, but they are increasing the size of their nuclear arsenals. Pakistan is expanding its plutonium production capabilities, and both India and Pakistan are seeking advanced delivery systems. In addition, North Korea has tested a plutonium-based weapon design and claims to be enriching uranium. Based on recent events, it is possible that the downward trend of recent years may be reversing with respect to North Korea. However, in the absence of full transparency and cooperation with the International Atomic Energy Agency, we remain concerned about Pyongyang's ultimate intentions.

Likewise, we are profoundly troubled by Tehran's nuclear ambitions and its unwillingness to meet its international nonproliferation obligations.

This complex global security environment is the context in which our future force structure decisions must be made.

IMPLEMENTATION OF THE NEW START TREATY

One very important step toward addressing the security environment we face, given that the United States and Russia continue to have the vast majority of the world's nuclear weapons, was the entry into force of the New START treaty in February 2011.

President Obama made the decision to expedite negotiations for the New START treaty in order to reinvigorate arms control and to minimize the lapse in verification measures occasioned by the expiration of the START treaty. This decision was consistent with the recommendations of the Congressional Commission on the Strategic Posture of the United States, which called for an initial agreement with Russia to ensure that a verification program would be in place after the START treaty expired, followed by negotiations on potential further reductions.

Implementation of the New START treaty is fully underway. From February 5, 2011 to February 5, 2012, the United States and Russia conducted 18 onsite inspections, which is the maximum number allowed under the New START treaty. The Defense Threat Reduction Agency conducts these inspections, and the organization's extensive experience with onsite inspections ensures the maximum value of this exercise. The two countries have also exchanged roughly 1,800 notifications regarding nuclear weapons dispositions, deployments, and repairs since the New START treaty entered into force. This represents a 28 percent increase above the predecessor START treaty over a comparable period. These exchanges and inspections provide transparency that is crucial to fostering mutual trust between the two countries. Additionally, delegations of both sides have already met three times under the New START treaty's Bilateral Consultative Commission to discuss implementation issues.

We are on track to meet the 2018 deadline for the central limits of 1,550 warheads on deployed ICBMs, deployed SLBMs, and accountable nuclear warheads for deployed heavy bombers; 700 deployed ICBMs, deployed SLBMs, and deployed heavy bombers; and 800 deployed and non-deployed launchers and bombers—thresholds that, based on careful analysis, are adequate to meet U.S. national security requirements.

The New START treaty is the first step in the Obama administration's vision for further reductions in strategic and non-strategic nuclear weapons. The timing and framework for the next round of arms control negotiations have not been set, but new discussions with Russia will need to be broader in scope and more ambitious. The President has made clear that the next phase should include the total arsenal of nuclear weapons: deployed and non-deployed, strategic and non-strategic. To that end, we fully support the Senate's condition in its New START treaty Resolution of Advice and Consent to Ratification to pursue an agreement with Russia that would address the disparity between the tactical nuclear weapons stockpiles of the Russian Federation and of the United States and would secure and reduce tactical nuclear weapons in a verifiable manner. As the 2010 Nuclear Posture Review (NPR) states, Russia's nuclear forces will remain a significant factor in determining how much and how fast we are prepared to reduce U.S. forces. Strict numerical parity in nuclear weapons between the two countries is no longer as compelling as it was during the Cold War. However, large disparities in nuclear capabilities could raise concerns on both sides, as well as among U.S. allies and partners, and may not be conducive to maintaining a stable, long-term strategic relationship. Therefore, we would emphasize the importance of Russia joining us as we move to lower levels of nuclear forces.

We continue to pursue high-level, bilateral dialogues with both Russia and China that are aimed at promoting stable, resilient, and transparent strategic relationships. The United States took a bold step toward transparency by making public the number of nuclear weapons in the U.S. stockpile. We would welcome reciprocal declarations by Russia and China.

STRENGTHENING REGIONAL DETERRENCE AND ASSURANCE

The United States remains committed to our allies' continuing security through our policy of extended deterrence. We seek to reiterate this message as often as possible, including through efforts to bolster regional deterrence architectures around the world. We are building regional cooperative missile defenses, forward-deploying U.S. forces, and maintaining what is commonly referred to as the "nuclear um-

brella." The Obama administration will uphold U.S. security commitments to our allies.

We would like to touch briefly on deterrence issues in three regions, starting with the Asia-Pacific region. As DOD's new strategic guidance makes clear, this region is being accorded increased importance, and we are strengthening our security partnerships there. In 2010, for example, we added new forums to our already robust relationships to enhance extended deterrence in Northeast Asia—the Extended Deterrence Policy Committee with the Republic of Korea and the Extended Deterrence Dialogue with Japan.

Japan is also a strong partner in ballistic missile defenses, successfully developing its own layered capabilities and co-developing an advanced version of the SM–3 interceptor, the SM–3 Block IIA. We regularly train together, learn from each other, and conduct cooperative missile defense exercises. In addition, the United States is consulting with the Republic of Korea and Australia about possibilities for missile defense cooperation.

Another priority region for DOD is the Middle East. For the United States, the Arab Awakening and the withdrawal of U.S. military forces from Iraq present new strategic opportunities and new challenges. Developments stemming from the Arab Awakening provide an opportunity to support governments that are responsive to the aspirations of their people. At the same time, we remain unrelenting in our commitment to counter the proliferation of ballistic missiles and weapons of mass destruction. The United States is nurturing longstanding relationships and expanding new ones to prevent Iran's development of a nuclear weapon capability and to counter destabilizing policies in the region.

Israel and the United States coordinate and cooperate extensively on missile defense. We have a long history of cooperation on plans and operations, combined exercises, and combined research and development programs. The United States maintains a constant missile defense presence in the Persian Gulf region, and we are working with a number of Gulf Cooperation Council members—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE)—on missile defense, including the purchase of U.S. capabilities. The UAE, for example, recently announced its plan to purchase Terminal High Altitude Area Defense (THAAD) and Patriot systems from the United States.

DOD's strategic guidance also makes clear that "Europe is our principal partner in seeking global and economic security, and will remain so for the foreseeable future." The guidance affirms the critical importance of NATO, as President Obama did in November 2010 when he invited his fellow heads of state and government to Chicago for the first NATO Summit in the United States in 13 years. This came on the heels of the Lisbon Summit, which made real progress in strengthening our ties as allies through the approval of a new Strategic Concept for the Alliance and through NATO's adoption of territorial missile defense as an Alliance mission. Allies at Lisbon also agreed to undertake a Deterrence and Defense Posture Review (DDPR) to determine the appropriate mix of nuclear, conventional, and missile defense forces that NATO will need to deter and defend against threats to the alliance. This review will consider how arms control, disarmament and nonproliferation could promote alliance security.

Guided by the Strategic Concept, allies are working to complete the DDPR by the time of the NATO Summit in Chicago in May 2012. The primary aim of the DDPR is to determine the appropriate mix of nuclear, conventional, and missile defense forces that NATO will need to deter and defend against threats to the alliance, and to ensure its members' security. The drafting of the DDPR is proceeding in accordance with the premises that continue to be central to NATO's nuclear posture, particularly the basic principles reaffirmed by the United States in the 2010 NPR that any changes in NATO's nuclear posture will be taken only after a thorough review within—and decision by—the Alliance as a whole.

A NUCLEAR FORCE STRUCTURE FOR THE FUTURE

As part of the NPR, the President called for follow-on analysis to set a goal for future nuclear reductions below New START levels while strengthening deterrence of potential regional adversaries, enhancing strategic stability vis-a-vis Russia and China, and assuring our allies and partners. Even as we consider future reductions, the President has made clear that the entire administration remains committed to retaining a safe, secure, and effective nuclear arsenal for as long as nuclear weapons exist.

The administration's review of nuclear guidance in light of the current and expected future security environment is making good on the President's commitment, and it is consistent with how past Presidents have managed their responsibilities

as Commander in Chief. We want to underscore that this process is not a re-evaluation of the NPR, but that it is a key part of its implementation.

The study is not revisiting the first principles outlined in the NPR. Indeed, in undertaking this effort, we are focused on achieving the NPR's five strategic objectives: preventing nuclear proliferation and nuclear terrorism; reducing the role of U.S. nuclear weapons in U.S. national security strategy; maintaining strategic deterrence and stability at reduced nuclear force levels; strengthening regional deterrence and reassuring U.S. allies and partners; and sustaining a safe, secure, and effective nuclear arsenal. These are the standards by which we will assess deterrence requirements.

Our analysis is also considering the critical question of what to do if deterrence fails. In effect, we are asking: What are the guiding concepts for employing nuclear weapons to deter adversaries, and what are the guiding concepts for ending a nuclear conflict on the least catastrophic terms if one has already started?

The Office of the Secretary of Defense is working closely with the Joint Staff and U.S. Strategic Command (STRATCOM) in conducting this analysis. We are closely coordinating with the National Security Staff and senior representatives from the Departments of Energy and State. The results are intended to inform the President's guidance to DOD on nuclear planning and to shape the force structure needed to protect the United States, its allies, and its partners.

BUDGET

The budget, of course, influences our plans looking forward. The current fiscal situation is putting pressure on the entire DOD, and the nuclear enterprise is no exception.

For fiscal year 2013, we have made careful choices to protect high-priority programs while allowing some efforts to be delayed with acceptable or manageable risk. Some programs, including the replacement for the *Ohio*-class ballistic missile submarine, will be delayed. Others, such as a new bomber, will remain on schedule. As we look to sustain the current triad and develop the appropriate force mix, cost efficiencies must be factored into the sequencing of our upgrade efforts.

Ensuring that our nuclear forces are properly sized and configured to face real threats, both today and in the future, is a responsibility this administration takes very seriously. The Obama administration continues to believe that maintaining a nuclear triad is essential to U.S. national security.

The budget request protects investments in homeland missile defense, and we will continue to develop our regional missile defense capabilities, although at a somewhat slower rate.

In this budget, we will also continue to fund the development of conventional strike capabilities, another important part of deterrence. The DOD budget includes a Defense-wide technology development program on Conventional Prompt Global Strike (CPGS), the objective of which is to develop and demonstrate boost-glide CPGS technologies and test capabilities. CPGS would provide the President with a wider range of options to engage targets at strategic ranges in less than an hour, a capability that has previously only been available with nuclear-armed strategic missiles. DOD has no current plans to replace nuclear warheads on our Minuteman ICBMs or Trident SLBMs with conventional warheads.

It is worth bearing in mind that some of the most important initiatives detailed in the NPR do not require any additional funding. These include support to the Nuclear Nonproliferation Treaty, pursuing future arms control negotiations, and reducing the role of nuclear weapons in national strategy. Such efforts continue apace.

REVITALIZING THE NUCLEAR INFRASTRUCTURE

Despite an overall declining top line for DOD, the President's fiscal year 2013 budget request makes the investments necessary for DOD to meet its deterrence requirements. To do so, these investments must span the nuclear enterprise, including the infrastructure that provides agile research and development and manufacturing capabilities upon which an effective strategic deterrent relies.

DOD and the Department of Energy (DOE) are committed to a shared approach to recapitalizing the Nation's nuclear infrastructure in a responsible, fiscally prudent way. The NPR states that the physical infrastructure supporting the nuclear weapons complex "has fallen into neglect" and that increased investments in the nuclear infrastructure are "needed to ensure the long-term safety, security, and effectiveness of our nuclear arsenal and to support the full range of nuclear security work to include nonproliferation, nuclear forensics, nuclear counterterrorism, emergency management, intelligence analysis and treaty verification." The NPR also emphasizes that the human capital of the nuclear enterprise has been "underfunded

and underdeveloped." It is clear that reversing these trends and accomplishing this revitalization will require significant investment over a sustained period of time.

Fiscal year 2013 funding levels in the President's budget will allow us to work with DOE in continuing our efforts to restore the health of the intellectual infrastructure that our national laboratories provide. The scientific and technological base at our nuclear weapons laboratories forms the backbone of our deterrent. As the 2010 NPR states, rehabilitation and modernization in the nuclear weapons infrastructure would allow the United States to "shift away from retaining large numbers of non-deployed warheads as a hedge against technical failure, allowing major reductions in the nuclear stockpile."

DOD has agreed to transfer approximately $8.2 billion to the National Nuclear Security Administration (NNSA) during fiscal year 2011–2016. This funding will help ensure that we can successfully extend the life of our current weapons and modernize the supporting infrastructure. In addition, we are currently working with NNSA on a budget issue team to review joint priorities for support of the nuclear deterrent and to ensure that we are fully aligned for fiscal year 2014 and beyond. We expect the issue team's results later this year.

The aging of the nuclear weapons physical infrastructure presents significant challenges for ensuring that the capabilities needed to support the nuclear deterrent are maintained over the long term. To address these obstacles, construction of the Uranium Processing Facility (UPF) has been accelerated to ensure that current uranium processing capabilities are not jeopardized.

Building a large, one-of-a-kind nuclear facility such as the UPF, presents substantial planning, design, and development challenges. Indeed, the estimated costs for the UPF have grown substantially, raising concerns about the affordability of the project. Particularly in today's fiscally constrained environment, the NWC is prioritizing efforts to control costs.

DOD has worked closely with NNSA in the last year, and will continue to do so, to ensure that necessary plutonium capabilities are available to meet future projected requirements.

Finally, crucial to continued certification of the nuclear arsenal is a robust weapon surveillance program that provides sufficient information for NNSA laboratories to assess the state-of-health of the weapons. NNSA has increased its surveillance funding and reduced test backlogs. With improved science tools, such as advanced computers and new experimental facilities, the national laboratories have increased their capability to understand and resolve stockpile issues. DOD will continue to support these efforts, for example, by providing sufficient flight test assets.

Beyond their national deterrent mission, the national laboratories contribute greatly to our efforts in nonproliferation and WMD counterterrorism. They have become "dual-use" nuclear security research and development organizations that provide considerable leverage to enhance all aspects of global security. Prioritizing these important missions among U.S. national security objectives and supporting the laboratories with sufficient resources are mandatory for recruiting, training, and retaining a talented workforce.

DOD STOCKPILE REQUIREMENTS

Today, the U.S. nuclear weapon stockpile is the smallest it has been since the Eisenhower administration. All three nuclear weapons laboratory directors and Commander, STRATCOM, assess the stockpile annually. The most recent assessment found that the stockpile is safe, secure, and effective and that there is no need to conduct explosive nuclear testing.

Looking to the future of the nuclear arsenal, DOD and DOE will continue several weapon-system LEPs in fiscal year 2013 to support long-term deterrence capabilities. Among the near-term efforts, DOE will continue the B61 and W76 LEPs. Given fiscal challenges, the NWC agreed to extend the duration of the LEPs, enabling DOD to meet deterrence requirements effectively while more efficiently managing annual costs among multiple programs.

Other ballistic missile warheads are also nearing end-of-life. DOD and DOE are conducting a W78/W88 common warhead study to examine a warhead option that could be deployed with both ICBMs and SLBMs. To leverage this effort, DOE, the Air Force, and the Navy are jointly developing a modern Arming, Fuzing, and Firing system, initially for the W88 SLBM warhead but also adaptable for use in a potential W78/W88 common warhead.

Efforts to develop a common warhead for deployment on multiple platforms would allow DOD to reduce the number of warhead types in the stockpile and the number of warheads needed to maintain the nuclear deterrent should a failure occur with

a delivery platform or warhead. Warhead commonality would also allow for substantial reductions in life-cycle and production costs.

Life extension of the B61 gravity bomb is needed for support to the bomber leg of the triad and to provide U.S. extended deterrence to our allies. The NPR reaffirms both the extended and strategic deterrent roles of the B61 and affirmed its full-scope life extension. The result will be the B61 mod 12 bomb, which will replace four of the five B61 variants (mods -3,-4,-7, and -10), further promoting efficiencies and lowering costs.

DELIVERY SYSTEMS AND COMMAND AND CONTROL MODERNIZATION

DOD will continue to modernize programs for the delivery systems that underpin nuclear deterrence. The NPR's conclusion to retain a nuclear triad of ICBMs, SLBMs, and nuclear-capable heavy bombers is premised on maintaining these delivery systems, and the President's fiscal year 2013 budget reflects this approach.

Sustaining the sea-based, and most survivable, leg of our nuclear deterrent is particularly vital as we move to lower numbers under the New START treaty. To ensure the continued health of this critical capability, the service lives of our Trident D–5 missiles are being extended to 2042, and construction of the first of the *Ohio*-class replacement submarines is scheduled to begin in 2021. As mentioned, this represents a 2-year slip compared with last year's plan. However, the Navy believes it can manage the challenges resulting from the delay: specifically, that the first *Ohio*-class SSBNs would reach end-of-life before replacement boats come on-line, and that the common missile compartment would be installed first in the new British submarine. Twelve new boats are planned for purchase, with the first scheduled to begin patrol in 2031. All DOD sustainment and modernization efforts for the submarine-based deterrent are fully funded in the President's fiscal year 2013–2017 request.

With respect to ICBMs, the administration plans to sustain the Minuteman III (MMIII) through 2030. Ongoing intensive flight test and surveillance efforts will inform sustainment and modernization planning by providing better estimates for component aging and system reliability. The Air Force will begin an Analysis of Alternatives in 2013 (to be completed in 2014), examining options and required capabilities for a follow-on system. Further, a small-scale program to maintain a "warm" production line for MMIII solid rocket motors was completed last year. Among key modernization issues is sustainment of the large-diameter solid rocket motor industrial base, pending decisions to produce a follow-on system. The President's budget request includes an $8 million Air Force study to evaluate a path forward to sustain this key industrial capability.

Third, the United States will maintain two B–52H strategic bomber wings and one B–2 wing. Both bombers, however, are aging, and sustained funding and support are required to ensure operational effectiveness through the remainder of the aircrafts' service lives. The fiscal year 2013 budget request allocates funding to upgrade these platforms; for example, providing the B–2 with survivable communications, a modern flight system, and updated radar.

In addition, this year DOD intends to begin a program for a new, long-range, nuclear-capable, penetrating bomber that is fully integrated with a family of supporting aircraft and intelligence, surveillance, and reconnaissance assets. DOD continues to invest to ensure that we maintain an effective stand-off capability as the anti-access threat continues to evolve. Thus, DOD is carrying out an Analysis of Alternatives, to be completed early in 2013, for an air-launched cruise missile (ALCM) follow-on system called the long-range standoff (LRSO) missile. We plan to sustain the ALCM and the W80 ALCM warhead until the LRSO can be fielded.

To allow us to continue the U.S. nuclear presence in Europe in support of our extended deterrence and assurance commitments, DOD is planning to provide a nuclear capability to the Joint Strike Fighter to replace aging F–16 dual-capable aircraft. The original plan was to deliver a dual-capable Joint Strike Fighter (JSF) in 2017. As a result of changes in the JSF program, the Air Force now intends to deliver nuclear capability to all JSFs in Europe in the 2020 timeframe via the Block IV upgrade. The Air Force will ensure there is no gap in our ability to meet extended deterrence assurances to our allies and partners.

We also want to take note of a critical but often underappreciated component of strategic deterrence: the nuclear command and control (NC2) system that links the triad of nuclear forces. Independent of deployed delivery systems and warheads, we require robust, survivable, and effective systems for early warning, attack assessment, and force direction to support our existing nuclear employment plans, as well as associated contingencies.

An effective NC2 system must clearly and unambiguously detect and characterize an attack; assemble key decision makers in a conference so an appropriate response can be chosen in a timely manner; disseminate emergency action messages to nuclear forces taking into account the survivability of the force elements involved; and provide enduring control of surviving forces.

We plan to spend significant resources on NC2 system research and development, procurement, and operations and maintenance to address a range of challenges, including: the need for survivable satellite communications; survivable communications to forces; early-warning satellite modernization; improved, secure senior leader conferencing; hardening of critical communications links to electromagnetic pulse; and airborne and ground mobile command post sustainment/modernization.

PHYSICAL SECURITY

In addition to our efforts to revitalize weapons, delivery systems, and facilities, we continue to enhance nuclear physical security. Most notably, we have formalized DOD–DOE collaboration through a memorandum to pursue a common basis for the protection of nuclear weapons and weapons-usable fissile material. This effort will provide consistency when addressing enterprise nuclear concerns, facilitate collaborative risk-informed decisions, and provide better communication with Congress.

The first major step in this process was the Nuclear Security Threat Capabilities Assessment, which was jointly developed by the Defense Intelligence Agency and the DOE Office of Intelligence/Counterintelligence. This assessment provides the basis for developing a baseline of terrorist attack force size and capabilities to inform security system design and evaluation. DOD and DOE are moving forward to shape the methodology for vulnerability assessments, test and evaluation, and physical security standards to maximum commonality. Although the memorandum specifically links DOD and DOE efforts, DOD is also actively engaging with the Nuclear Regulatory Agency and our United Kingdom counterparts to optimize physical security methodology and our understanding of threats to the nuclear enterprise.

Finally, DOD is enhancing the physical security posture in "nuclear mission environments," where the current environments meet nuclear weapons security standards, but there is room for improvement.

INTERNATIONAL EFFORTS TO COUNTER NUCLEAR THREATS

The last area we want to highlight is DOD's efforts to ensure that terrorists and proliferators cannot access nuclear materials and expertise abroad. Since September 11, 2001, there has been tremendous collaboration on this goal at the Federal level. President Obama has called nuclear weapons in the hands of terrorists "the single biggest threat to U.S. security." In his words, just one nuclear weapon detonated in an American city would devastate "our very way of life" and represent a "catastrophe for the world." For this reason, the NPR outlines a series of policies that reflect the gravity of this threat. Specifically, it placed the prevention of nuclear proliferation and nuclear terrorism at the very top of its list of five key objectives.

To meet this goal, the United States has been aggressive in its threat reduction efforts; but it cannot meet this challenge alone. In President Obama's view, there is a pressing need to "deepen our cooperation and to strengthen the institutions and partnerships that help prevent nuclear materials from ever falling into the hands of terrorists." Thus, DOD and its interagency partners are building on our long history of nuclear cooperation with allies such as the United Kingdom and France to expand that partnership into threat reduction activities. This mission is growing in importance for an increasing number of countries, and we will continue to make building international partnership capacity in this area a high priority.

Just yesterday, we concluded the second Nuclear Security Summit in Seoul, South Korea. This gathering brought together more than 50 heads of state to address measures to combat the threat of nuclear terrorism, protect nuclear materials, and prevent the illicit trafficking of these materials. The Summit successfully built on the achievements of the first-ever Nuclear Security Summit in Washington, DC, in 2010, which focused on improving the security of weapons-grade plutonium and uranium. An outgrowth of the Washington, DC, Summit was the Global Nuclear Lockdown initiative, a 4-year effort to secure all vulnerable fissionable materials worldwide. This initiative involves participation from across the U.S. Government, including the Departments of State, Defense, Energy, Justice, and Homeland Security.

CONCLUSION

Upon taking office, President Obama made it a priority to sustain a safe, secure, and effective nuclear deterrent. Implementing these commitments requires a part-

nership between the executive branch and Congress. President Obama has demonstrated his commitment to these priorities, which have enjoyed strong bipartisan support in the past. We trust that Congress will continue to demonstrate the same commitment. These programs are central to our national security. They deserve full, bipartisan support.

Our nuclear forces remain the foundation of deterrence. Our arsenal needs significant and immediate investment. Given the declining defense budget, some modernization efforts may proceed more slowly than desired, but to reiterate the President's statements, the NPR, and DOD's strategic guidance, the United States will maintain a safe, secure, and effective arsenal to deter threats to our Homeland, our deployed forces around the world, and our allies and partners. The President's fiscal year 2013 budget ensures that this will remain a leading national security priority.

Senator NELSON. Thank you.

In terms of the 10-year funding plan, Secretary Creedon, Secretaries Chu and Panetta sent the letter that I referenced before to Chairman Levin, dated March 2, 2012, explaining basically that they can't give Congress the 10-year funding projections from the revised 1251 plan, now known as section 1043 of the NDAA for Fiscal Year 2012.

Maybe you can tell us what happened and when we might be able to see something from DOD on that 10-year projection?

Ms. CREEDON. We obviously recognize that the report is late. With the reductions that needed to be made in the defense budget, there were also obvious adjustments in the strategic enterprise. So, we needed some time to look at the long-term impact of the reductions that were made in the 2013 budget, for instance the 2-year delay of the SSBN–X. We are right now in the process of completing that report, so hopefully, if it doesn't take too terribly long to get through all the various review procedures in DOD, we would hope that it would be provided in weeks.

Senator NELSON. Weeks?

Ms. CREEDON. Weeks, not months. So hopefully in April.

Senator NELSON. All right, thank you.

Then, Secretary Creedon, in terms of the nuclear employment strategy, the President stated in a speech just this week in Korea that the administration is almost finished with the nuclear employment strategy that was originally called for in the 2010 nuclear posture review, and again in April of last year by National Security Adviser Donilon.

Do you have any idea when we might see that strategy?

Ms. CREEDON. Again, Senator, I think that, as the President said, we are in the final throes of concluding that work. Obviously, it's difficult to tell when the President himself will be making the final decision, when this will happen. But here again, the hope is that it will be within the next couple of weeks.

Senator NELSON. Secretary Weber, DOD signed a memorandum of understanding (MOU) with DOE to transfer some $8 billion in DOD budgetary authority to increase the top line of the NNSA budget. The MOU requires construction and operation of a new CMRR facility by 2022. Are you going to have to go back and renegotiate the terms of the MOU with the 5-year deferral of the CMRR facility proposed by NNSA in fiscal year 2013? A lot of concern has been raised about the replacement for the building and the proposal here. Can you tell us what might happen in terms of having to renegotiate?

STATEMENT OF HON. ANDREW C. WEBER, ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR, CHEMICAL, AND BIOLOGICAL DEFENSE PROGRAMS

Mr. WEBER. Thank you, Senator. We will not have to renegotiate the MOU. Through the Nuclear Weapons Council (NWC), which is the vehicle that DOE and DOD use to coordinate between, as Senator Sessions said, the consumer and the producer of the weapons in the stockpile, we had to make some hard choices this year in the President's 2013 budget request. One of those was the deferral of construction of the CMRR facility at Los Alamos for at least 5 years. The requirement for pit production capacity of 50 to 80, which is based on the current stockpile size, remains, so we accepted some schedule slip in order to sustain the critical life extension programs (LEP), such as the B61 gravity bomb LEP, which will enter the engineering development phase this year.

The uranium processing facility at the Y12 plant in Oak Ridge, TN, this budget request actually accelerates construction of that facility, which DOD recommended to DOE as a higher priority of the two facilities because we have an urgent need. The current building where secondaries are produced at the Y12 plant dates back to the 1950s and is at risk. So we essentially staggered those two facilities, putting more of a near-term emphasis on the uranium processing facility.

As far as the plutonium production capacity and capability, the revised NNSA plutonium strategy will give us some near-term capacity, we hope up to 20 to 30 pits per year, within the next 5 years, and that's very important in support of the LEP for the W78–W88 common ICBM–Submarine Launched Ballistic Missile (SLBM) warhead that we're currently studying.

Thank you.

Senator NELSON. I'll come back to that in a minute. Senator Sessions?

Senator SESSIONS. Secretary Creedon, how does DOD interface with DOE as you move forward with issues like this building? It's really not your choice whether Oak Ridge or Los Alamos goes first, is it, or is it? Are you consulted as to what you think the priorities are?

Ms. CREEDON. Senator, the NWC is a statutorily-mandated body that is actually chaired by DOD and is also populated by DOE. It's through that body that a lot of these decisions are made. It's through that body that there was a joint decision that the uranium processing facility, the facility at Y12 that Andy Weber was talking about, that builds the uranium secondaries, there was a decision that of the two buildings, if we couldn't afford to build both at the same time, which was at one point the plan, if we had to pick who goes first, NWC said plutonium goes second, uranium goes first. So that was, in fact, a joint decision of NWC.

Senator SESSIONS. A joint decision, but the money is in the DOE budget. But you participated in that decision.

Do you have any ability—I suppose you really don't, but what ability might you have to examine the plan for construction and see if it can be done at less expense? I have to say I believe we need to do whatever it takes to modernize our nuclear weapons, but I have been taken aback by the cost of these construction projects.

DOE seems to be not as responsive as I would like to see them and as intensely interested in trying to accomplish the goal at the least possible expense, if you will forgive me. I'm sure they don't see it that way, but I haven't sensed the kind of intense interest in it.

So where is that headed?

Ms. CREEDON. Again, in the context of NWC, there has been a lot of discussion about these two buildings and also about the cost of these two buildings, about the overall NNSA budget. In the MOU that Senator Nelson mentioned last year, there was an agreement for DOD to actually transfer money to NNSA, do some top-line transfers, to provide some more money to NNSA so that they could meet some of these obligations.

DOD, in particular, through NWC, but DOD independently has also been engaged pretty closely with NNSA looking at the costs of things like the LEP for the B61, also for the uranium processing facility. So for instance, the Army Corps of Engineers did a pretty comprehensive study on the costs of the uranium processing facility and their estimate in their study was about $4.1 billion.

Senator SESSIONS. $4.1 billion?

Ms. CREEDON. $4.1 billion.

Senator SESSIONS. What was the DOE estimate?

Ms. CREEDON. The DOE estimate actually had been a little bit lower originally. So the Corps, by the time——

Senator SESSIONS. It was about $8 or $10 billion total. Was that for both buildings?

Ms. CREEDON. That's about right, because the estimate at this point is they're about $4 to $4.5 billion apiece. That's where we were right now.

So the Corps' estimate when they went through it, having also built in a contingency, was actually a little more than the initial DOE. But one of the things that's really important that NNSA is doing that DOD has encouraged NNSA to do is complete the design to the 90 percent level so that you can get a really good cost estimate.

One of the historic problems with NNSA in some of the construction projects is they didn't have a good completed design, so that they didn't have really good cost estimates. So for both these two buildings they're going to get to that 90 percent design level to do real independent cost estimates, so they have a real no-kidding baseline.

Senator SESSIONS. I know I'm a Senate Budget Committee member here, but I'm not interested in buildings. I'm only interested in what we need, which is the weapons being modernized. If we have to have buildings, I guess we have to have buildings. If we have to have them, they should be as cost-effective as we possibly can get them and as much of the money as possible directed to the product that you need, the American people need, and not just for building buildings.

The fiscal year 2013 budget for NNSA makes a number of changes. During a hearing yesterday General Kehler, head of STRATCOM, testified that he is concerned with the lack of a plan and strategy to meet STRATCOM requirements. According to General Kehler, he will "be concerned until someone presents a plan

that we can look at and be comfortable with and understand that it's being supported."

Secretary Weber, do you want to comment on that? Do you agree the commitment to modernize the nuclear weapons complex was a key element in ratification of the START treaty, and do you agree that the fiscal year 2013 budget does not meet the terms of the plan that was committed to at that time?

Mr. WEBER. As Secretary Panetta and Secretary Chu indicated in their letter to Chairman Levin, modernization remains a firm commitment for them and for this administration. We are dealing with a difficult budget situation in the country and that forced us to accept a little bit of schedule risk. We are comfortable with the President's fiscal year 2013 budget request, which actually increases the NNSA funding by $363 million, about a 5 percent increase.

Where we need to do work and, as General Kehler indicated in his testimony yesterday, we need to work closely with NNSA, and we've established a joint issue team to develop an executable, affordable plan for the out-years, 2014 and on, that meet our highest priorities, which are the weapons, the LEPs for the weapons and the capabilities in the complex, in the national laboratories, that support certification of the stockpile and design and production of the actual weapons.

So we work very closely through the NWC, with General Kehler, with the Navy and Air Force Secretaries and Service Chiefs, to make sure that DOE maintains its focus on what the Nation needs for its safe, secure, and effective deterrent.

Senator SESSIONS. I guess two questions. First, I think you said you agree that modernization is universally recognized as essential to the future viability of the nuclear weapons complex, and is a prerequisite for future reductions in our nuclear arsenal; is that correct?

Mr. WEBER. Yes, Senator. Modernization is essential, and as the stockpile——

Senator SESSIONS. Now, DOD, for the record, of course, doesn't do this. DOE does this, and I understand General Kehler is saying that he's not comfortable with the plan that he's seen. He's the man that has the responsibility of receiving the weapons and he has to certify that they are ready to be used effectively if such an event were to occur.

Would you say you agree that this budget does not honor the commitments that we need to achieve that goal? It's not your fault the money is not there. I'm just asking you your professional opinion. The goals that were laid out by DOD, does this budget meet those goals?

Mr. WEBER. The fiscal year 2013 budget request does meet those goals. It's the out-years that General Kehler and I and other members of the NWC are concerned about, and we owe you, together with NNSA, as the two Secretaries described in their letter, by this summer a solid, executable plan that will ensure in the long-term that the modernization objectives are met and that we have a sustained, safe, secure, and effective deterrent for the Nation.

Senator SESSIONS. My time has expired. Thank you, Mr. Chairman.

Senator NELSON. Thank you, Senator.

There's no question that General Kehler was uncomfortable with the expectation that the future might not deliver what is needed. At best, it seems that you may be able to manufacture 20 to 30 pits per year in 5 years, whereas the MOU requires NNSA be able to have the capacity to produce 50 to 80 pits per year in the 2022 timeframe.

Has the 50 to 80 pit requirement changed? The second question is, has the timeframe when the capability is needed in 2022 changed? Secretary Weber?

Mr. WEBER. No, the DOD requirement has not changed. However, the NWC did accept some schedule risk. We accepted deferral of the CMRR facility. What we need is a capability to produce plutonium pits in the near-term, and the revised plutonium strategy that NNSA presented to the NWC will provide a 20- to 30-pit per year capacity in the near-term, within 5 years, and that will support the LEP for the common warhead that is among our highest priorities for the deterrent.

Senator NELSON. Obviously everybody is interested in meeting the timeframes and meeting the other requirements.

Let me switch now briefly here. Secretary Weber, my understanding is the initial estimates from NNSA for the B61 gravity bomb that were submitted last fall by NNSA were far too expensive and they are now having to revise downward, a less expensive option. Can you explain what's happened from your perspective as executive agent for the NWC?

Mr. WEBER. Yes. The LEP for the B61 gravity bomb, which is used for both the B–2 strategic bomber as well as our dual-capable aircraft that supports the deterrence mission in Europe, is critical. It's an aging weapon and we need to have a LEP underway.

Last summer NNSA, based on the work done at the National Laboratories, presented essentially three options for the LEP. The high-cost option exceeded the threshold military requirement and clearly was not affordable. The NWC settled on the middle option that meets our military requirements, that will enhance the safety, security, and reliability of that warhead, and that will allow for consolidation of four variants into one, which we're calling the B61–12. This is synchronized with the tail kit program that the Air Force is initiating.

Senator NELSON. Admiral Benedict, on the W76 warhead refurbishment delay, I understand NNSA has delayed the rate of refurbishment of the W76 Trident D5 warhead. What impact does this have and what kind of risk does it create for the fleet?

STATEMENT OF RADM TERRY J. BENEDICT, USN, DIRECTOR, STRATEGIC SYSTEMS PROGRAMS, U.S. NAVY

Admiral BENEDICT. Yes, sir. Mr. Chairman, as Secretary Creedon and Secretary Weber have discussed, as part of the budget discussions through the NWC, the decision was made to essentially rephase the program. The Navy will receive all operational reentry bodies and assets from NNSA by 2018. What we accepted was a 3-year delay in completing the total delivery, the last 3 years, which were the hedge requirements which we're required to have.

So in terms of impacts to the fleet, sir, there are no impacts from an operational warfighting requirement due to the readjustment of the schedule.

[The prepared statement of Admiral Benedict follows:]

PREPARED STATEMENT BY RADM TERRY J. BENEDICT, USN

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, distinguished members of the subcommittee, thank you for this opportunity to discuss Navy's strategic programs. It is an honor to testify before you this morning representing the Navy's Strategic Systems Programs (SSP).

SSP's mission is to design, develop, produce, support, and ensure the safety of our Navy's sea-based strategic deterrent, the Trident II (D5) Strategic Weapon System (SWS). The Trident II (D5) Submarine Launched Ballistic Missile (SLBM) represents the Nation's most survivable strategic deterrent capability. The men and women of SSP and our industry partners remain dedicated to supporting the mission of our sailors on strategic deterrent patrol and our marines and sailors who are standing the watch, ensuring the security of the weapons we are entrusted with by this Nation.

The Navy provides the most survivable leg of the U.S. nuclear triad with our ballistic missile submarines (SSBNs) and the Trident II (D5) SWS. A number of factors have contributed to an increased reliance on the sea-based leg of the triad. The 2010 Nuclear Posture Review reinforced the importance of the SSBNs and the SLBMs they carry. Under the New START treaty, SLBMs will comprise a majority of the Nation's operationally deployed nuclear warheads, thus increasing the Nation's reliance on the sea-based leg.

Ensuring the sustainment of the sea-based strategic deterrent capability is a vital, national requirement today and into the foreseeable future. Our budget request provides the required funding in fiscal year 2013 for the Trident II (D5) SWS. To sustain this capability, I am focusing on four priorities: Nuclear Weapons Surety; the Trident II (D5) SWS Life Extension Program; the *Ohio* Replacement Program; and the Solid Rocket Motor (SRM) Industrial Base. Today, I would like to discuss my four priorities and why these priorities are keys to the sustainment of the Navy's sea-based strategic deterrent and its future viability.

NUCLEAR WEAPONS SURETY

The first priority I would like to address, and arguably the most important priority, is the safety and security of the Navy's nuclear weapons. Navy leadership has clearly delegated and defined SSP's role as the program manager and technical authority for the Navy's nuclear weapons and nuclear weapons security.

At its most basic level, this priority is the physical security of one of our Nation's most valuable assets. Our Marines and Navy Masters at Arms provide an effective and integrated elite security force at our two Strategic Weapons Facilities in Kings Bay, GA, and Bangor, WA. U.S. Coast Guard Maritime Force Protection Units have been commissioned at both facilities to protect our submarines as they transit to and from their dive points. These coast guardsmen and the vessels they man provide a security umbrella for our *Ohio*-class submarines. Together, the Navy, Marine Corps, and Coast Guard team form the foundation of our Nuclear Weapons Security Program.

SSP's efforts to sustain the safety and improve the security of these national assets continue at all levels of the organization. My command maintains a culture of self-assessment in order to sustain safety and security. We continue to focus on the custody and accountability of the nuclear assets that have been entrusted to the Navy. SSP's number one priority is to maintain a safe, secure and effective strategic deterrent.

D5 LIFE EXTENSION PROGRAM

The next priority I would like to discuss is SSP's life extension efforts to ensure a future, effective, and reliable sea-based deterrent. We are executing the Trident II (D5) Life Extension Program in cooperation with the United Kingdom, under the auspices of the Polaris Sales Agreement. I am pleased to report that our longstanding partnership with the United Kingdom remains strong.

The Trident II (D5) SWS continues to demonstrate itself as a credible deterrent and exceeds the operational requirements established for the system almost 30 years ago. Our allies and any potential rivals are assured the U.S. strategic deter-

rent is ready, credible, and effective. However, we must remain vigilant of age-related issues to ensure a continued high level of reliability.

The Trident II (D5) SWS has been deployed on our *Ohio*-class ballistic missile submarines for over 20 years, and is planned for a service life of 50 years. This is well beyond its original design life of 25 years and more than double the historical service life of any previous sea-based deterrent system. As a result, significant efforts will be required to sustain a credible and viable SLBM force from now until the end of the current *Ohio*-class SSBN in the 2040s as well as the end of the service life of the *Ohio*-replacement SSBN in 2080s.

The Navy is proactively taking steps to address aging and technology obsolescence. SSP is extending the life of the Trident II (D5) SWS to match the *Ohio*-class submarine service life and to serve as the initial baseline mission payload for the *Ohio*-replacement submarine platform. This is being accomplished through an update to all the Trident II (D5) SWS subsystems: launcher, navigation, fire control, guidance, missile and reentry. Our flight hardware—missile and guidance—life extension efforts are designed to meet the same form, fit, and function of the original system, in order to keep the deployed system as one homogeneous population and to control costs. We will also remain in continuous production of energetic components such as solid rocket motors. These efforts will provide the Navy with the missiles and guidance systems we need to meet operational requirements.

SSP recently achieved a significant programmatic milestone in our life extension program. The first end-to-end operational test of Trident II (D5) life-extension guidance system was successfully conducted in February from the USS *Tennessee* (SSBN 734). SSP embarked on a major overhaul of the guidance system over a decade ago to extend the life of the guidance system to match the hull-life of the *Ohio*-class SSBNs. This represented the most significant guidance engineering effort since the development of D5 over 30 years ago.

Another major step to ensure the continued sustainment of our SWS is our SSP Shipboard Integration efforts, which utilizes open architecture and commercial off-the-shelf hardware and software for shipboard systems. The first increment of this update is now being installed throughout the fleet and training facilities. To date, installation is complete on seven U.S. SSBNs and all four United Kingdom SSBNs. This effort is a technical obsolescence refresh of shipboard electronics hardware and software upgrades, which will provide greater maintainability of the SWS and ensure we continue to provide the highest nuclear weapons safety and security for our deployed SSBNs.

To sustain the Trident II (D5) SWS, SSP is extending the life of the W76 reentry system through a refurbishment program known as the W76–1. This program is being executed in partnership with the Department of Energy, National Nuclear Security Administration. The W76–1 refurbishment maintains the military capability of the original W76 for approximately an additional 30 years.

In addition to the W76–1, the Navy also is in the initial stages of refurbishing the W88 reentry system. The Navy is collaborating with the Air Force to reduce costs through shared technology. These programs will provide the Navy with the weapons we need to meet operational requirements throughout the *Ohio* service life and the planned follow-on platform.

OHIO REPLACEMENT PROGRAM

One of the highest Navy priorities is the *Ohio* Replacement Program. The continued assurance of our sea-based strategic deterrent requires a credible SWS as well as the development of the next class of ballistic missile submarine. The Navy team is taking aggressive steps to ensure the *Ohio* Replacement SSBN is designed, built, and delivered on time with the right capabilities at an affordable cost.

The Navy team has the benefit of leveraging the success of the *Virginia*-class build program and the opportunity to implement many of those lessons-learned to help ensure we design the *Ohio* Replacement Program for affordability both in terms of acquisition and life cycle maintenance. Maintaining this capability is critical to the continued success of our sea-based strategic deterrent now and into the future.

The *Ohio* Replacement Program will replace the existing *Ohio*-class submarines. To lower development costs and leverage the proven reliability of the Trident II (D5) SWS, the *Ohio* Replacement SSBN will enter service with the Trident II (D5) SWS and D5 life-extended missiles onboard. These D5 life extended missiles will be shared with the existing *Ohio* Class submarine until the current *Ohio*-class retires. Maintaining one SWS during the transition to the *Ohio*-class replacement is beneficial from a cost, performance, and risk reduction standpoint.

A critical component of the *Ohio* Replacement Program is the development of a common missile compartment that will support Trident II (D5) deployment on both the *Ohio*-class replacement and the successor to the United Kingdom *Vanguard*-class. The United States and the United Kingdom have maintained a shared commitment to nuclear deterrence through the Polaris Sales Agreement since April 1963. The United States will continue to maintain its strong strategic relationship with the United Kingdom for our respective follow-on platforms, based upon the Polaris Sales Agreement. As the Director of SSP, I am the U.S. Project Officer for this agreement. Our programs are tightly coupled both programmatically and technically to ensure we are providing the most cost effective, technically capable nuclear strategic deterrent for both nations.

Consistent with the defense strategic guidance, the Navy is delaying the *Ohio* Replacement Program by 2 years. While the overall program is being delayed by 2 years, we are maintaining the original program of record for the design of the common missile compartment and SWS deliverables in order to meet our obligations to the United Kingdom. The United States and United Kingdom are working jointly to prioritize risk and develop a mitigation plan underthe auspices of the Polaris Sales Agreement.

Our continued stewardship of the Trident II (D5) SWS is necessary to ensure a credible and reliable SWS is deployed today on our *Ohio* Class submarines, as well as in the future on the *Ohio* Replacement SSBN. This is of particular importance as the reliance on the sea-based leg of the Triad increases as New START treaty reductions are implemented. The *Ohio* Replacement will be a strategic, national asset whose endurance and stealth will enable the Navy to provide continuous, uninterrupted strategic deterrence into the 2080s.

SOLID ROCKET MOTOR INDUSTRIAL BASE

The fourth priority I would like to discuss is the importance of the defense and aerospace industrial base. In particular, the decline in demand for the SRM industry has placed a heavy burden on Navy resources. The Navy is maintaining a continuous production capability at a minimum sustaining rate of 12 rocket motor sets per year through the Future Years Defense Plan. However, we previously have faced significant cost challenges as both the National Aeronautics and Space Administration (NASA) and Air Force demands have declined.

Over the past few years the Navy has worked with our industry partners to reduce overhead costs and minimize cost increases to the Department. Despite many efforts to address this issue, the industrial base remains volatile. Potential future unit cost increases due to further decline in SRM industrial base demand could impact the D5 Life Extension Program. We will continue to cautiously monitor the industrial base.

The Office of the Secretary of Defense-led Interagency Task Force developed a SRM Industrial Base Sustainment and Implementation Plan. One of the conclusions of the report is that "The Department must preserve the scientific, engineering and design skills and production capabilities necessary to support both large- and small-SRMs." SSP will continue to work with our industry partners, the Department of Defense, NASA, Air Force, and Congress to sustain the SRM industrial base and find ways to maintain successful partnerships to ensure this vital national capability is maintained.

CONCLUSION

SSP will continue to maintain a safe, secure, and effective strategic deterrent capability and focus on the custody and accountability of the nuclear assets entrusted to the Navy. Our budget request provides the necessary funds to sustain this capability in fiscal year 2013. However, we must continue to be vigilant of unforeseen age-related issues to ensure the high reliability required of our SWS. SSP must maintain the engineering support and critical skills of our industry and government team to address any future issues with the current system as well as prepare for the future of the program.

Our Nation's sea-based deterrent has been a critical component of our national security since the 1950s and will continue to assure our allies and deter our rivals well into the future. I am privileged to represent this unique organization as we work to serve the best interests of our great Nation.

Senator NELSON. Admiral Benedict, I understand that the *Ohio* replacement's going to be delayed 2 years. Once again, can you explain what impacts this may have on the common missile compartment program that you manage with the British, and how old the first *Ohio*-class boat will be when it's retired?

Admiral BENEDICT. Yes, sir. Today the *Ohio* replacement program will have 12 submarines, which will replace the 14 existing *Ohio*-class submarines. You're correct that the decision was made to delay by 2 years. Having 12 *Ohio* replacement submarines will give us the 10 operational that we require in order to support the STRATCOM at-sea requirement.

We will have a period of time, essentially through the 2030s, when we will be at that 10 minimum number in order to sustain the warfighting requirement. That will impose additional risk on the Navy. We believe that is manageable. Essentially, all *Ohio*-class will be, give or take a number of months, sir, within about 42 years of age at their retirement.

Senator NELSON. My time has expired. Senator Cornyn.

Senator CORNYN. Thank you, Mr. Chairman.

I just have a few questions with regard to nuclear modernization funding. When the New START treaty was ratified in the Senate, there were certain representations made by the administration, as well as assurances given by the appropriators in the Senate. I hear Senator Sessions may have touched on this some.

During yesterday's full committee hearing of the Senate Armed Services Committee, General Kehler of STRATCOM expressed his concerns about the funding shortfall in the President's budget request. Using the 1251 modernization plan as a baseline, the fiscal year 2013 request falls $372 million short and funding between fiscal years 2012 and 2017 could fall $4 billion short on the 1251 commitment.

General Kehler noted the slips to the B61 and W75 LEPs indicated that, while it would increase risk, it would be manageable, which I appreciate always. When our military says it's manageable, that's your job, to manage with the resources that you are given; not that it's optimal, but that it may be manageable.

He was concerned about deferring the start of construction of the plutonium handling facility, the CMRR facility, and perhaps more important, was uncertain about the administration's alternative course of action for producing the necessary number of nuclear pits to maintain a responsive infrastructure. It seems odd to me that DOD would agree to the fiscal year 2013 funding request and alternative to CMRR without knowing whether it's technically feasible or cost-effective or whether the funding will be provided in the outyears necessary to accomplish these tasks.

So I would ask, Secretary Creedon and Secretary Weber, perhaps in light of these comments, can you tell us whether you share these concerns and what the state of thinking of DOD is with regard to the way forward. How could NWC approve the fiscal year 2013 budget request with so much uncertainty?

Ms. CREEDON. Thank you, sir. In general terms, yes, we do share the concerns of General Kehler. To focus on the 2013 budget request, at the moment, the 2013 budget request is okay. We've made

some adjustments in some of the scheduled programs, but 2013 is okay.

Where we are all concerned and where we have work to do is in the out-years.

Senator CORNYN. If I may just ask for clarification, you say you're okay in fiscal year 2013, and that is because the funding request meets what was represented to be the prospective funding at the time the New START treaty was ratified?

Ms. CREEDON. 2013 is a little bit less than what was projected to be in 2013 in the 1251 report, but it's only a slight degree. It's only a little bit less, and it's more than the appropriated amount in 2012. With some schedule adjustments to some of the systems, specifically the 61, the 76–1 LEP, there's been some opportunity to have this reduction and have 2013 be okay.

Now, one of the big issues, obviously, is the issue of not doing both the plutonium building and the uranium building simultaneously. That was the decision that NWC made, to put the uranium building first and the plutonium building second, with some adjustments that NNSA is going to do in their overall plutonium strategy to allow an increase in production at the PF4 facility where the pits are actually made. So PF4 is the facility where pits are actually made and the CMRR, in other words the replacement facility, is where they do a lot of the analytical work, they store the plutonium, and they do a lot of the support work to allow the production of the pits.

So with some adjustments in the PF4 building and some adjustments throughout the complex, there is an ability to increase the production at PF4 in the near-term to about 20 pits and possibly a little bit more in the near-term, until we can get the plutonium building completely designed, the uranium building built, and then the plan is to go back then and pick up the construction and funding of the CMRR, the plutonium building.

So that's the current plan. But we need to fit this in the out-year's budgets, because right now the out-year's budgets are, as General Kehler said, not a reliable plan at the moment.

Senator CORNYN. So if I understood you correctly, there is a potential of producing as many as 20 pits using the current operations facility?

Ms. CREEDON. Yes.

Senator CORNYN. But the requirement is multiples of that, is it not?

Ms. CREEDON. The objective requirement is 50 to 80, based on what the longer-term LEP decisions are. So right now, with the decisions for the LEP on the 61 and the completion of the 76–1, the capability at PF4 that will be provided in the interim is adequate. It's the decision on the next round of LEP that starts to then generate the requirement for pits at PF4.

Senator CORNYN. Mr. Chairman, may I have one last question, if I may, please?

Senator NELSON. Sure, sure.

Senator CORNYN. I'd like to ask whether DOD would be willing to help our committee identify efficiencies within the National Laboratories or NNSA that would free up funding for the important weapons LEPs or perhaps even to fund the construction of CMRR

on its original schedule. In other words, about $300 million is needed in fiscal year 2013 and $1.8 billion over the next 5 years.

First of all, do you believe that there are efficiencies that could be identified within the National Laboratories and NNSA? If there are, would you be willing to work with us to try to find those in a way that keeps the original commitment, that I believe a lot of Senators relied upon in voting to ratify the New START treaty?

Ms. CREEDON. Senator, we would be happy—in fact, DOD is working very closely with NNSA right now, going through a process to try and identify efficiencies. But at some point, it really depends on what the annual budget is as to what we can accomplish. Even with efficiencies, there's only so much you can do with efficiencies based on whatever the outyear top line is. But we would be more than happy—in fact, we've already started that process internally.

Senator CORNYN. I appreciate that. We'll be happy to work with you to find those, and if there's money that's not being used to good purpose it seems to me that that's something—that's a commitment that was made that we need to make sure is kept.

Thank you, Mr. Chairman.

Senator NELSON. Thank you, Senator Cornyn.

Senator Reed.

Senator REED. Thank you very much, Mr. Chairman.

Thank you, witnesses. I think the chairman touched upon the delay of the *Ohio*-class submarine, but I want to ask a few more questions. When General Kehler was before us as STRATCOM commander, in response to Senator Blumenthal he pointed out that survivability of the deterrent is one of the key factors that must be considered. My understanding of this conversation was that he saw the submarine as providing the most survivable deterrent and therefore the *Ohio*-class replacement is the top priority in terms of the rebuilding or refurbishing the nuclear triad.

Madam Secretary, can you talk about this priority in the context of support by DOD to the Navy to make sure we get this done? Because I think one of the issues that we're running into, and I think similarly with respect to the other Services, these platforms, this replacement, is expensive. It crowds out shipbuilding and other key aspects that we have to do, unless there's some support from DOD because of the strategic nature of the platform.

Can you comment on that, Madam Secretary?

Ms. CREEDON. Yes, sir. From a policy perspective, maintaining all three legs of the triad is DOD and the administration's commitment, and the submarine, as you mentioned, is the most survivable leg of the triad. So from a policy perspective, the ability to maintain and fund that leg of the triad is critical.

But, recognizing the fiscal constraints, the decision to slip the first Trident—to slip the program by 2 years and then save about $4 billion within the Future Years Defense Program, that level of risk was acceptable. We recognize the fiscal constraints and it still maintains the commitment to the triad.

For any operational specifics, I think I'd rather defer, though, to Admiral Benedict.

Senator REED. I'd be happy to hear from Admiral Benedict. One further elaboration is that this slip is just for 2 years, so we will

begin in earnest the research and design, construction, et cetera. But what happens still, even though we've pushed the problem back 2 years, at some point you have a lot of different platforms, ships in this case, that have to be built and, given the strategic nature of this system, the Navy top line might have to be adjusted upwards by DOD resources to make sure it can be done to maintain the triad, all three parts of it, but leading with the submarine.

Admiral Benedict, please, your comments?

Admiral BENEDICT. Yes, sir, Senator. As Mr. Stackley and Vice Admiral Blake described this morning, the Navy is in conversation, Navy leadership, with the Office of the Secretary of Defense (OSD) on the potential to do that. Those discussions are ongoing. It's clearly recognized within all levels of leadership the pressure that the *Ohio* replacement program puts on the total Navy shipbuilding program, and I believe that those discussions will run their course in due time, sir, as Mr. Stackley described.

Senator REED. Thank you.

A final question and this goes back to the very difficult budget choices you have to make. You might want to comment, and this is not particularly profound—we're going to have to do some prioritizing in terms of what we build and the sequence of building these platforms. So the goal is, and I agree with you, to maintain the triad, but the pace of replacement of air- and land-based systems and sea-based systems is something that you're going to have to consider because of the budget. Is that fair?

Ms. CREEDON. Yes, sir. Looking from a policy perspective, again looking at all of the systems in the triad, looking at what their current life expectancy is, when we need new ones, that's part of the overall OSD discussions in terms of maintaining the triad. At the moment it was clear that, based on the extended life of the hull of the Tridents, that was an acceptable risk, to slip it by 2 years.

On the other hand, the bombers stayed on schedule and we're continuing with the Minuteman LEP to get the Minuteman up to 2030.

Senator REED. One final question. That is, there's a new—I guess it's not that new, but there's a new factor. That's cyber, in terms of development of systems, the deployment of systems, the survivability of systems. I'm old enough—in the 1950s, 1960s, 1970s, this was not a significant factor. I'm talking about the effect of a cyber attack, not on military installations directly, but the utilities that serve it, so that your power's down, disrupting communications, et cetera.

Is that being weighed also, and does that go to the point that General Kehler made about the survivability of the seaborne deterrent because of its potential to withstand cyber? Conversely, are other systems more vulnerable to cyber? It's a big question, but if anyone would like to comment.

Ms. CREEDON. Other than just generally yes, we are looking at that. Nuclear command and control is extraordinarily important. But in terms of the specifics for the platform, I would prefer, frankly, to defer to my colleagues from the Services.

Senator REED. General?

STATEMENT OF LT. GEN. JAMES M. KOWALSKI, USAF, COMMANDER, AIR FORCE GLOBAL STRIKE COMMAND, U.S. AIR FORCE

General KOWALSKI. Yes, Senator. We just wrapped up a study of the cyber vulnerabilities of the ICBM and the conclusion of the study was it was an invulnerable system in terms of getting into the actual command and control. I take your point, that some of the supporting systems might be vulnerable. In fact, we've already taken measures to close those gaps. It was a worthwhile effort. It took us about a year.

In our other systems, we have looked at the same thing and we're pretty confident with where we are.

[The prepared statement of General Kowalski follows:]

PREPARED STATEMENT BY LT. GEN. JAMES M. KOWALSKI, USAF

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, and distinguished members of the subcommittee; I am honored to appear again before you today as the Commander of Air Force Global Strike Command (AFGSC), representing nearly 24,000 dedicated airmen and civilians.

Our mission at AFGSC is clear. We organize, train, and equip combat ready forces for nuclear deterrence and global strike operations with an intense focus on ensuring a safe, secure, and effective nuclear arsenal and global strike force to support the President of the United States and the combatant commanders.

As we move forward in reducing our force to the New START levels, I am confident that with your support our airmen will meet that mission while demonstrating the disciplined professionalism our Nation expects of the stewards of this fundamental national security capability.

AIR FORCE GLOBAL STRIKE COMMAND UPDATE—ORGANIZE, TRAIN, EQUIP

I would like to take this opportunity to update you on the command by discussing the initiatives and challenges to "organize, train, and equip" our force so we remain ready across a broad mission set. Only through constant attention to readiness metrics can we responsibly balance fiscal austerity with ready forces to support the combatant commanders for nuclear deterrence and a broad range of conventional missions.

Organize

During this past year, our Command grew with the transfer of nuclear weapons Munitions Squadrons from Air Force Materiel Command. This transfer to AFGSC further strengthened the nuclear enterprise through enhanced unity of command and streamlined operational coordination. Additionally, we activated a new munitions division at the headquarters to provide advocacy, guidance and oversight to the conventional, nuclear, and armament systems activities across the command.

We also strengthened the nuclear enterprise through our efforts as the core function lead integrator for Air Force nuclear deterrence operations. In support of the Air Force corporate planning and programming structure, we developed the Nuclear Deterrence Operations Core Function Master Plan (NDO CFMP) in collaboration with key stakeholders across the Air Force. The NDO CFMP aligns nuclear deterrence strategy, operating concepts, and capability development. It is a long range plan that forms a reference point for helping the Air Force mold its strategic priorities, risks, and tradeoffs.

As we looked for opportunities to improve our nuclear deterrence operations, we won approval to serve as the chief architect for the Air Force Nuclear Command and Control system. This strengthens our role as lead program manager for 14 nuclear command, control, and communications (NC3) systems and programs. In this capacity, AFGSC created a roadmap to effectively sustain the Strategic Automated Command and Control System through 2030.

We also found that by developing a governance structure of stakeholders in our key weapon systems we were able to establish relationships and understanding that has led to continued improvements in weapon system performance and faster solutions to problems. These General Officer Steering Groups for the B–2, B–52, Min-

uteman III, and UH–1N ensure decisionmakers prioritize and resolve key sustainment support issues.

To better support our missile wings, AFGSC adopted the Schlesinger Report recommendation to renew the assignment of intelligence officers to the missile wings. Today, those officers fill a critical gap, providing a better understanding of real-world events and deploying a number of intelligence tools that were not previously accessible. Our missile wing intelligence officers are also playing a vital role in ensuring the safety and security of our nuclear weapons and personnel through support for force protection and anti-terrorism programs at the wings.

We also continue to refine our Nuclear Surety Council (NSC). The NSC is a quarterly meeting across our enterprise to identify nuclear surety issues and track them to resolution. During the course of 2011, the NSC successfully monitored and closed a number of issues to include improvements to nuclear convoy security, implementing technical order changes at Intercontinental Ballistic Missile (ICBM) Launch Control Centers, increasing missile field security by upgrading land mobile radio coverage, and completing permanent repairs to flooded defense access roads used to reach launch facilities in North Dakota. The success of the AFGSC NSC in 2011 ensured continued strengthening of the nuclear enterprise.

As part of our efficiency efforts, we reviewed our ongoing operations and adjusted how we provide forces to U.S. Pacific Command under the Continuous Bomber Presence (CBP) mission. We transitioned deployment duration from 4 to 6 months and changed our logistics and support concepts to reduce the rotations of aircraft, tools, and parts. These actions yielded $21 million of savings in annual flying hours and logistic shipment costs.

Train

In partnership with Air Combat Command we reviewed and prioritized our aircrew training to better align with the missions the combatant commanders have told us are most important to them. We have improved the execution of our flying hour program and established benchmarks for sortie production. The most critical training in our bomb wings—for operations, maintenance, munitions and support—is done by generating the sorties needed to meet the weekly flying schedule.

AFGSC played a major role in U.S. Strategic Command's (STRATCOM) capstone nuclear exercise, while also directing the first major command-level nuclear operational readiness exercise in over 20 years. These two major exercises serve to focus the command's nuclear training and provide recurring mission emphasis.

Conducting inspections is an essential command function, and we have made significant progress in this area. Over the course of the last year, the command conducted 19 scheduled and no-notice inspections of which 15 were focused on strategic bomber and ICBM nuclear mission areas. We also established an Inspection Deficiency Review Board to track deficiencies indentified during our unit inspections. This deliberate process puts the command staff's attention on both the deficiencies and corrective actions.

Another command initiative is to reduce, synchronize, and integrate all non-nuclear inspections, audits, assessments, and evaluations into a consolidated unit inspection regime providing commanders at every level a more comprehensive organizational assessment of readiness and compliance.

This initiative, coupled with our efforts that deconflict and synchronize inspection and exercise schedules, provides a more predictable unit calendar allowing our wing commanders additional time to focus on individual and small unit training.

Exercises and inspections are important training tools, but we are also using competition to promote esprit de corps and stimulate tactical innovation. Global Strike Challenge 2011 marked it's the second year as the Air Force's premiere bomber, missile, security forces, and maintenance competition. The competition is rooted in the rich heritage of Strategic Air Command's Proud Shield, Giant Sword, and Olympic Titan competitions. Global Strike Challenge has become an event that Airmen across the command eagerly anticipate and has contributed to improved morale, pride in our mission, and a culture of excellence through the crucible of competition.

Equip

AFGSC is the lead command for the B–2, B–52, Minuteman III, and UH–1N weapon systems. We identify requirements, advocate and program for resources, and maintain weapons systems stewardship for these mission-critical assets.

B–2

Our 20 B–2s represent the Nation's only long-range bomber capable of penetrating advanced enemy air defenses in an anti-access, areal denial scenario. The B–2 is the most modern bomber in America's arsenal, yet it is approaching 20 years old.

The President's budget contains critical B–2 sustainment initiatives, to include $656 million for modernization of the B–2's Defensive Management System which will improve aircrew awareness and facilitate avoidance of modern and future air defense threats. This system is crucial to the B–2's ability to hold any target at risk by penetrating enemy air defenses.

The B–2 has other important requirements to be addressed in the future. A secure, survivable, strategic communications path is required as current communications systems rapidly approach the end of their service life. We are working a more affordable very low frequency/low frequency solution to prevent a nuclear-survivable communications gap while we await the maturation of a common EHF SATCOM terminal for integration on the B–2.

B–52

The B–52Hs flying today entered service from 1961 to 1962. Regularly updated over the past 50 years, the dual-role capable B–52 is capable across the range of military operations and employs the widest variety of ordnance in the fleet.

We are celebrating this year as the "Year of the B–52," marking both the 50th anniversary of the last delivery of a B–52 to Minot AFB, and the 60th anniversary of the first test flight of the YB–52. This aircraft may be the most universally recognized symbol of American airpower, and its contributions to our national security through the Cold War, Vietnam, Operation Desert Storm, Kosovo, Operation Iraqi Freedom, and Allied Force are remarkable. We invite Congress to join us in this celebration.

Of course, there are B–52 sustainment issues we must address. The President's budget request contains $24 million for a 1760 databus to the B–52's internal bomb bay. This upgrade will enable the B–52 to carry 20 J-series "smart" weapons instead of 12, and the internal carriage of smart weapons also improves the aircraft's fuel efficiency. Finally, this upgrade will allow us to carry mixed internal weapons loads, providing even more flexibility for combatant commanders.

Future B–52 requirements include a data link and voice communications to facilitate net-centric warfare operations envisioned in the Air/Sea Battle concept. The aging radar on the venerable bomber will also need to be replaced within the next decade as sustainment costs grow and failure rates increase.

Minuteman III

The Minuteman III ICBM is the least expensive and most responsive leg of the nuclear triad and is fundamental to ensuring strategic stability with nuclear peers. The Minuteman III dramatically complicates any adversary's offensive and defensive plans, and hedges against technical or geo-political surprise.

The Minuteman III system became operational in 1970 with an expected life span of 10 years but still maintains an alert rate of over 99 percent. We thank Congress for funding a number of sustainment programs to include replacing the boosters, upgrading environmental controls, modernizing security and support equipment, and procuring new reentry system payload transport vehicles.

The President's fiscal year 2013 budget request fully funds warhead fuze replacement initiatives in partnership with the Navy, a new transporter erector, and continues effort toward the next solid rocket motor program. We continue to closely examine emerging needs to include guidance systems upgrades to ensure Minuteman III reliability and readiness through 2030.

UH–1N

With the proposed termination of the Common Vertical Lift Support Program (CVLSP), also known as the common support helicopter (CSH), the Air Force will continue to fly UH–1N "Hueys," with a focus on two critical national security missions: nuclear asset security for AFGSC and Continuity of Operations/Continuity of Government taskings for the Air Force District of Washington.

The average age of the UH–1N fleet is over 40 years old. Anticipating the Air Force may fly the UH–1N for another decade or longer, we must selectively modernize the UH–1N to minimize existing capability gaps and to avoid increased sustainment costs brought on by obsolescence. These efforts include making the cockpit fully night vision compatible, upgrading the sensors to better support our security mission, and performing some delayed safety and sustainment improvements. We will continue to look for pragmatic and creative ways to mitigate risk with the current fleet.

Long-Range Strike Family of Systems

We are strong advocates and partners in the development of a Long-Range Strike (LRS) Family of Systems that will provide a visible deterrent and global strike capability well into the future. The Air Force LRS strategy conceptually uses a Family

of Systems construct consisting of three precision-strike pillars: a Long-Range Strike Platform (LRSP), a Long Range Standoff Missile (LRSO), and a Conventional Prompt Global Strike (CPGS) capability. Work continues on the Analysis of Alternatives (AoA) for LRSO to replace the Air Launched Cruise Missile (ALCM), though recent budgetary realities have resulted in a 2-year slip of this program. The AoA will be completed in late 2012 and will be used to inform future funding decisions.

We are also eager to make progress with Air Combat Command in developing and fielding the new Long-Range Strike Bomber. This bomber will be essential in providing capabilities needed for strategic deterrence of adversaries fielding advanced anti-access and area denial weapons. Those capabilities must include penetrating denied airspace to find and efficiently engage mobile systems and time sensitive targets.

Ground Based Strategic Deterrent

In March 2010, STRATCOM requested AFGSC initiate mission requirements analysis for the Ground-Based Strategic Deterrent, the follow-on system to the Minuteman III. The Nuclear Posture Review reiterated the need and stated that although a decision on any follow-on ICBM is not needed for several years, studies to inform that decision are needed now.

In January of last year, we began the Capabilities Based Assessment (CBA), which is the first step in the Joint Capabilities Integration and Development System process. The CBA was a joint effort of a team composed of representatives from across the Air Force, the Office of the Secretary of Defense, and the Joint Force. The CBA took a "strategy to task" look at higher level guidance and from that guidance, identified those tasks required to meet our mission objectives. The next step is to conduct a formal AoA identifying potential solutions and provide comparative cost, effectiveness, and risk assessments of each. This work is scheduled to start March 2013.

CHALLENGES AND CONCLUSION

Our challenge for the next year is to strengthen a culture in which every airman embraces the special trust and responsibility of our nuclear deterrent mission, maintaining our excellence in conventional missions across the range of military operations, and finally enhancing and sustaining the current force while modernizing for the future.

Mr. Chairman, our airmen continue to rise to these enduring challenges and they have made measurable improvements across the command. It is my distinct privilege to lead them through the challenges, and opportunities, our Nation faces. I assure you and this committee they remain fully committed to executing all current missions to the highest standards, and I know their professionalism allows AFGSC to stand by its motto: To Deter and Assure.

Senator REED. Thank you very much.

Senator NELSON. Thank you, Senator Reed.

Senator Sessions.

Senator SESSIONS. Secretary Creedon, does DOD agree that the 5-year delay in the CMRR is acceptable?

Ms. CREEDON. Yes, sir. We looked at the budgetary constraints. We looked at the requirements for pits. We looked at the relative conditions of the two buildings, and looked at some of the efficiencies that actually NNSA has identified, and decided that we can't build two—there's not enough money to build the two buildings concurrently and the most critical——

Senator SESSIONS. I know that. You're saying we don't have the money.

Ms. CREEDON. We don't have the money.

Senator SESSIONS. You had a requirement. Has the requirement for 50 to 80 pits per year changed?

Ms. CREEDON. No, sir, that requirement has not changed. But the timing of when we need 50 to 80 pits has also moved.

Senator SESSIONS. But you had a requirement to have the 50 to 80 pits within a time period that's no longer going to be met, is that right?

Ms. CREEDON. That's true.

Senator SESSIONS. That's basically what I was asking. So you have a requirement. We've run out of money and now you say we've changed, and it's not meeting the requirement we had just recently. So this worries me.

Isn't it true, and I'm not sure I should get our military people involved in this, but, Admiral Benedict, is it true the budget would result in a 2-year delay of the B61 LEP, moving the production from 2017 to 2019? Or is that General Kowalski?

Admiral BENEDICT. Senator, that's the Air Force.

Senator SESSIONS. All right.

General KOWALSKI. Senator, yes, it does delay it from 2017 to 2019. But that's still consistent with the lifetime of the current modifications of the B61 that we have out in the fielded force.

Senator SESSIONS. Is it true the budget would delay the completion of the W76 by 4 years and the Navy, in response, has publicly expressed concern? Is that right, Admiral Benedict?

Admiral BENEDICT. Sir, as I explained earlier, it will delay the final numbers, which are my hedge requirements, by 3 years, but the operational requirement numbers will be met on the baseline schedule.

Senator SESSIONS. Did the Navy express concern at one point?

Admiral BENEDICT. Yes, sir, the Chief of Naval Operations did.

Senator SESSIONS. Is it true this budget would delay the previously agreed-to schedule for the W78–W88 by 3 years, to 2023?

STATEMENT OF MAJ. GEN. WILLIAM A. CHAMBERS, USAF, ASSISTANT CHIEF OF STAFF FOR STRATEGIC DETERRENCE AND NUCLEAR INTEGRATION, U.S. AIR FORCE

General CHAMBERS. Yes, Senator, that's true.

[The prepared statement of General Chambers follows:]

PREPARED STATEMENT BY MAJ. GEN. WILLIAM A. CHAMBERS, USAF

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, distinguished members of the subcommittee, thank you for the opportunity to discuss your Air Force's strategic forces.

As Assistant Chief of Staff for Strategic Deterrence and Nuclear Integration, my team, on behalf of the Chief of Staff, leads planning, policy development, advocacy, integration, and assessment for the airmen and the weapon systems performing Nuclear Deterrence Operations, a core function of our U.S. Air Force. Continuing to Strengthen our nuclear enterprise remains an Air Force priority, in fulfillment of the President's mandate that, as long as nuclear weapons exist, the United States will maintain a safe, secure, and effective arsenal.

The Strategic Guidance announced by the President and Secretary of Defense on the 5th of January states, "U.S. forces will be capable of deterring and defeating aggression by any potential adversary." It continues, "Credible deterrence results from both the capabilities to deny an aggressor the prospect of achieving his objectives and from the complementary capability to impose unacceptable costs on the aggressor."

Maintaining the credibility of our strategic deterrent requires a long-term commitment to our nuclear capabilities, through sustainment, investments in modernization, and eventual recapitalization. Most importantly, it requires deliberate development of the precious Human Capital required to maintain and operate our nuclear forces, and leading-edge Intellectual Capital to provide the innovative thinking that the 21st century security setting demands. The Air Force demonstrates such commitment every day.

In a constrained fiscal environment, the Air Force has made investments in the distinctive capabilities we provide to our joint and coalition partners. One of the distinct capabilities the Air Force provides the Nation is Global Strike, and the Air

Force's ability to carry and deliver nuclear weapons to hold any target at risk is continually exercised under operational conditions. Results continue to confirm the readiness and accuracy of such capability. The Air Force helps ensure the Nation's worldwide power projection, even in the face of growing anti-access and area denial challenges, through funding of Air-Sea Battle priorities and through prudent investment in Continuing to Strengthen its Nuclear Enterprise.

REVITALIZING THINKING

Every day, about 36,000 airmen in the U.S. Air Force are performing Nuclear Deterrence Operations, a mission that remains vital in the 21st century. In many respects, the Cold War was fairly simple and mutual deterrence with the Soviet Union seemed predictable. As the 2010 Nuclear Posture Review indicated, "Russia remains America's only peer in the area of nuclear weapons capabilities. But the nature of the U.S.-Russia relationship has changed fundamentally since the days of the Cold War." During the Cold War, we became experts at Sovietology. We understood them and they understood us. Today, we have hit fast-forward in our thinking, seeking that same level of understanding about a wide array of potential adversaries and potential proliferators.

The Chief of Staff of the Air Force has tasked us to, "Revitalize thinking within the Air Force about crisis stability and 21st century deterrence dynamics." For 21st century deterrence, one size does not fit all, and deterrence of near-peers and other nuclear armed states requires new thinking and tailored application. Still, deterrence must ensure that potential adversaries, both peers and non-peers, lack incentive to use their nuclear capabilities. The non-peer case may be the most challenging, and our more likely threat. Our power projection capabilities must be credible in the eyes of potential adversaries, increasingly so in pre-crisis situations and especially in a regional context. The assurances and extended deterrence we provide allies strengthen our security relationships while supporting our nonproliferation goals. Such effects increase in importance in a complex, multi-polar environment. The Air Force is focused on these new dynamics.

SUSTAINMENT, MODERNIZATION, AND RECAPITALIZATION

America continues to be a leader in nuclear nonproliferation. In fact, since the end of the Cold War, we have retired or dismantled tens of thousands of nuclear weapons. The current stockpile has undergone a 75-percent reduction since the fall of the Berlin Wall. While our arsenal size declines, the commitment to sustainment and modernization grows. This is not a paradox. The importance of each individual weapon increases as overall numbers go down; every weapon system and every warhead must be reliable. The fiscal year 2013 President's budget submission makes hard choices, appropriate to our constrained fiscal environment, but continues to invest in the enduring and compelling attributes the Nation needs from its Air Force deterrent forces.

We have a plan for two decades of sustainment and modernization to keep Minuteman III viable and credible until 2030. To prepare for beyond 2030, the Air Force has begun a Capability-Based Assessment and Initial Capabilities Document for a successor program, Ground Based Strategic Deterrence (GBSD). The DOD is preparing to begin a GBSD Analysis of Alternatives to study the full range of concepts to recapitalize the land-based leg of the Triad.

The recent Strategic Guidance also states that "... while the U.S. military will continue to contribute to security globally, we will of necessity rebalance toward the Asia-Pacific region." Our ability to project power and hold targets at risk despite adversary employment of anti-access and area denial strategies is driving our choices in bomber force programs reflected in the President's budget submission.

The B–52 continues to provide critical stand-off capability and will be sustained until a replacement capability comes on line. We are accepting some risk in B–52 modernization in order to apply resources to ensure the B–2, our only long-range direct-strike asset, remains capable of penetrating in an anti-access and area denial environment. The combined capabilities of these bombers directly support our power projection requirements.

Over time, our ability to hold targets at risk with current technologies and systems will diminish. The nuclear-capable Long-Range Strike Bomber is a Department of Defense commitment to address that eventual shortfall. We remain committed to delivering a force of 80–100 new bombers starting in the mid-2020s.

We currently have service life extension programs in progress for the Air Launched Cruise Missile to ensure its viability beyond 2030; such programs include the propulsion system, guidance and flight control systems, and warhead arming components. In the fiscal year 2013 President's budget, the program for its replace-

ment, the Long-Range Standoff (LRSO), was delayed until fiscal year 2015 as part of the adjustments necessary in our constrained fiscal environment. However, the LRSO Analysis of Alternatives, which began in August 2011, continues apace and is scheduled to be completed in early fiscal year 2013. Despite the LRSO delay, there will not be a gap between ALCM and LRSO.

The B61 is an aging weapon, originally designed and built in the 1960s. Though they remain ready and reliable, some warheads in our current stockpile date back to 1978. Without refurbishment of key components, it will continue to age and eventually will not meet the requirements for a safe, secure and effective nuclear deterrent. The Department has fully funded the Air Force portion of the B61 Life Extension Program, which will deliver the first production unit at the end of fiscal year 2019. The B61 is critical to bomber viability, deterrence of adversaries in a regional context, and support of our extended deterrence commitments.

To fund these high priority programs, the Air Force had to make the hard decision to restructure programs with unacceptable cost growth and technical challenges. Last year, we briefed you about initial steps we were taking to replace the UH–1N Huey helicopters, under a program called the Common Vertical Lift Support Program (CVLSP). Prioritization of available funding demands difficult choices, and as a result, the CVLSP has been deferred. UH–1N Huey helicopters will continue to operate and support the nuclear security mission. We made other investments in missile security to reduce the risk of meeting requirements. In the United States, we installed Remote Visual Assessment cameras at our Minuteman III Launch Facilities and started installing Remote Targeting Engagement Systems at our nuclear storage locations. We also recently began a $14.4 million Military Construction project to build a new security forces training facility at Camp Guernsey, WY. In addition, U.S. and the North Atlantic Treaty Organization funds are producing security upgrades for weapon storage sites in Europe.

One critical capability that underpins our deterrent forces is nuclear command, control, and communications, otherwise known as NC3. NC3 underpins U.S. nuclear deterrence and provides our Nation's leaders with the means to manage and employ a wide range of strategic options for rapid power projection. It is especially important with lower force structure numbers. The Air Force is entrusted with a major portion of our Nation's NC3 systems, and many of these systems are nearing the end of their lifecycles. Constrained budgets and increasing system complexity require us to pay special attention and use innovative management and program oversight. Over the past 2 years, the Air Force has developed strong links with all the other key NC3 stakeholders throughout the government, codified Air Force NC3 roles and responsibilities, and prioritized near-term NC3 programs for investment.

NST IMPLEMENTATION

A little over a year ago, the New START treaty (NST) entered into force, giving us until 5 February 2018 to meet our obligations to reduce and limit our strategic forces to meet the NST's central limits. To ensure the activities needed to achieve an intercontinental ballistic missile (ICBM) and heavy bomber force compliant with NST's central limits, the Air Force has fully funded NST implementation with $20.1 million in fiscal year 2013 and an additional $50.6 million through the Future Years Defense Program. Implementation activities are underway including the reduction of systems no longer used to perform the nuclear mission. This includes the elimination of 39 heavy bombers in storage at Davis-Monthan Air Force Base and an environmental study to eliminate 103 empty ICBM silos. We are also looking at methods to convert some B–52Hs from dual-use mode to a conventional-only capability.

HUMAN CAPITAL

A safe, secure, and effective nuclear deterrent for the 21st century requires top-notch people dedicated to uncompromising stewardship. We are institutionalizing fixes and developing an enduring culture of self-assessment to Continue to Strengthen the nuclear enterprise. Increasing pass rates and leveling of repeat deficiencies during Nuclear Surety Inspections indicate success in this endeavor. Root cause analysis is embedded into process improvements in our enhanced nuclear inspection program and in initiatives to improve unit performance. Over the past 3 years, root cause analysis led to several structural, procedural, and process improvements.

As part of our culture of self-assessment, we continue to refine our organizational constructs, an example being the successful transfer of CONUS munitions squadrons from Air Force Materiel Command to Air Force Global Strike Command.

We are also committed to the professional development of our airmen through new formal training programs and more deliberate developmental education, all designed not only to bring airmen up to date quickly on the current issues within the

nuclear enterprise, but also to foster the critical thinking necessary for the 21st century security setting.

CLOSING

The Air Force provides two legs of our nuclear Triad and extended deterrence for allies and partners for a relatively low cost. Nuclear Deterrence Operations amount to 4.6 percent of the total Air Force budget, about 1 percent of the total Department of Defense budget.

As events over the past year demonstrate, the United States does not get to choose the timing or location of a crisis. Having ready, diverse, and resilient capabilities to ensure stability during crises remains very important. The attributes of the Air Force's deterrent forces—the responsiveness of the ICBM and the flexibility of the bomber—underwrite the Nation's ability to achieve stability in the midst of the crises and challenges of the next few decades.

The President's budget submission makes hard choices, but retains the commitment to strong deterrent capabilities through modernization and recapitalization programs. That commitment is made manifest every day by the 36,000 airmen performing deterrence operations, demonstrating those capabilities, and doing it with precision and reliability. They are trustworthy stewards of our Nation's most powerful weapons, still needed to project power, to deter and assure in the 21st century.

Senator SESSIONS. Is it true the budget does not provide the resources necessary to meet a DOD requirement for developing pit production capacity to 50 to 80 pits that you had previously declared would be for 2022? You'll not meet that goal?

Ms. CREEDON. Sir, that's correct. But because of what General Chambers has said, the actual time when that requirement becomes an essential requirement has also slipped.

Senator SESSIONS. The Navy, Admiral Benedict, previously had stated that the schedule for the SSBN, the new *Ohio* replacement, and the 12 follow-ons, 12 of them, is "inextricably linked to the legacy *Ohio*-class SSBN requirements," and that there is "no leeway in this plan to allow a start or any delay in the procurement plan." Did the Navy make that statement in previous years to your knowledge?

Admiral BENEDICT. Sir, I don't know who made that statement, sir.

Senator SESSIONS. You didn't make that statement?

Admiral BENEDICT. No, sir.

Senator SESSIONS. You'd remember, I know. But that's the information I have.

Admiral BENEDICT. Yes, sir.

Senator SESSIONS. So I'm just saying, gentlemen, one thing sometimes in uniform you don't focus on and maybe you shouldn't, but the problem is that when you keep moving things to the right all of them don't get completed. If you don't get started and you don't do them and Congress comes along or some other problem or something, the next thing you know a program that was designed to be completed isn't ever completed, number one; number two, you don't really save $4 billion when you move a submarine 1 year, or $8 billion when you move it 2 years. What you do is you create a hole that has to be filled because you spent that money on something else.

So we have to have from you realistic testimony concerning the threat. I'm going to take you at your word based on what I know today, but fundamentally what I'm saying is when we keep moving things to the right we're endangering our defense capability, and I'm worried about it. It's for one reason. As Admiral Mullen said,

the debt is a great threat to our national security. So we have money shortages.

Then I also have to say that I'm uneasy because this administration has not been strongly committed on the strategic issues, whether it's national missile defense or whether it's nuclear weapons. The President said recently that we have more weapons than we need, and General Chilton, when asked about this by Senator Feingold in 2010, said: "I do not agree that it is more than needed. I think the arsenal that we have is exactly what is needed today to provide the deterrent."

So I think the President better communicate with DOD to make sure that he knows what he's saying. He's proposed and openly and repeatedly stated he's in favor of moving to a world without nuclear weapons.

So this makes me concerned that our nuclear triad submarine is being delayed, modernization is being delayed, that agreements we thought we had are not being followed. So that's the problem, Mr. Chairman. I know it's a challenge, but these issues are so important that I do feel like I should express them.

Senator NELSON. Thank you, Senator Sessions. I think we're all concerned about slippage on timeframes, because it can slip right into the future, and we all know that the future doesn't become the present and will remain the future, obviously. That's what our concern is.

Then when it comes to the CMRR and the building, not having enough to construct both buildings, with respect to the STRATCOM headquarters, we have phased-in or incremental funding. Has DOD looked at incremental funding? Because once you start the building it's not going to finish in a single year, but you could get at least started?

I think the fear is that it'll just keep going, slipping off into the future. In the next budget, there won't be anything; there will be other reasons. It looks like we have a plan for fiscal year 2013. What's the plan for fiscal year 2014 and beyond?

I guess any one of you that might want to respond to phased-in or incremental funding would be fine with me.

Ms. CREEDON. Senator, unlike DOD, where incremental funding is the exception to the rule, the way the budget is structured at NNSA, the construction projects are always incrementally funded. So the NNSA budget is built in a way that, particularly because NNSA tends to do very large, one-of-a-kind, first-of-a-kind, technically complex, very expensive buildings, that you couldn't possibly fund, nor do you need all that money in 1 year because they take so long to build. NNSA is always incrementally funded.

So the uranium processing facility, the money for that that starts in 2013, assuming that it's appropriated, but it's requested over a period of years and we hope that it will be appropriated over a period of years.

Senator NELSON. Wouldn't it be possible to get started with the planning or some of the basic requirements that are almost always initial funded? I guess everybody seems to be concerned—I know General Kehler was concerned, we're all concerned—about not having the building. We're concerned about slipping, dropping down the number of pits that will be taken care of. So we don't just slide

way off into the future, I would hope that maybe with what Senator Cornyn was saying about getting together and looking at other ways to do this, to find a way to put us into a position to begin moving forward.

I know we're not talking about tens of millions. We're talking about a lot more money than that. But it does seem that that is desirable to at least explore.

I have a question here. Admiral Benedict, I understand that NNSA is now undertaking a common warhead design for the W88 Trident D5 warhead and the W78 Minuteman III warhead. Will you tell us whether you think it's possible to have a single warhead for both families of missiles and what is the risk to the Navy for a common design of sorts?

Admiral BENEDICT. Yes, sir. I do believe it is possible and the Navy does support that program. Right now it is envisioned that the Air Force would lead that and we would be in a supporting role as that effort rolls out.

As in any program right now, which it's in the initial 6.1 phase of development, there are programmatic and technical challenges which we are exploring today. I do believe that it is the intention of DOD to go to NWC in fiscal year 2012 and ask for permission, authorization to proceed to phase 6.2, at which time we would go into further development and design understanding.

Of course, in this type of a program a common warhead will need to be able to meet both the Navy requirements for the SLBM as well as the Air Force requirements for the ICBM. That's never been done before. I do believe that, given the right time and talent, we can achieve those requirements, sir.

Senator NELSON. Thank you.

General Kowalski, what impact will delaying the installation of the B–52 CONECT system have? I understand it was to provide a digital backbone for the B–52 and provide rapid retargeting recognizing moving from analog to digital. What will that involve?

General KOWALSKI. Mr. Chairman, the B–52 combination of its extremely long range—it has the longest range of any of our bombers—along with the wide variety of munitions it carries—it has the widest variety of any of our bombers—makes it extremely well-suited for the role of a standoff weapons platform, especially in the more high-end conflict, where we're going against a denied air space environment with this proliferation we have of anti-access and area denial kinds of weapons.

So as we think about what that joint force looks like, we need that standoff platform to be fully integrated into that joint force, meaning that we can communicate to it and pass it information related to threats, related to retargeting, et cetera, as it moves to be able to access global targets. So that requires beyond line-of-sight communication.

So that digital backbone is going to be important as we think about the future employment of the B–52. The reality that we're in is that the combination of budget pressures and problems with the program has caused us to restructure the CONECT system. We've separated it from the AEHF part of that, the AEHF radio and communications systems, and we are looking now at options to bring it back in.

The bottom line is the requirement for that capability remains and we're going to continue to advocate for it.

Senator NELSON. Should the requirement remain to do the CONECT as well?

Admiral BENEDICT. The requirement remains for that kind of capability. So as we go through and we look at the funding that we have for 2013 and we look at what we can get outside of 2013 for the rest of the program, we'll be able to come back with a better answer. But right now we're reviewing all our options.

Senator NELSON. Senator Sessions, I notice the time. Do you have some more?

Senator SESSIONS. I really don't. I thank all of you for your excellent testimony and service to the country. I believe that all of us in Congress need to examine carefully the financial restraints that are falling on this part of our strategic forces. It's a key component of our strategic forces and as we make choices, difficult choices, I don't think we need to allow too much to fall on this aspect of our defense posture.

Thank you, Mr. Chairman.

Senator NELSON. Thank you, Senator Sessions.

Let me add my thoughts. We ask you to reduce budgets, to watch the growth, and then when you come before us after you've done it, then we question why you've done it and whether you've done it right or not. But thank you for your explanations. We appreciate it very much. Thank you for your service. We are adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR E. BENJAMIN NELSON

W–76 WARHEAD REFURBISHMENT DELAY

1. Senator NELSON. Admiral Benedict, I understand the National Nuclear Security Administration (NNSA) has delayed the rate of refurbishment of the W–76 Trident D–5 warhead. Can you please explain what is the delay and how does this impact the risk to the fleet?

Admiral BENEDICT. In order to fund the B61 refurbishment, NNSA has decremented its Directed Stockpile Work budget. The W76–1/Mk4A is one of the donor programs. The production period has been extended by 3 years, but the NNSA has committed to meeting the Navy SSBN fleet operational requirements by 2018 and the remaining assets will be delivered by 2021. This is consistent with Navy fleet needs and Strategic Systems Programs (SSP) Strategic Weapons Facility planning requirements.

DELAY OF THE *OHIO* REPLACEMENT

2. Senator NELSON. Admiral Benedict, I understand the *Ohio* replacement will be delayed by 2 years. Can you explain how this impacts the Common Missile Compartment (CMC) program you manage with the British and how old the first *Ohio*-class boat will be when it is retired?

Admiral BENEDICT. PB13 has sufficient resources for the Navy to maintain the CMC and Strategic Weapon System (SWS) design efforts on a schedule that supports the United Kingdom (U.K.) Successor program. The 2-year delay to the U.S. *Ohio* replacement lead ship will slow rest-of-ship design activities, however, systems and interfaces affecting the CMC design will be sufficiently mature to deliver a CMC design package to U.K. for construction. The U.K. will now lead the United States and be first to construct a CMC, integrate a SWS, and launch a Trident II (D5) missile from a CMC. The United States is working closely with the U.K. to mitigate U.K. first-use risks by prototyping and proofing CMC construction techniques and test programs. Maximum use of U.S. First Article prototypes and SWS Ashore facilities will mitigate risk shifted to the U.K. program.

The *Ohio*-class SSBNs begin retiring in 2027 following their 42 year extended service life. The *Ohio*-class will then retire at a rate of one per year with the first *Ohio* replacement SSBN entering strategic service as the fifth *Ohio* retires.

CONVENTIONAL PROMPT GLOBAL STRIKE

3. Senator NELSON. Admiral Benedict, the Department of Defense (DOD) has been researching delivery methods to strike targets using conventional warheads several thousand miles away in less than an hour. Is the Navy participating in this?

Admiral BENEDICT. The Navy does not have a requirement or program of record to develop a sea-based Conventional Prompt Global Strike (CPGS) capability and has not requested funds in the President's budget for fiscal year 2013 for CPGS. However, the Navy has provided subject matter expertise, including conceptual solutions, to the Office of the Secretary of Defense for Acquisition, Techology, and Logistics-led CPGS working group.

W–78/88 WARHEADS

4. Senator NELSON. Admiral Benedict, I understand that NNSA is now undertaking a common warhead design for the W–88 Trident D–5 warhead and the W–78 Minuteman III warhead. Do you think it is possible to have a single warhead for both families of missiles and what is the risk to the Navy in this common design?

Admiral BENEDICT. A W88/Mk5 Reentry Body is composed of an Aeroshell, electronics, non-nuclear components and a Nuclear Explosives Package (often referred to as a warhead). It is not possible to have a common reentry body for both the Trident D5 missile and the Minuteman III missile systems. It is theoretically possible to design a Nuclear Explosives Package that, with adaptable mounting hardware, could be fielded in both the W88/Mk5 Aeroshell and the W78/Mk12A Aeroshell. Preliminary concept studies have indicated potential designs to meet this purpose. However, all designs which have their qualification basis in underground test require new pit production to meet both the Air Force and Navy inventory requirements. Current and foreseeable future pit production capacity is far short of what would be needed to support any of these concepts within service timeline requirements.

B–52 CONNECT SYSTEM

5. Senator NELSON. General Kowalski, I understand the B–52 connect system was to provide a digital backbone for the B–52 and provide rapid retargeting. What impact will delaying the installation of the B–52 connect system have?

General KOWALSKI. [Deleted.]

UH–1N PROGRAM

6. Senator NELSON. General Kowalski, what impact will the delay of replacing the UH–1N have on your missile field operations?

General KOWALSKI. Air Force Global Strike Command (AFGSC) is committed to providing the strongest security measures possible using available resources. The UH–1N continues to be a reliable helicopter but capability gaps complicate missile field security operations. AFGSC is mitigating risks with the current fleet by putting a UH–1N response force on alert, pursuing low-cost UH–1N modernization, and revising our security concept-of-operations to take full advantage of other security enhancements we have made to include the Remove Visual Assessment cameras at our launch facilities. However, we will continue to advocate for replacement to the UH–1N that meets DOD's mandated requirement for speed, range, and payload.

7. Senator NELSON. General Chambers, is the replacement for the UH–1N canceled or deferred. It is not clear from the budget documents.

General CHAMBERS. The Air Force program to replace to UH–1N helicopter, now referred to as the Common Support Helicopter, is deferred. Budget constraints prevented the Air Force from funding the previously proposed Common Vertical Lift Support Platform and is currently reexamining options to initiate a new acquisition strategy to fulfill the requirement for vertical lift in the missile fields and the National Capital Region. In deferring the UH–1N replacement, the Air Force is committed to mitigating risk while it pursues new means to meet the requirement.

Until a long-term replacement is possible, the Air Force will work to mitigate aircraft safety and capability gaps.

B–2 ADVANCED EXTREMELY HIGH FREQUENCY TERMINAL

8. Senator NELSON. General Kowalski, I understand that the terminal for connecting the B–2 to the Advanced Extremely High Frequency (AEHF) Satellite has either been delayed or canceled. This is to provide secure nuclear command, control, and communications (NC3). What impact will that have on your B–2 fleet?

General KOWALSKI. [Deleted.]

NUCLEAR COMMAND, CONTROL, AND COMMUNICATIONS

9. Senator NELSON. General Chambers, what is the Air Force doing to assess and modernize its NC3 network?

General CHAMBERS. In July 2011, the Chief of Staff of the Air Force directed the Air Force to evaluate its NC3 requirements, and modernize lagging infrastructure to ensure credible, reliable, and survivable nuclear command and control. To that end, the Air Force has made significant strides in assessing and modernizing its NC3 network. For example, Phase IV of the Air Force's Comprehensive Assessment of Nuclear Sustainment conducted an in-depth survey of NC3. Regarding modernization, the Air Force is currently focused on AEHF and Very Low Frequency capability for our bomber fleet through the Family of Beyond Line-of-Sight Terminals (FAB–T) and the Common Very Low Frequency Receiver, respectively. By July 2012, we will complete the cryptographic modernization of the Strategic Automated Command and Control System, our fastest, most reliable NC3 communications system, extending its service life to 2030. We are also exploring materiel options to upgrade the Low Frequency/Very Low Frequency transmitter on the National Airborne Operations Center. Additional modernization upgrades include the Minuteman MEECN Program Upgrade (MMPU), which will deliver AEHF connectivity to our ICBM fleet, and the Global Aircrew Strategic Network Terminal (Global-ASNT), which will deliver both AEHF and VLF to our nuclear command posts.

SLIP IN B–61 GRAVITY BOMB

10. Senator NELSON. General Chambers, I understand the B–61 gravity bomb refurbishment has slipped from coming on line by 2 years to 2019. Can you explain why this slip occurred; was it on the Air Force end or the NNSA end?

General CHAMBERS. The NNSA requested and the Nuclear Weapons Council (NWC) approved a 2-year delay in the First Production Unit (FPU) of the B61. The NNSA provided analysis showing critical B61 limited life components have longer lives than originally estimated and U.S. Strategic Command (STRATCOM) has confirmed that a fiscal year 2019 FPU will meet their requirements.

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

SEQUESTRATION

11. Senator SESSIONS. Secretary Creedon, Secretary Weber, General Kowalski, and Admiral Benedict, the Budget Control Act (BCA) requires DOD in January 2013, to reduce all major accounts over 10 years by a total of $492 billion through sequestration. This will result in an immediate $55 billion reduction to the fiscal year 2013 DOD program. The Secretary of Defense has stated on numerous occasions that the impact of these cuts would be "devastating" and "catastrophic," leading to a hollow force and inflicting serious damage to our national defense. Yet, the Military Services must begin this month with some type of guidance on developing a Service budget for fiscal year 2014. What are some of the specific anticipated implications of sequestration to DOD nuclear programs and the modernization of the nuclear triad?

Ms. CREEDON, Mr. WEBER, General KOWALSKI, and Admiral BENEDICT. If triggered, sequestration would indeed have a profound impact across DOD, and nuclear programs would be no exception. At this time, no analysis on specific programmatic impacts is available.

12. Senator SESSIONS. Secretary Creedon, Secretary Weber, General Kowalski, and Admiral Benedict, what programs would have the most significant impact to operations or readiness?

Ms. CREEDON, Mr. WEBER, General KOWALSKI, and Admiral BENEDICT. If sequestration occurs, automatic percentage cuts are required to be applied without regard to strategy, importance, or priorities, which would impact almost every program within DOD.

13. Senator SESSIONS. Secretary Creedon, Secretary Weber, General Kowalski, and Admiral Benedict, would sequestration lead to a contract cancellation, termination, cost increases, or schedule delays?

Ms. CREEDON, Mr. WEBER, General KOWALSKI, and Admiral BENEDICT. A sequester could disrupt thousands of contracts and programs.

14. Senator SESSIONS. Secretary Creedon, Secretary Weber, General Kowalski, and Admiral Benedict, is DOD currently conducting any planning in your areas of responsibility? If so, can you describe the plan?

Ms. CREEDON, Mr. WEBER, General KOWALSKI, and Admiral BENEDICT. DOD is not currently preparing for sequestration, and the Office of Management and Budget (OMB) has not directed agencies, including DOD, to initiate plans for sequestration.

15. Senator SESSIONS. Secretary Creedon, Secretary Weber, General Kowalski, and Admiral Benedict, how will you assess the risk of each cut?

Ms. CREEDON, Mr. WEBER, General KOWALSKI, and Admiral BENEDICT. DOD is not planning for such an event; hence, it would be premature to attempt to assess the risk of sequestration.

16. Senator SESSIONS. Secretary Creedon, Secretary Weber, General Kowalski, and Admiral Benedict, has any planning commenced to date to assess the impact of such sequestration reductions, such as prioritizing programs in preparation for reprogramming actions or terminations?

Ms. CREEDON, Mr. WEBER, General KOWALSKI, and Admiral BENEDICT. DOD is not currently preparing for sequestration, and OMB has not directed agencies, including DOD, to initiate plans for sequestration.

SOLID ROCKET MOTOR INDUSTRIAL BASE

17. Senator SESSIONS. Admiral Benedict, during our hearing last year you told us that the unit cost for Submarine Launched Ballistic Missile (SLBM) motors had increased in cost from approximately $10.7 million in fiscal year 2011 to approximately $19.2 million in fiscal year 2012, an $8.5 million increase. Has anything improved over the past year to address the fragility of the solid rocket motor (SRM) industrial base?

Admiral BENEDICT. SSP has proactively worked with their prime missile contractor, Lockheed Martin (LM), and SRM subcontractor, Alliant Techsystems (ATK), to respond to the eroding business base for large rocket motors and take steps to reduce the infrastructure and personnel at both of ATK facilities in Utah. Over the past few years SSP has engaged LM and ATK senior leadership to review and develop action plans to reduce overhead costs and minimize cost increase. As a result, ATK has significantly (up to 50 percent) reduced its workforce in line with future production demands. Moreover, in an effort to reduce its physical infrastructure, ATK has shut down many buildings within its Bacchus and Promontory campuses to consolidate operations. SSP has engaged LM and ATK leadership to address: required requalification to minimize production disruptions; retention of critical skills and safety disciplines during downsizing/consolidation of ATK operations; reduction in ATK overhead costs; and viability of sub-tier suppliers for critical materials. As a result of these actions, the Navy has lowered the projected SRM unit cost in the President's budget request for fiscal year 2013 approximately $1.6 million per year. The fragility of the SRM industry is still a concern. Despite efforts to reduce overhead costs, the SRM industrial base remains volatile. National Aeronautics and Space Administration's (NASA) decision to consider SRM for Space Launch System (SLS) applications has a stabilizing impact on industry for the time being. The next key milestone is in 2015 when NASA has to make a decision on the Advanced Booster System. If NASA decides to exit SRM industry for SLS booster application, it will have a significant cost impact on Navy and other DOD programs.

18. Senator SESSIONS. Admiral Benedict, is there more that should be done to ensure that NASA and DOD approach this issue together from a whole-of-government perspective?

Admiral BENEDICT. NASA programs have been a key contributor to the viability of the SRM industrial base. During the last several years, there has been significant cooperation among SSP and NASA to jointly study and address this issue. Both programs have been part of the Interagency Task Force for the past few years and, recently, SSP has jointly worked with NASA to complete a Cost Sensitivity Study. Although basic design and application is different for Fleet Ballistic Missile and Space Exploration, SSP and NASA deal with the same SRM vendors and have many common sub-tier suppliers. NASA decisions have strong implications for the FBM program. It is worth noting that two shuttle-like rocket motors are roughly equivalent to 20 Trident II D5 motor sets.

SSP is actively participating in the recently started National Institute for Rocket Propulsion Systems (NIRPS), a NASA led effort focused on addressing the needs of U.S. solid and liquid rocket propulsion capabilities to promote resilience of the industrial base. A combined U.S. Government strategy involving NASA and DOD (including Air Force, Navy, and Missile Defense Agency (MDA) is imperative where both departments can jointly define future production and development needs in order to provide stability for this industry that depends on U.S. Government business.

19. Senator SESSIONS. Admiral Benedict, concern of the past has involved costs driven up by overhead costs tailored to meet a demand no longer necessary with the end of the shuttle program. Do you believe the industrial base today is appropriately sized?

Admiral BENEDICT. The current SRM industrial base is adequately sized to meet all U.S. Government demands. Less than 2 decades ago there were five major SRM vendors. Today, there are only two large motor manufacturing companies—ATK and Aerojet. This was a major industry adjustment driven by the space commercial market that helped keep costs under control. Right-sizing of facilities and workforce has been going on for over a decade at Aerojet. ATK has recently taken numerous steps to right size its capacity after completion of the NASA Shuttle program. This included a significant reduction in workforce and consolidation of buildings and work centers. The SRM industry continues to make progress and SSP is working proactively with industrial partners to reduce overhead costs and help industry to right size, keeping in mind our future needs.

20. Senator SESSIONS. Secretary Creedon, Secretary Weber, General Kowalski, and Admiral Benedict, while demand today is low, our long-term need for SRMs is not going away any time soon, especially with respect to strategic missile and future follow-on Intercontinental Ballistic Missile (ICBM) and SLBM programs. If we were to let the temporary lapse in the SRM base take place, how much do you anticipate it would cost to restart that industrial base in the future?

Ms. CREEDON and Mr. WEBER. DOD has not developed a cost estimate to restart the industrial base from a cold start. DOD does not expect there to be a lapse in the SRM industrial base. The SRM industrial base has been on a steady decline for the last 2 decades and remains an area of concern for DOD. The completion of Minuteman III and Shuttle SRM production and the cancellation of both the MDA's Kinetic Energy Interceptor (KEI) and NASA's Constellation programs have dramatically decreased demand for SRM. Last year, DOD submitted a SRM Industrial Base Sustainment Plan (April 4, 2011) to Congress as required by section 1078 of the National Defense Authorization Act for Fiscal Year 2010, Public Law 111–84. DOD's primary objectives for the SRM Industrial Base Sustainment Plan were to: (1) sustain production capabilities for national assets; (2) keep critical design teams in place for future system needs; and (3) to the extent practical, preserve the option to satisfy new government demand in the future. After careful analysis, DOD concluded that it could achieve its sustainment goals through a combination of initiatives. DOD needs industry to take the lead by right-sizing its excess capacity to align with projected demand. DOD must invest in SRM science and technology (S&T) and research and development (R&D), along with adequate production that will sustain the base. Currently, the Navy's Trident II D5 missile is the program of significance sustaining the large SRM production capability. The S&T program includes the Integrated High Payoff Rocket Propulsion Technology (IHPRPT) program, and the R&D programs include the Air Force Propulsion Application Program (PAP), and the proposed Air Force Minuteman III SRM modernization program.

General KOWALSKI. I defer to Secretary Creedon to address the question in that she is more familiar with the details of this matter.

Admiral BENEDICT. SSP has kept a low optimum production rate of 12 motor sets a year since 1999 in order to provide affordable stability in the strategic industrial base and to maintain unique critical skills and production capabilities. The Navy must continue rocket motor production in order to support D5 deployment through 2042 because most of the currently inventoried D5 rocket motors will age out before then. The Navy uses unique Class 1.1 high energy propellant instead of the Class 1.3 propellants typically used by the Air Force and NASA. High energy Class 1.1 propellant is necessary in order to meet range and performance requirements, as well as deployment on a volume-constrained, manned launch platform. The Fleet Ballistic Missile (FBM) propellants have mechanical properties far superior to any Class 1.3 propellant for reasons of long life, damage tolerance, and reliability for underwater launch from manned platforms.

In SSP's assessment, given the current industrial base environment, if D5 rocket motor production is gapped or stopped, there will be significant costs associated with the restarts. Cost drivers will include resurrecting the infrastructure with unique skills required and reestablishing the supply chain. Depending upon the length of the lapse, it could take 5 to 10 years to restart D5 rocket motor production with an associated cost of several billion dollars.

FAMILY OF ADVANCED BEYOND LINE OF SITE TERMINALS

21. Senator SESSIONS. Secretary Creedon, General Kowalski, and Admiral Benedict, the FAB–T has experienced significant delays, and for the third year in a row procurement has had to be deferred to address development issues. According to the Government Accountability Office (GAO), the program's software development schedule is still unrealistic and the Air Force announced that it would be terminating its FAB–T contract and seeking alternative providers. How do delays in FAB–T impact the efforts to modernize nuclear command and control?

Ms. CREEDON. Further delays in FAB–T will affect efforts to modernize NC3; however, the Air Force's current alternate acquisition strategy will meet the most pressing requirements for warfighter capabilities (e.g., the Command Post Terminals (air/ground) with President and National Voice Conferencing (PVNC)) and will provide for deferring the bombers and RC–135 capabilities outside the Future Years Defense Program. This deferral presents minimal risk. The B–52 currently has Low Frequency/Very Low Frequency (LF/VLF) capability, and the Air Force is developing LF/VLF capability for the B–2 via the Common VLF Receiver Program. The RC–135 program is also pursuing an alternate solution to FAB–T.

General KOWALSKI. I defer to Secretary Creedon to address the question in that she is more familiar with the details of this matter.

Admiral BENEDICT. The FAB–T is not a SSP. As such, I cannot comment on changes to the FAB–T program schedule.

22. Senator SESSIONS. Secretary Creedon, General Kowalski, and Admiral Benedict, is the Air Force developing contingencies in the event FAB–T cannot meet that need date?

Ms. CREEDON. Yes. First, the AEHF system is backwards compatible with our existing Milstar command post terminals. Although those terminals are aging, and do not have all of the capability of the FAB–T, we will continue to use their services if FAB–T deliveries are further delayed. Second, we just released the Request for Proposals to develop in parallel an alternative source for the FAB–T capability. This alternative source will be focused on meeting our more urgent, near-term need to provide strategic communications. As the program matures, we will be able to assess the progress of the alternative source and the current FAB–T effort and determine a path forward for production.

General KOWALSKI. I defer to Secretary Creedon to address the question in that she is more familiar with the details of this matter.

Admiral BENEDICT. The FAB–T is not a SSP. As such, I cannot comment on changes to the FAB–T program schedule.

23. Senator SESSIONS. Secretary Creedon, General Kowalski, and Admiral Benedict, what is being done to address FAB–T affordability and should requirements be reexamined?

Ms. CREEDON. Air Force Space Command recently completed a thorough review of the FAB–T requirements and will brief the results to the Joint Requirements Oversight Council. Due to the critical Nuclear Command and Control mission FAB–T supports, we did not find any significant areas where we could reduce requirements without unnecessarily increasing risk. We did clarify the priority of require-

ments to allow our acquisition community more flexibility in delivering that capability. We believe this will lead to an affordable solution, and we will seek production proposals from our current contractor and from alternative sources this summer to validate those costs.

General KOWALSKI. I defer to Secretary Creedon to address the question in that she is more familiar with the details of this matter.

Admiral BENEDICT. The FAB–T is not a SSP. As such, I cannot comment on the FAB–T program's affordability or its requirements.

QUESTIONS SUBMITTED BY SENATOR JOHN CORNYN

GOAL OF A NUCLEAR-FREE WORLD

24. Senator CORNYN. Secretary Creedon and Secretary Weber, in December 2010, I opposed ratification of the President's New Strategic Arms Reduction Treaty (New START), in part because of serious doubt about the President's long-term nuclear weapons policies. The reality is that nuclear weapons are proliferating in the world, not going away. The Russians maintain a sizeable nuclear arsenal. But, more alarmingly, Iran continues to make progress in its pursuit of nuclear weapons, North Korea's nuclear weapons program remains a serious threat to regional security and stability, and the full extent of the Chinese nuclear arsenal is not known. Nuclear weapons exist, and this is not a genie that we can put back in the bottle by unilaterally disarming and dismantling our nuclear weapons. Yet, all the while, the administration is reportedly contemplating deep reductions in U.S. nuclear forces. How realistic is the President's goal of a world without nuclear weapons?

Ms. CREEDON and Mr. WEBER. As stated in the Nuclear Posture Review (NPR) (2010), the conditions that would ultimately permit the United States and others to give up their nuclear weapons without risking greater international instability and insecurity are very demanding. Among those are the resolution of regional disputes that can motivate rival states to acquire and maintain nuclear weapons, success in halting the proliferation of nuclear weapons, much greater transparency into the programs and capabilities of key countries of concern, verification methods and technologies capable of detecting violations of disarmament obligations, and enforcement measures that are strong and credible enough to deter such violations. Clearly, such conditions do not exist today, but they are achievable and we must work to create those conditions.

The administration remains committed to the safety, security, and effectiveness of the nuclear arsenal as long as nuclear weapons exist. As the President stated in 2010, nuclear modernization requires investment for the long-term, and, even in light of the new fiscal realities of the BCA, the administration continues to pursue these programs and capabilities.

25. Senator CORNYN. Secretary Creedon and Secretary Weber, if President Obama were to succeed in eliminating the entire U.S. nuclear arsenal, what effect do you think that would that have on the global threat picture for the United States?

Ms. CREEDON and Mr. WEBER. The President has specified the conditions that would need to exist to support a world without nuclear weapons. Those conditions would ensure that the United States was not accepting undue risk. Clearly, such conditions do not exist today.

DEEPER NUCLEAR FORCE REDUCTIONS

26. Senator CORNYN. Secretary Creedon and Secretary Weber, the administration is conducting a review of U.S. nuclear deterrence requirements, ostensibly to support another round of nuclear arms reductions with Russia. It appears, however, that the President has already determined that additional reductions are necessary. This past weekend, he told an audience in South Korea that he "can already say with confidence that we have more nuclear weapons than we need." Yet, during consideration of the New START treaty, the then-Commander of STRATCOM, General Kevin Chilton, told the Senate, "I think the arsenal that we have is exactly what is needed today to provide the deterrent." In light of this authoritative statement from a subject matter expert on nuclear forces, how can the President subsequently conclude that we have more nuclear weapons than we need?

Ms. CREEDON and Mr. WEBER. Detailed analysis of potential reductions in strategic weapons, conducted in spring 2009 as part of the NPR, concluded that the United States could sustain stable deterrence with significantly fewer deployed strategic nuclear warheads, assuming parallel Russian reductions. The NPR analysis

considered several specific levels of nuclear weapons, all below current levels of approximately 2,200 deployed strategic warheads. Its conclusions, concurred in by the Secretary of Defense, the Joint Chiefs of Staff, and Commander, STRATCOM, and approved by the President, formed the basis for U.S. negotiations with Russia on the New START treaty. Because the New START treaty is intended to be only an initial step in a continuing process of bilateral nuclear reductions, this initial analysis used conservative assumptions to determine acceptable reductions in deployed strategic nuclear weapons.

The administration is conducting an NPR implementation study to determine the nuclear force size and structure needed to support U.S. national security requirements and meet international obligations in a dynamic security environment. The ongoing study was directed by the President as part of the NPR of 2010. The analysis from this study will provide a basis for the President's guidance to DOD and the Department of Energy on nuclear planning with respect to the force structure, force posture, and stockpile requirements needed to protect the United States and its allies and partners, and to inform plans for the employment of nuclear weapons in the event that deterrence fails. As stated in the NPR, the United States intends to pursue further reductions in nuclear weapons with Russia. When complete, the analysis of deterrence requirements and force postures will inform the development of any future arms control objectives.

27. Senator CORNYN. Secretary Creedon and Secretary Weber, we have been told that the deterrence relationship between the United States and Russia is stable. We've been told that neither side has an incentive to strike first in a crisis, and that there is no arms race. So, in light of this stability achieved by our current approach, why must we reduce below New START levels of 1,550 warheads on 700 strategic delivery systems?

Ms. CREEDON and Mr. WEBER. Even under the New START treaty levels, the United States and Russia still have approximately 90 percent of the nuclear weapons in the world. Seeking further bilateral reductions will not diminish, but rather, strengthen the deterrence and strategic stability relationship between the United States and Russia.

28. Senator CORNYN. Secretary Creedon and Secretary Weber, what justifications can you offer for risking national security by altering nuclear strategy in pursuit of deeper reductions?

Ms. CREEDON and Mr. WEBER. As stated in the 2010 NPR, the United States intends to pursue with Russia further reductions in nuclear weapons. When complete, the analysis of deterrence requirements that was called for in the NPR will inform the development of any future arms control objectives. However, several factors will influence the magnitude and pace of such reductions:

- First, any future reductions in U.S. nuclear forces must continue to strengthen deterrence of potential regional adversaries, strategic stability vis-á-vis Russia and China, and assurance of our allies and partners.
- Second, implementation of the Stockpile Stewardship Program and the nuclear infrastructure investments recommended in the NPR would allow the United States over time to shift away from retaining large numbers of non-deployed warheads as a hedge against technical or geopolitical surprise, allowing major reductions in the nuclear stockpile.
- Third, Russia's nuclear force will remain a significant factor in determining how much we can reduce U.S. forces and how fast we are prepared to reduce U.S. forces.

As stated in the NPR, increased investments in the nuclear infrastructure and a highly skilled workforce are needed to ensure the long-term safety, security, and effectiveness of our nuclear arsenal and to support the full range of nuclear security work, including nonproliferation, nuclear forensics, nuclear counterterrorism, emergency management, intelligence analysis, and treaty verification. These investments are essential to facilitating reductions while sustaining deterrence under the New START treaty and beyond.

We can take the practical steps identified in the NPR of 2010 that will not only move us toward the ultimate goal of eliminating all nuclear weapons worldwide but will, in their own right, reinvigorate the global nuclear nonproliferation regime, erect higher barriers to the acquisition of nuclear weapons and nuclear materials by terrorist groups, and strengthen U.S. and international security.

29. Senator CORNYN. Secretary Creedon and Secretary Weber, do you believe U.S. allies still feel assured under our nuclear umbrella? If not, do you foresee them building up their own nuclear capabilities?

Ms. CREEDON and Mr. WEBER. We have strong and positive indications that our allies and partners continue to feel assured. We meet regularly with the North Atlantic Treaty Organization (NATO), Australia, the United Kingdom, France, Japan, and the Republic of Korea to discuss our ongoing extended deterrence.

30. Senator CORNYN. Secretary Creedon and Secretary Weber, would a shift in U.S. nuclear doctrine away from counterforce and flexibility toward minimum deterrence weaken the credibility of U.S. nuclear use on behalf of allies?

Ms. CREEDON and Mr. WEBER. Yes. For decades, the United States has rejected a minimum deterrence doctrine as ill-suited to meet our deterrence objectives, including the extension of U.S. nuclear deterrence to our allies and partners.

31. Senator CORNYN. Secretary Creedon and Secretary Weber, do you believe that at lower numbers, the implications of cheating become more important?

Ms. CREEDON and Mr. WEBER. Yes. In general, as the number of strategic forces diminishes, the military significance of cheating could be more significant. The United States would view any deliberate effort by Russia to exceed the New START treaty's limits or circumvent its verification regime with great concern, especially if the cheating had military significance. For that reason, it is important that militarily significant cheating can be detected in time to respond appropriately. Should there be any signs of Russian cheating or preparations to break out from the New START treaty, this would be raised through diplomatic channels immediately, and if not resolved, raised to higher levels immediately. The administration would also keep the Senate informed.

As stated in the NPR of 2010, because of our improved relations, the need for strict numerical parity between the United States and Russia is no longer as compelling as it was during the Cold War. However, large disparities in nuclear capabilities could raise concerns on both sides and among U.S. allies and partners, and may not be conducive to maintaining a stable, long-term, strategic relationship, especially as nuclear forces are significantly reduced.

32. Senator CORNYN. Secretary Creedon and Secretary Weber, would lower strategic nuclear force levels exacerbate the existing disparity in tactical nuclear weapons between Russia and the United States? If so, wouldn't this affect allied calculations during future crises?

Ms. CREEDON and Mr. WEBER. Because of our improved relations, the need for strict numerical parity between the two countries is no longer as compelling as it was during the Cold War. But large disparities in nuclear capabilities could raise concerns on both sides and among U.S. allies and partners, and may not be conducive to maintaining a stable, long-term strategic relationship, especially as nuclear forces are significantly reduced. Therefore, it is important for Russia to join in any move to lower levels. In any post-New START treaty negotiations with Russia, we plan to address non-strategic nuclear weapons, as well as the non-deployed nuclear weapons of both sides.

CHINA'S NUCLEAR FORCES

33. Senator CORNYN. Secretary Creedon and Secretary Weber, according to DOD data, since 2001, China has perhaps tripled the size of its ICBM force. Add to this, China's ambitions for a submarine-based nuclear force, as well as increasing numbers of short- and medium-range ballistic missiles. Dr. James Miller, who is currently the Acting Under Secretary of Defense for Policy, testified to Congress in March 2011, that "the lack of transparency surrounding China's nuclear programs—their pace and scope, as well as the strategy and doctrine that guide them—raises questions about China's future strategic intentions." His concerns seemed to be confirmed in December 2011, when research by Georgetown University revealed that China could have as many as 3,000 nuclear missiles and thousands of miles of underground tunnels to hide this arsenal. How large is this force likely to be in another 10 years?

Ms. CREEDON and Mr. WEBER. [Deleted.]

34. Senator CORNYN. Secretary Creedon and Secretary Weber, what is your assessment of the incentive that further reductions in U.S. nuclear weapons would

provide to China and other nuclear powers to build up to United States and Russian levels?

Ms. CREEDON and Mr. WEBER. The United States and Russia still have approximately 90 percent of the nuclear weapons that exist today. China and others are far from being in parity with the United States and Russia. We seek a relationship of strategic stability with China, as we do with Russia, focused on improving transparency and mutual confidence.

35. Senator CORNYN. Secretary Creedon and Secretary Weber, how many nuclear weapons does the United States need to maintain to convince China not to seek strategic equivalence?

Ms. CREEDON and Mr. WEBER. We need to continue to foster strategic stability in the Asia-Pacific region so that China does not conclude that it needs to seek parity in nuclear arsenals.

MISSILE DEFENSE

36. Senator CORNYN. Secretary Creedon and Secretary Weber, I am also particularly concerned regarding President Obama's recent unfortunate admission to Russian President Dmitry Medvedev that he is waiting until after the election, when he can exercise more flexibility to deal with issues relating to missile defense. Although not having to worry about the judgment of the American people on this issue may be convenient, allowing the President to make more concessions to the Russians would be antithetical to our safety and security, as well as dishonest and contrary to the assurances President Obama has given. In order to secure Senate support for the New START treaty, President Obama pledged to continue development and deployment of all stages of the Phased Adaptive Approach (PAA) to missile defense in Europe. What is the precise status of the plan to deploy the remaining three phases of PAA?

Ms. CREEDON and Mr. WEBER. The United States has pursued missile defense cooperation with Russia with the clear understanding that we would not accept constraints on missile defense and we would implement all four phases of the European Phased Adaptive Approach (EPAA). The plan has not changed.

37. Senator CORNYN. Secretary Creedon and Secretary Weber, President Obama's discussions with Russian President Dmitry Medvedev at the Nuclear Security Summit in Seoul do not appear to have produced any fruit, with Medvedev stressing that the United States and Russia remain in their respective, opposing positions on missile defense. Ellen Tauscher, former Under Secretary of State for Arms Control and International Security Affairs, stated at the 10th Annual Missile Defense Conference this week that the administration is committed to "getting Russia inside the missile defense tent now," so that the United States can demonstrate to Russia that missile defense systems, "will not threaten Russia's strategic forces." She believes this conversation, and associated exchanges of information that have been discussed, are "essential because Russia has not been convinced by our technical arguments that the NATO system isn't a threat even despite ... detailed technical responses to Russia's inaccurate assumptions about our missile defense capabilities." It seems that Secretary Tauscher is operating based on a flawed assumption that Russia will eventually agree to our missile defense plan, despite already receiving repeated assurances and technical responses from the United States. What is your assessment of the likelihood that further dialogue will placate Russia's fears regarding the deployment of missile defense systems in Europe?

Ms. CREEDON and Mr. WEBER. We continue to believe that cooperation with Russia on missile defense, both bilaterally and through NATO, can enhance the security of the United States, our allies and partners in Europe, and Russia. We will continue to work with Russia to define the parameters of possible cooperation.

Russia has an extensive and capable sensor network for tracking ballistic missiles that could make a real contribution to the protection of U.S. deployed forces, and allies and partners in Europe. In addition, U.S.-Russia and NATO-Russia cooperation would send a strong signal to Iran that its development of missiles and pursuit of nuclear capabilities are reducing rather than enhancing Iranian security. Cooperation would also signal that the United States and Russia agree on the dangers posed by the proliferation of ballistic missile and nuclear technology.

At their meeting, President Obama and President Medvedev reaffirmed their intent to continue a dialogue on missile defense cooperation.

38. Senator CORNYN. Secretary Creedon and Secretary Weber, do you believe that offering them concessions, such as viewing Aegis SM–3 missile defense flight tests, will improve the likelihood that Russia will be willing to cooperate in the future?

Ms. CREEDON and Mr. WEBER. Offering Russia the opportunity to observe a missile defense flight test is not a concession. Flight test observations have been used by this administration and the previous administration to provide Russia the opportunity to understand more fully the purpose and intent underpinning our missile defense plans and programs.

Transparency regarding our missile defense plans and programs increases the credibility of our arguments that our missile defenses are not directed at Russia and will not negate Russia's strategic deterrent. Credibility on this issue is important for our current missile defense cooperation with allies and partners, as well as for potential future cooperation with Russia.

39. Senator CORNYN. Secretary Creedon and Secretary Weber, what would the ramifications be if the United States were to continue fielding the PAA without Russia's blessing?

Ms. CREEDON and Mr. WEBER. The United States is not seeking Russia's blessing on the implementation of the EPAA. The United States remains committed to fully deploying all four phases of the EPAA to counter a real and growing threat from the Middle East. We remain hopeful that Russia will work with us to counter the threat from ballistic missile proliferation.

FUNDING FOR THE STRATEGIC NUCLEAR DETERRENT

40. Senator CORNYN. Secretary Creedon and Secretary Weber, last year, Dr. James Miller testified to Congress that the 10-year cost of sustaining and modernizing U.S. strategic nuclear forces will be approximately $125 billion over 10 years, which does not include the NNSA funding for the nuclear weapons complex and the warheads. Assuming that amount remains roughly constant, that is about $12.5 billion per year for the nuclear deterrent, which equates to approximately 3 percent of the defense budget. During the Cold War, we devoted up to 25 percent of the defense budget to nuclear deterrence. We should bear this in mind. It's important for Congress to understand just how much our nuclear deterrent costs. What is the total that DOD plans to spend over the next 10 years to sustain and modernize U.S. strategic forces? Please provide a breakdown of that funding by weapon system or whatever category makes the most sense.

Ms. CREEDON and Mr. WEBER. The information will be provided to you in the report pursuant to section 1043 of the National Defense Authorization Act for Fiscal Year 2012. This report will be submitted to you within a few weeks. This document will update our 10-year cost profile as provided in the previous reports provided pursuant to section 1251 of the National Defense Authorization Act for Fiscal Year 2010, and will provide additional information on the 10-year cost of sustaining and modernizing our nuclear command and control assets.

NUCLEAR MODERNIZATION AND REDUCTION

41. Senator CORNYN. Secretary Creedon and Secretary Weber, the 2010 NPR stated: "Implementation of the Stockpile Stewardship Program and the nuclear infrastructure investments recommended in the NPR will allow the United States to shift away from retaining large numbers of nondeployed warheads as a hedge against technical or geopolitical surprise, allowing major reductions in the nuclear stockpile. These investments are essential to facilitating reductions while sustaining deterrence under New START and beyond." In other words, the modernization program was intended to give us, among other things, a modern manufacturing capability necessary to extend the life of our nuclear weapons and to be able to respond to unforeseen events that may require the manufacturing of nuclear weapons components, such as the nuclear pits. The logic was that once we had this capability, we would eliminate some of the nuclear warheads that are in the non-deployed or hedge category. For example, the United States has approximately 5,000 nuclear warheads of all types; of this, approximately 2,000 are in the operational category, the rest are non-deployed. If the Chemistry and Metallurgy Research Replacement-Nuclear Facility (CMRR–NF) is delayed from 2021 to 2028 at the earliest, does it not follow that we should similarly delay the elimination of our nondeployed or hedge weapons?

Ms. CREEDON and Mr. WEBER. The NNSA is reviewing the impacts that resulted from the deferral of the CMRR–NF. This will help inform the NWC on the path for-

ward regarding plutonium pits for our life-extension programs and related decisions on hedge weapons. The uranium processing facility (UPF) is also an important contributor to the manufacturing capability of the nuclear infrastructure. DOD fully supports staggering the two projects with UPF going first.

[Whereupon, at 3:31 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2013 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, APRIL 25, 2012

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

BALLISTIC MISSILE DEFENSE POLICIES AND PROGRAMS

The subcommittee met, pursuant to notice, at 12:56 p.m. in room SR–222, Russell Senate Office Building, Senator E. Benjamin Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Nelson and Sessions.

Majority staff members present: Jonathan S. Epstein, counsel; and Richard W. Fieldhouse, professional staff member.

Minority staff member present: Daniel A. Lerner, professional staff member.

Staff assistant present: Brian F. Sebold.

Committee members' assistants present: Ryan Ehly, assistant to Senator Nelson; and Lenwood Landrum, assistant to Senator Sessions.

OPENING STATEMENT OF SENATOR E. BENJAMIN NELSON, CHAIRMAN

Senator NELSON. Senator Sessions will be just a little bit late and he's asked that I go ahead and start, so it won't matter if we start a little bit early. We might have a couple more minutes to have the hearing.

The subcommittee is now in session and is meeting today under somewhat unusual circumstances. Since the Senate will have a series of votes throughout this afternoon, we had to move up the hearing to start early. Otherwise we wouldn't have been able to hold the hearing before our committee marks up the National Defense Authorization Act for Fiscal Year 2013.

Since the votes will start at 2 o'clock, we'll have a highly compressed hearing. Probably that doesn't break your hearts, to have to have a little bit less time in the hearing. But we won't be making the ordinary, normal opening statements. Instead we'll put all the opening statements in the record, together with your other prepared testimony, in order to maximize our time.

We'll also give members an opportunity, when Senator Sessions gets here, to submit statements and questions for the record. The record will remain open until the end of next Tuesday, to make certain we get the complete record in the transcript. We would greatly appreciate if you could respond promptly to the questions so that we can then answer some of the questions that are so important that are facing us.

I want to thank all of you today, each of you, for your service, for your flexibility and understanding of our need to start the hearing early. Our witnesses today are: the Honorable J. Michael Gilmore, Director of Operational Test and Evaluation, Department of Defense (DOD); Dr. Bradley H. Roberts, the Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy; Lieutenant General Patrick J. O'Reilly, USA, the Director of the Missile Defense Agency (MDA); Lieutenant General Richard P. Formica, USA, the Commander of the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command and Commander, Joint Functional Component Command for Integrated Missile Defense; and Ms. Cristina T. Chaplain, the Director of Acquisition and Sourcing Management at the Government Accountability Office (GAO).

I thank Senator Sessions and his staff for being able to accommodate the rescheduling of the hearing today.

We'll begin the question and answer period with 7-minute rounds. I'll use all the time that I can until Senator Sessions gets here and then we'll recognize him right away.

In terms of Homeland defense as a priority—and this is a question for Dr. Roberts and our two generals—General O'Reilly's prepared statement says that, "Defense of the Homeland is our highest priority," which is consistent with the Ballistic Missile Defense Review (BMDR). But some have questioned whether it is the top missile defense priority or suggested that we have to choose between Homeland defense and regional missile defense.

Can each of you tell us if Homeland defense is the administration's top missile defense priority and if you believe we can and should and do provide both Homeland defense and regional missile defense capability simultaneously in a balanced manner that meets our warfighters' needs?

Dr. Roberts?

Dr. ROBERTS. Thank you, Mr. Chairman.

The BMDR actually sets out six priorities and we would continue to hold to all of them. Top of the list, the first priority, is the protection of the Homeland. But it's a false choice between the first priority and the other priorities. We have it within our means and within the current budget to do everything we need to do to advance our commitment to both Homeland defense and regional defense.

The perception of an imbalance of investment here has been reinforced by some inaccurate information that was put into play earlier. My reading of the budget in front of you is that roughly one-third or 37 percent can be uniquely associated with regional missile defense and the remaining two-thirds is either uniquely associated with Homeland defense or reinforces both sets of commitments, for

example investments in command and control, investments in the Precision Tracking Space System (PTSS) sensor system.

So we don't see that our investments are skewed heavily away from Homeland defense. We see a robust set of investments in addressing the reliability problems in the ground-based interceptor (GBI), strengthening the sensor system, taking additional steps to strengthen the defense of the Homeland. The budget permits us to do all of those things in a balanced manner with acceptable risk.

Thank you, sir.

Senator NELSON. Isn't it also true that this concept of dual protection isn't new with this administration? The previous administration introduced the idea of some regional defense mechanisms during the last administration; isn't that accurate?

Dr. ROBERTS. Yes, indeed, that's accurate. Our national commitment to both of these areas has been clear since the end of the Cold War. The Persian Gulf war woke us up to the fact of regional missile proliferation and long-range missile proliferation. So in the 1990s, first the Bush administration and then the Clinton administration talked about theater missile defense and national missile defense. The Bush administration for the last decade set out a different set of shorthands, but the same basic concept, that we pursue a balanced approach. We similarly have set out a balanced approach.

So yes, sir, we see continuity over the last 3 decades to our national commitment in this area.

Senator NELSON. Part of that would be consistent with the Phased Adaptive Approach (PAA) that is under consideration right now; is that accurate?

Dr. ROBERTS. Yes, sir. The notion of bringing together regional defensive capabilities in tailored support of our commitments in individual regions goes back to the initial development of these capabilities in the 1990s. It would be—although our principal political debate has been focused on European Phased Adaptive Approach (EPAA) missile defense, I would say there's a longer history of phasing and adapting missile defense in Northeast Asia, in partnership with Japan, and similarly in the Middle East in partnership with Israel and some others.

So we have a long history of adapting and integrating these capabilities as they emerged proven from the technology developers, and indeed that dates back a good number of years.

Senator NELSON. General O'Reilly?

General O'REILLY. Senator, I would also add that this budget that we've submitted is balanced, and the balancing occurred with the full participation of not only the Office of the Secretary of Defense for Policy, but also Dr. Gilmore in considering the test needs, also warfighter priorities, the combatant commands, the Joint Chiefs, and the Services.

In that balancing and looking at both regional and Homeland defense, we considered the intelligence. In the area of regional defense, there's a significant disparity between the number of missile defense systems we have and interceptors and the number of threat missiles that we see in the regional context, globally. We're not in that position with Homeland defense. We want to stay in a position of strength, where today we have a greater Homeland de-

fense than the threat of future ICBMs from current regional threats.

Finally, technical progress. In the Ground-based Midcourse Defense (GMD) program right now, we are addressing and are prepared to come back to flight testing, but we are paced by the flight test progress that we've had, and we've had two failures. No matter what budget we are discussing, we have to get over those flight test failures. I don't think those failures would have been avoided if we would have had a larger or a lesser budget than we had. It's a matter of working through the flight environments and the other issues which we uncovered in testing.

Senator NELSON. In terms of let's say even the regional defense mechanisms, aren't we finding that some of the nations in connection with the regional defense are providing us help with their own radar and their own capacity for technology?

General O'REILLY. Yes, sir. We've had very extensive discussions in many theaters around the world, in the North Arabian Gulf and Europe and Northeast Asia. We participate with over 20 countries that work either on missile defense, working in analyzing architectures, or where they can contribute, as you said. They have lower tier systems, some of them have Aegis systems, Patriot, their own indigenous systems like the French surface-to-air missile (SAMP–T), and the Dutch and others have made declarations this year that they are investing in their own budgets to modify their ship radars so they can participate and we can utilize the data coming off those radars.

So we've had an extensive amount of cooperation in order to leverage their capability, which is primarily a lower tier, and we bring the higher intercept altitudes, the upper tier, to a missile defense architecture.

Senator NELSON. General Formica?

General FORMICA. Mr. Chairman, thank you for the opportunity to add to this discussion. From an operator's perspective, this really does come down to a balance of many competing priorities—Homeland, region, operational risk, and affordability. We recognize the six priorities laid out in the BMDR and recognize that Homeland defense clearly identifies the number one priority and protecting our forces, allies, and friends abroad as our number two priority.

My assessment is that it was appropriately discussed and adequately represented in the discussions that led to the approval of the MDA's budget that you have in front of you. It also recognizes that there is never going to be enough missile defense assets to satisfy all of the warfighters' demands. But this budget, I believe, is an appropriate balance of Homeland defense, regional capability, operational risk, and affordability.

Senator NELSON. Thank you.

General O'Reilly, our missile defenses must provide force protection for our forward-deployed military personnel and that's an overarching national priority referred to by General Formica, and it's a responsibility to our troops as well. If we were just trying to provide protection for our military forces deployed in Europe, wouldn't that require some missile defense capabilities very similar to our planned EPAA, with the number of troops that we have stationed and the number of bases that are located within that area?

General O'REILLY. Yes, sir, it would. As I said before, we provide primarily the high altitude intercepts. Because of the nature of that intercept, occurring exoatmospherically or up in the higher parts of our atmosphere, you get a very broad area coverage for that layer of defense. If we only isolated on U.S. bases or U.S. interests in the region, we still would cover a very large portion of Europe, because the coverage extends beyond just the particular asset you're trying to protect. Under article 5 of our North Atlantic Treaty Organization (NATO) agreement, we are committed to, if we have the opportunity, we will defend another threatened portion of NATO.

Senator NELSON. Our troops' force protection has to be among the highest priorities, together with protecting the Homeland, as General Formica said. So in a sense we get two areas of protection, one of our allies and the other is for our own troops, with this regional or theater protection system; is that accurate?

General O'REILLY. Yes, Senator.

Senator NELSON. Thank you.

General O'Reilly, in previous testimony you've indicated that the missile defense program and budget request were reviewed, and General Formica has made reference to it as well, by an array of senior decisionmakers at the Missile Defense Executive Board (MDEB), with the participation of the Joint Chiefs of Staff, the Services, combatant commands, the Deputy Secretary of Defense, and finally the Secretary of Defense.

Can you tell us, did they review and approve the current budget request for missile defense?

General O'REILLY. Yes, Senator, they did. The process involves typically at least a half a year of me returning to that board, presenting different options, getting guidance from them. It is a very rigorous process, very iterative process, as they balance the intelligence and the other needs to formulate a final budget.

I would also add, Senator, that Dr. Gilmore is part of that board, too, and our testing represents a large part of the budget every year in order to give the combatant commanders confidence that we have the capability and also to support and address any issues which my programs may reveal based on previous testing.

Senator NELSON. Dr. Gilmore, could you give us your perspective on this process of review and the conclusions that were drawn?

Dr. GILMORE. It's a rigorous review, and to support the reviews that are actually done by the MDEB, General O'Reilly and I and our staffs participate in a number of reviews, as the two versions that are done each year of the integrated master test plan, that lays out all the testing for all the elements of the Ballistic Missile Defense System (BMDS), is developed, and we have a good technical interchange and sometimes robust debate about what the content of the test program ought to be, and we always reach good conclusions about what it ought to be.

The plan in my opinion that was recently submitted this year is a very rigorous plan. In fact, in the 20 years I've been dealing with missile defense, the most rigorous plans for testing ballistic missile defenses (BMD) that I've seen are the ones that General O'Reilly has produced when he started with the Integrated Master Test Plan (IMTP) process.

I'd note that the testing for ground-based missile defense, the defense of the Homeland, in the most recent IMTP, the pace of that and the content of it has been preserved despite the budget cuts that DOD has taken to comply with the Budget Control Act (BCA), and the pace and content of GMD testing is essentially the same as it's been for the last 2 or 3 years since I've been involved in this process.

The focus of the testing is on doing flight testing to discover the problems that have been discovered, which are very important—actually, sometimes you learn a lot more from the failures than you do from the successes—but also on validating and accrediting the models that are going to be key. In fact, it is the only way to build high confidence in the performance of the system, because none of these elements, including GMD, are actually going to be able to be tested in all aspects across the full battle space and in totally operationally realistic conditions, because of real world constraints, like we can't fire out of the Russian information flight region when we do tests.

So I'm very happy with the process that's in place and the plan I think is very rigorous and defensible.

Senator NELSON. Thank you.

General Formica, you made some reference to the amount of time and the number of individuals doing the review. Are you satisfied that the review was appropriately undertaken and that the conclusions drawn are the best conclusions that could be drawn?

General FORMICA. Mr. Chairman, again thank you for the chance to comment. I'm new to this business; 24 months ago I didn't know what an MDEB was. So I haven't had an opportunity to participate in the system. I walked away with confidence in the system as it is laid out and in the way and manner in which it was applied in the development of this budget.

It started with the requirements of the demands that the combatant commanders have brought forward, synthesized by the U.S. Strategic Command (STRATCOM) in a Prioritized Capability List (PCL). Every time that MDA brought forth a budget proposal, what we call the Program Objective Memorandum (POM), and a series of alternate POMs—and there were several iterations—and we also considered alternatives that weren't necessarily done by the MDA, to look at a full range of budgeting options—program options.

We compared those against the PCL. The operators, both Deputy Commander of STRATCOM and I, were at the MDEB to provide that operational assessment. U.S. Northern Command was generally represented there, as well as the Services. There was, as you heard in this testimony, healthy discussion and debate and it is my assessment that this budget that you have in front of you is a reflection of an appropriate balance of affordability versus risk, and again Homeland versus region, and we discussed all of those tradeoffs in this process.

Senator NELSON. Thank you.

Ms. Chaplain, the report you issued last Friday focuses on what you assess to be high levels of concurrency in a number of MDA programs. Although DOD has agreed with almost all of your recommendations, I take it that General O'Reilly has a maybe perhaps different view on concurrency. I'd like to explore the issue.

Ms. Chaplain, you acknowledge that some concurrency is acceptable and probably inevitable under the circumstances. What do you believe constitutes an acceptable level of concurrency and perhaps you could give us an example that would be helpful?

Ms. CHAPLAIN. Yes. You can look at concurrency in terms of a spectrum and not as an on and off switch in terms of when it gets bad or isn't bad. A lot of programs need to buy some long lead items, for example, that represent some concurrency in a program and that's okay to do. Where we get concerned is where we see what we believe to be pretty extreme levels of concurrency. For example, if you're testing and producing assets at the same time, and therefore when you find problems you're going to have to do a lot of expensive retrofits. We've seen that in a couple of the programs. That's where we've highlighted concerns.

I don't believe we had really acknowledged enough that some concurrency was okay in our draft and General O'Reilly was responding to some of that.

Another example, though, where we see concurrency as being a little bit more on the extreme side is with the lining up of knowledge for making a long-term program commitment. We'd like to see a preliminary design review inform that decision to make a long-term commitment to a program, because that review helps ensure that you can match resources to requirements, your technologies are well understood, and that you can get something done within the resources you have.

In a couple of cases we've seen that particular review come after that commitment. So we've already made a long-term commitment to something and yet you don't have that knowledge that you need, that we believe you need, to make that commitment.

Senator NELSON. General O'Reilly, what do you believe would be an acceptable level of concurrency, and have you been taking steps to reduce the level of concurrency in the programs?

General O'REILLY. Yes, sir. We agree in large part with what the GAO report contained from the point of view of it's very high risk, as far as cost goes, to deploying a missile system, for example, that hasn't gone through what we call ground qualification testing, testing all the environments and the components.

I do believe there has to be some concurrency, first of all from an industrial base point of view. What we typically do is develop prototypes or early production models, and those are the items which we fly. However, if we do not sustain the production base during that period—and a lot of times our test programs take 2 years or more—we actually raise risk to the program by not continuing to produce at a low level.

I think the best balance is to ensure you have very good ground qualification to convince yourself that we have no inherent problems in the designs, and then move to flight testing, but continue at a low production rate, which most programs do. Unfortunately, with missile defense programs, there are very few end items in the end because we're limited in the number of missiles we procure, and the budget. So we have to be very careful of sustaining some production while we're going through testing.

We have, in fact, reduced a significant amount of concurrency. I did not concur with the level of concurrency in the current pro-

grams when I became the director. We reviewed them and we added approximately a year to the test program and the design phase of the program for the 1B, and we also added approximately 2 years to the 2A program to address concurrency. That was prior to the GAO report, and we do balance that. It also depends on the maturity of the technology.

Senator NELSON. Ms. Chaplain, do you agree with General O'Reilly's assessment there?

Ms. CHAPLAIN. I would make a couple points. I think in terms of what's the optimum amount of production numbers when you're in that phase trying to sustain an industrial base, where we've had disagreements is actually the amount that is being produced and is it too much, is it going beyond what you need for test assets. In that case, I think MDA recently took action to address that concern we had in the 1B program.

In terms of trying not to put in gaps in the industrial base, our concern is when there is too much concurrency and you have the need to retrofit and stop production, you're actually creating more disruptions to the industrial base. So there is a careful balance there.

Lastly, I would just also recognize that, I think, after our audit work MDA took a step on the GMD side to put off production until it has that flight intercept test, which we had a very specific recommendation about. So we were happy with some of the steps that were made that we weren't able to really recognize in our report because they were made after our audit work.

Senator NELSON. I assume that you agree that the practical realities of production are such that you can't always have a line of production sitting idle, so that there are some requirements that things continue to move. But your concern would be that they not move too quickly, so that you get ahead of your testing. Is that a fair statement?

Ms. CHAPLAIN. Yes. It's not ramping up too much before that testing is complete so that it becomes very expensive to make those adjustments.

Senator NELSON. By the same token, having a line idle is not very likely and that's costly as well.

Ms. CHAPLAIN. It's costly and you could lose key skills, which are difficult to find in this kind of system development. So it's a balancing act. We recognize that. We're not trying to be very black and white about this. But in the cases we've looked at it—the concurrency there was more than we were comfortable with. It's resulted in problems. Our recommendations are just aimed at having DOD go back and look across the portfolio, see where concurrency could be reduced. I don't think it's realistic to expect it to be reduced across the board.

Senator NELSON. I think it's safe to say that General O'Reilly will do his best to keep concurrency at an acceptable level, recognizing the costly nature of getting ahead or falling behind. We appreciate those thoughts.

My friend and colleague has arrived, the ranking member. I've taken all of your time.

Senator SESSIONS. I don't have anything left. [Laughter.]

Senator NELSON. No, I think you do. But we compressed the timeframe without opening statements, but you're entitled to an opening statement—I made one—if you choose. We're in a 7-minute round for questions. I have answered—I have raised several questions and have several more. But at this point I'd say the floor is yours.

Senator SESSIONS. Thank you. I had a very important engagement. I grew up in a little town, there were 30 in my senior class, and I just got to have lunch with my classmate of first through 12 grades, who's the President of the University of Alabama, who just got elevated. Of course, her brother's Congressman Joe Bonner from the House. We also have a lieutenant governor of Alabama who's a couple of years ahead of us. So we're a pretty good little group, I guess, all things considered. So it was a real pleasure to see her.

Senator NELSON. I'll brag on mine next hearing.

Senator SESSIONS. It was a pleasure to see my classmate just after she's been selected to that important office. In Alabama, that's a big deal. Next to the football coach or the President, it's pretty important.

I request my prepared statement be inserted for the record to save time.

[The prepared statement of Senator Sessions follows:]

PREPARED STATEMENT BY SENATOR JEFF SESSIONS

Thank you very much, Mr. Chairman, I join you in welcoming our distinguished panel of witnesses.

Today's hearing focuses on the President's fiscal year 2013 budget for the Missile Defense Agency (MDA). In today's fiscal environment, no budget is immune to cuts and the $7.75 billion request for MDA was certainly no exception. Unfortunately, MDA's reductions reflect a concerning imbalance and underfund the procurement, sustainment, and modernization of proven capabilities, to pay for the development efforts necessary to fulfill the President's unproven vision for the defense of Europe. We had a plan, which would have provided a lower risk option to augment the defense of the Homeland against a long-range Iranian threat. Now because of our dismal fiscal situation, we are faced with unfortunate tradeoffs, such as having to cut funding for the procurement of high demand mature systems—like transportable radars and the Terminal High Altitude Area Defense system—in order to sustain funding for the development of higher risk efforts, like the SM–3 IIB.

Rogue nations continue to pursue the capabilities necessary to inflict unimaginable harm on the United States. Now is not the time to rest on our laurels and sacrifice the security of the Homeland for regional architectures. Regional and Homeland defense can and should coexist. System robustness and diversity should be encouraged. However, funding must be balanced and encourage the refinement of proven capabilities, not poorly defined ones that rely on high levels of concurrency and provide questionable benefit to Homeland defense.

It has been almost a year and a half since the last Ground-based Midcourse Defense (GMD) test failure and unfortunately the problems remain unfixed. I look forward to understanding why MDA believes it can achieve and sustain success in returning GMD back to its full capability as quickly as possible, while also fulfilling the modernization efforts that have been postponed since 2010. After all of the money we have spent developing this capability, taking our eye off the ball is simply unacceptable. As North Korea reminded us a couple of weeks ago, diplomacy is not going to sway their intent to develop a missile capable of reaching the United States. We welcome their failures; however, North Korea is not going to quit their reckless ways. Returning GMD—the only system currently capable of protecting the United States from ballistic missiles—to its full capability must be our highest priority.

I applaud MDA for the successful competition of the GMD development and sustainment contract. Through this competition, MDA was able to find efficiencies and savings that benefit the taxpayer, by achieving a 20 percent cost savings, and

ensure that the GMD program is well-positioned to develop, improve, and expand this critical capability.

Section 233 of the National Defense Authorization Act (NDAA) for Fiscal Year 2012 required the Department of Defense to submit a report on the Homeland missile defense hedging strategy. This strategy and policy framework, originally proposed in the Ballistic Missile Defense Review of 2010, is long overdue and was included in the NDAA for Fiscal Year 2012 to compel the administration to take a serious look at the technical risks associated with the later phases of the Phased Adaptive Approach. Thus far, I am disappointed that little has been relayed to Congress on how this administration intends to mitigate technological and threat-based risk. I look forward to hearing more from our witnesses on the hedging options being evaluated in the study, if those options include an assessment on the feasibility of deploying an east coast missile defense site, and when they expect this report will be delivered to Congress.

The President has made it very clear that if reelected he intends to do whatever it takes to appease Russian concerns on missile defense, even if that means going beyond the restrictions Congress tried to set on sharing classified information. The President's "more flexibility" gaffe confirms what many of us have warned, that the President will do whatever it takes to reassure the Russians on missile defense even if that means giving them the keys to the front door and the pass code to the alarm. The extraordinary level of transparency shared today with Russia exceeds that of some of our closest allies. "More flexibility" with Russia on missile defense would make us less secure, and it must be made clear to President Obama that undermining our defensive capabilities is unacceptable.

I thank the witnesses for joining us today and look forward to their testimony.

Senator SESSIONS. General O'Reilly, General Formica, and Dr. Roberts: the fiscal year 2013 MDA budget creates an imbalance, an underfunding, it seems, underfunding the procurement, sustainment, and modernization of the proven capabilities, it seems to me, the things that we worked on and got ready to deploy, to pay for developing efforts necessary to fulfill the President's vision for a new kind of defense of Europe.

We had a plan for a number of years that would have provided a lower-risk option to augment the defense of the Homeland against a long-range Iranian threat and also Europe. So now we're using monies from those programs to help pay for the more high risk programs—you and I have talked about it, so this is not a surprise—but to pay for the Standard Missile-3 (SM–3) Block IIB, which is, I think, not developed, just beginning to go forward, and the risk factor in a lot of different areas is great.

The budget proposes a reduction of more than $3 billion, it looks like to us, across the Future Years Defense Program for the procurement of Terminal High Altitude Aerial Defense (THAAD) and the AN/TPY–2 portable radars, two high demand systems that the Joint Staff-led joint capability mix study justified in past budgets.

So is it true—I guess yes or no: Is it true that this budget reduces the number of planned THAAD battery purchases from nine to six? Who wants to be first on that? General?

General O'REILLY. Sir, it has been reduced from nine to six. There was a process that we went through of many different budget alternatives and they were reviewed by DOD at the highest levels, including the Joint Chiefs, the combatant commanders, the Services. We went through many trades and part of the balance was the BCA requirements. But of the priorities that came out of it—and again, they were set by the priorities that General Formica's organization sets—this budget is consistent with those priorities.

Senator SESSIONS. Of course we know that DOD has been asked to take a very substantial reduction and it had to make tough

choices. So we're just trying to ascertain how that's playing out in real events.

Isn't it true that the budget reduces the number of planned THAAD interceptors from 503 to 320?

General O'REILLY. Yes, sir. It matches the number of units that we are now procuring.

Senator SESSIONS. Doesn't it reduce the number of planned TPY–2 radars from 18 to 11?

General O'REILLY. Yes, sir. Those radars are associated with the units.

Senator SESSIONS. Is it true that the Joint Staff-led capability, joint capability mix study endorsed and was used as a justification for increasing quantities of these high-demand assets in last year's budget?

General O'REILLY. Yes, sir, that was. As that was reviewed again this year, again by General Formica's organizations and others, and that was taken into account.

Senator SESSIONS. Has the demand from the combatant commands for THAAD and TPY–2 radar decreased over the last year?

General FORMICA. Sir, if I may, I would like to respond to that.

Senator SESSIONS. Yes.

General FORMICA. The demand for THAAD and TPY–2 radars, like the demand for other missile defense assets, continues to increase and has not been reduced by combatant commanders. The discussion on how many THAADs to procure as it came up in the review process during the MDEB really came down to going back to the priority between investing in the Homeland and investing in the region. THAAD is a capability that predominantly provides for investment—for defense, regional missile defense. So the decision was made to reduce the number of THAAD batteries from nine to six. Six was the minimum acceptable that the operators had identified, so we didn't go anywhere below that. There's demand for more than six. There's actually demand for more than nine. But again, balancing operational risk, affordability, Homeland defense, and regional defense, the decision was——

Senator SESSIONS. Balancing the amount of money that you had.

General FORMICA. Yes, sir, there is no doubt that was part of it. That was the affordability.

Then I would just say, one of the important decisions that we take for granted is that the three THAADs that were reduced were the last three in the program. So this budget will build THAAD capability in the early years on the time and schedule that was originally programmed. It allows us to build that capability and establish increased capacity, and we will be able to assess based on operational requirements and budget in the following years.

Senator SESSIONS. So you plan to stick at the 320, is that what that means?

General FORMICA. It means that the current budget will start at the 320 interceptors. Again, as General O'Reilly said, that is appropriate for the number of launchers that are being procured. The number of launchers, it's tied to the number of batteries.

Senator SESSIONS. Right. So the number of batteries and the number of launchers, the 320 would be where you plan to stop.

General FORMICA. That's in the current program.

Dr. ROBERTS. May I add a point to that discussion?

Senator SESSIONS. Yes.

Dr. ROBERTS. It's not where we plan to stop. We plan to continue to build capability for the Homeland and for the regions for decades to come. That's the plan in the FYDP. It's not as if at the end of that we've drawn a line and said that's enough. This is just what we're currently capable of funding. It leaves the production line open and it continues the capability in the regions, and it also gives our allies the opportunity to buy some of their own.

Senator SESSIONS. I understand that allies might help keep an assembly line going. But if we allow the assembly line to go down, you just can't start it up so easily, and the price per copy would go up, would it not?

General O'Reilly, it's been almost a year and a half since the GMD test failure. Unfortunately, the problems I understand have not been fixed. I understand that the flight test to validate the fix will not take place until December of this year, a full 2 years after the failure.

Is there anything that you could have done, that you think now you could have done, to fix that capability enhancement sooner than we planned?

General O'REILLY. Sir, the first issue we had was a quality control issue. We showed in the second flight that we have addressed that issue, and we did not have that in the second flight.

Unfortunately, that delayed us from getting into a test regime and environments where we did find where we needed to revise the design of some of the components of the missile. Once we finish that, sir, going through the time it took to validate exactly what the issue was and convince ourselves we understood it, and then we started the process of building the revised components. But out of that understanding we now have changed—we have more stringent manufacturing requirements and we've found we were not meeting those manufacturing more stringent requirements, and that caused us to start again to adjust the production.

What's really key in the time it's taking is, unfortunately, the components that we've had to redesign and revalidate and requalify are at the very beginning of the assembly process. So we have to literally disassemble most of the kill vehicle (KV) in order to get to the component and then very precisely build them back up. If it was some of the components on the outside, like a thruster problem or something, we could have very quickly replaced out the components once we had a redesign.

So it's the nature, it happens to be, of the actual components where we found the issue that is the driver in the long timeline.

Senator SESSIONS. Sometimes those things happen. We can all pretend that these things shouldn't happen, but sometimes they just do and I understand that.

I guess, Mr. Chairman, if we look at it, we had the GMD trying to use a two-stage in Europe, and we have a THAAD program and a Patriot program, but we're shifting a good deal of money and resources to what is projected to work, an SM–3 Block IIB, that I think now will be about 2020 before it's projected to be ready to deploy. Would that be about right, General O'Reilly?

General O'REILLY. Sir, that's what we projected last year. But our budget we received—we requested $123.5 million. We received $13 million. So that has effectively delayed the program a year because we didn't have the funding to execute. So 2021 I believe is a more accurate number.

Senator SESSIONS. We have severe financial challenges in this country, and I'm not sure how tough it's going to be. I'm not prepared to say that we're not going to have additional cuts, that it's not going to be put off longer, or you might have a technical difficulty and it's 2025, when we could have had in the ground, as I understand it, the two-stage by what, 2017, something like that? What was the plan for the two-stage GMD for the Polish site? How long would it have been to be deployed?

General O'REILLY. Sir, first of all, we flew the two-stage 2 years ago and it has the same KV on it that we have in our three-stage. So we believe it is a very mature missile design and capability.

As I recall, it was a 2014 delivery when we finished, when we'd begin delivering those. I defer to Dr. Roberts. I'm trying to remember.

Dr. ROBERTS. Sir, when I assumed my responsibilities my first briefing on the European third site was that initial operational capability (IOC) had slipped to 2018. At the same time, we'd also lost the support of the Czech Government for the radar. But that was IOC, and as a result of the approach that we've taken with our allies we now actually have what might equate to IOC. We actually have phase one of the PAA already in place, the capabilities in place, radars deployed.

We will continue to grow this capability to protect our forces and to give our allies opportunities to protect themselves. In other words, we will have covered a lot of ground in providing protection against the emerging Iranian threat, that would not have been covered at all until IOC, whenever it was. The briefing I got was 2018.

So we can have a discussion about whether beyond 2018 we're on the right path, where you grow the capability. But the regional approach that's now in place puts capability into the field now that wasn't planned for another few years.

Senator SESSIONS. I'm aware that this happened. I think some of it was to try to accommodate the Russians' concerns. But I believe had we been strong and firm the Czechs would have stayed in line, I think the Poles would have been happy to see the system deployed, and we would be on the road to doing it now. I'm a little bit concerned about where it all will end.

We'll need to look at that. I just share that concern.

Senator NELSON. Thank you, Senator Sessions.

Dr. Gilmore, there have been numerous concerns raised over the years, especially after flight test failures, that our missile defense systems won't work in an effective manner. There have been some recent press articles on this. Part of your job is to evaluate whether our missile defense systems have demonstrated that they will work effectively in an operational environment. Do you believe that testing to date has demonstrated that our fielded systems are able to accomplish their initial missions and are improving in their capability against increasing missions?

Dr. GILMORE. Testing to date has demonstrated the systems can work. What I will not make is a statement about confidence in the performance of the systems, because a statement of confidence for me is a statistical statement and it won't be ready for some time. As I have said in the two or three reports to Congress that I have submitted on testing of BMD, until we have, as I pointed out in my comments a minute ago, conducted enough flight tests, which will give us the information needed to verify, validate, and accredit the models that we will have to use in order to evaluate the performance of the systems across the full battle space in which they'll have to operate.

In the report that I submitted this year, I provided quantitative estimates of performance and confidence in that performance for Aegis and Patriot. We're close and next year we'll provide the same kind of information on THAAD. But it takes time to gather the data, to verify, validate, and accredit the models. That is the focus of the test program and it will take a number of more years until we can do that comprehensively for all the elements of the system.

We're continuing to gather data and improve the models, so we're making progress in that regard constantly. But a complete, comprehensive assessment is still a number of years away.

Senator NELSON. General Formica, from the warfighter's perspective, do you have confidence in the capability of our fielded missile defense systems, and do you agree that they're becoming more capable?

General FORMICA. Again, thank you, Mr. Chairman. The warfighter actively participates in and supports MDA's robust test program. The test program enables the system to demonstrate reliability in its performance. It improves warfighter confidence in the systems as they continue to test. It allows operators to develop tactics, techniques, and procedures so that when those systems are eventually fielded we are ahead of the game in having those procedures in place and begin to develop them, and it allows for us to begin training our operators. Finally, it provides an opportunity for interface between the operator and the material developer early on, so that they can consider adjustments based on operator input.

So we support the test program, have confidence, continued growing confidence in the capability of the BMD system, and do agree that it is improving.

Senator NELSON. General O'Reilly, from time to time as failures have occurred I'm sure that others have talked to you about those failures and asked questions as to what you're going to do to fix them. What do you say when people ask you whether or not these systems are going to work effectively if needed, after the failures?

General O'REILLY. Sir, what we do is as we proceed forward with our flight test programs, we make each test tougher. We've had in the last 10 years, as I recall, 51 intercepts or 52 intercepts out of 64 hit-to-kill intercepts. So we have a very high percentage of success. But each test we make it, again working with Dr. Gilmore and the test community, we make it harder.

We also test in different environments. The basic environments, which for GMD for example, we've gone through the functionality. We've flown the older version. A large portion of the current

version of our fleet of GBIs has flown five times and we have not found significant issues with it and we adjust to it.

But when we have a failure, we have a very disciplined process. In fact, our failure review boards are formed before we have a test, just to make sure we don't lose anything and we can immediately capture data. Then it takes an extreme amount of analysis. These are complex programs, complex systems. We not only determine with renowned experts from around the country what the probable cause is. I require they demonstrate it to me, they prove it, that this is a failure.

If they come up with three or four things that could have been the failure and they can't prove any one of them, then we do fixes to all of those probable causes. So that's a key point, sir. Our flight test at the end of this year is a non-intercept test, purposefully, because we're going to fly that missile in a much rougher environment than you normally would in any of our missions to protect the United States, just to validate that we have solved this problem.

Senator NELSON. There has been some confusion about the SM–3, Block IIB system that's intended for phase 4 of the EPAA to missile defense. In addition to providing robust defense of our forces and allies in Europe against potential long-range missiles from Iran, it would also augment our Homeland defense capability by providing a forward-based and cost-effective early defense capability against potential future long-range Iranian missiles that could reach the United States.

General O'Reilly, can you explain why you believe, if you do, the SM–3 IIB is important to our Homeland defense and what the impact would be if we didn't develop it.

General O'REILLY. Sir, there's two levels of answers to this. First of all, the SM–3 IIB program is designed to be a program that intercepts a long-range ballistic missile, an ICBM, and that is what it's designed to do, a longer-range missile. That is its primary purpose. It's to intercept it if you're in the right location and you're on a mobile launcher, like a ship.

If you intercept—and you can have a quite small missile compared to the capability if you're in the right location for the threat. If you're worried about, an example, Iran in the future and the United States, it's goal-tending. You get into the right position.

The benefit of it is our regional systems are built by having shoot-look-shoot. You have several opportunities to make an attempt and then determine have you been successful, and then you shoot again. We have that for all our regional systems. We do not have that for our Homeland defense system, for all of the scenarios for Homeland defense. We want that so that GMD is the system we're dedicated to and it is our primary defense, but we would first like to have a shot at any early intercept to determine whether or not we need to shoot the second one.

The second is, sir, is that in our industrial base we have a limited opportunity for companies to continue to compete and use their well-developed design teams in order to develop an intercept program to accomplish that capability.

So I am concerned about the industrial base and I am concerned about the opportunity for multiple companies. I think it's important for competition that multiple companies have the opportunity to

compete for our missile defense interceptor programs. Without the IIB program, that tremendously limits the ability for the industrial base to maintain their expertise and capability.

Dr. ROBERTS. Sir, may I add an additional point to the discussion?

Senator NELSON. Sure, please.

Dr. ROBERTS. This goes to Senator Sessions' concern about the balance of investment between GBIs and SM–3 IIB. General O'Reilly has set out the important operational benefit of being able to have two tiers in this defense of the Homeland. So when we've talked about EPAA phase 4, people associate the SM–3 IIB with the defense of Europe. Yes, we'll have some ancillary benefit there, but phase 4 is about the defense of the Homeland. It's getting that first shot in early.

An entirely separate discussion is cost. We all expect we're going to have to continue to grow missile defense of the Homeland for a long time to come. The proliferation trends are clear enough. There's a question of when threats will mature, but we don't expect them to stop maturing.

So we've tried to take a long-term look while ensuring that we remain well-protected in the short- and medium-term. So strengthening the defense of the Homeland involves addressing the technical problems in the GMD system, the results of concurrency that we discussed earlier. It involves being well-hedged against the possibility that we need to put a lot more capability into the ground quickly because there's a breakout somewhere that would somehow call into question the fact that we're already well-protected with 30 GBIs in the ground.

But looking ahead to the future growth, we'd rather put that future growth in two areas: first, improving the performance of the existing system. If your shot doctrine is four to one, six to one, eight to one, you're much better off having a shot doctrine of two to one than buying a whole bunch of new GBIs.

Second, we'd like to put money into the IIB because it gives you the opportunity to grow at a much more cost-affordable way that future capability we're going to need. So from our perspective it's not a ransack the GBI budget to go do regional missile defense. Rather, it's a strategy for strengthening the Homeland defense over the long-term in a way that is cost affordable and enhances the performance of the system through the addition of this second layer.

Thank you.

Senator NELSON. Thank you.

Dr. GILMORE. Just one additional comment.

Senator NELSON. Sure.

Dr. GILMORE. With regard to the GMD test program, the content and pace of the GMD test program is essentially the same today as it was when I first looked at the integrated master test plan when I first took office almost 3 years ago. So it is not the case that we have used the GMD test program budget to pay for anything else in this budget or in previous budgets.

Senator NELSON. Senator Sessions?

Senator SESSIONS. I'll just say this about the SM–3 Block IIB. It's not developed, it's not on the assembly line, it's not ready to

be deployed, it's not a mature technology. We've gone from a bird in the hand to two in the bush. You're not going to be here probably, Mr. Roberts, and President Obama is not going to be here, in 2022, 2023, 2024, whenever this thing, if it ever gets funded to conclusion.

So we've gone from a virtual certainty to a very uncertain situation. From a politician who handles the money and knowing what we're going to be looking like, that's what we're doing. I'm uneasy about it, frankly.

General O'Reilly, you talked about competition. You had some success with competition recently you were sharing with me. I was very impressed. Maybe we ought to hear that and what your concerns might be if we lose competition in the future.

General O'REILLY. Sir, we have had a benefit. We've had multiple programs. In, first of all, our GMD contract, it was over 10 years old. We have recompeted it. We believe because of the competition the actual cost of the contract was a billion dollars less than the government cost estimate that looked at all the factors, and we use history to predict what the cost of the contract should be.

We saw extremely innovative ideas in the company that ultimately won, Boeing, in order to save costs and have a very effective program.

There were some other benefits, too. Because we were in a competitive situation, it allows the government to make clear what its desires are and to ensure that industry is highly motivated to respond. For example, our defects clause that's in this contract now. Previously, if we had a flight test failure, there's a limited amount of award fee money that we had planned to award the contractor, given a successful flight. Often, though, the failure of a flight can cost many times more than that award fee.

Under the new contract, all of their award fee from the moment the contract was first awarded is under consideration, rather than just the award fee associated for an event if the government determines harm has occurred to the government by a failure or something that we determine should have been preventable.

We have great access to data within the program that often isn't part of another contract. So we think that the competition, sir, has saved in this case $1 billion. We have also determined that we've had several others. This isn't the only one. We have a trend. Every time we've competed in our missile programs and targets programs, the savings has been in the hundreds of millions of dollars. This is all over the past year alone.

Senator SESSIONS. I think that's good news, and I think some of the things that we were prepared to pay a lot of money for because they were so difficult and unproven, once the technology has become available, it's like computers and cell phones to some degree; they're just less expensive today. Hopefully, we can build on all that good work that's been done and the price per copy of a lot of the new systems will be less and we can achieve even better capabilities.

Thank you, Mr. Chairman. This is an important part of America's defense. One of the things that I learned a number of years ago—when the issue was hot and I asked people at town meetings,

what would happen if a country launched a missile at us, and they said: We'd shoot it down. This was before the GMD was in the ground. I think there's a general perception by the American people that we have perhaps more capability than we do. But we have some people that think the system won't work at all, that it's too complex and can't work.

But the truth is, we are developing a missile defense capability that is reliable, that consistently defends America, but we need more of them. We need to keep the cost low. I think all in all we've accomplished more than a lot of people ever thought possible. So I congratulate all of you.

Senator NELSON. Thank you.

I have one final question. General O'Reilly, the Aegis BMD program had a flight test failure last September during the first flight test of the SM–3 Block IB missile, which has delayed the scheduled production of that missile, and now it requires a plan to fix the problem and demonstrate the fix in flight testing. Can you tell us the likely cause, if it's not a matter of security, and how you're planning to correct it, and give us some indication of the criteria for a production decision on it? Do you agree in general that we should demonstrate the problem is corrected in flight testing before we make a full rate production decision?

General O'REILLY. Sir, I offer to answer that question in a closed session. I can describe the exact reason why we believe the failure occurred. I can say we've duplicated it many times on the ground. We've proven this is the cause. We fly again next month. To answer your question, sir, there were planned three flight tests across the summer, and next year three more, to firmly address that we have resolved it and flown it in many different scenarios before we go for a production decision.

Senator NELSON. We don't have a getting-the-cart-before-the-horse situation here at all. You're going through a very significant methodology of identifying the problem, with a plan to fix it and test it before production; is that fair?

General O'REILLY. Sir, that is fair, and it's the same criteria we set with Dr. Gilmore years ago. The criteria hasn't changed. When we have a failure and a problem, we maintain the criteria. We just have to be ready to continue on with the flight testing.

So effectively it has delayed the start of the production, but again to address risk for EPAA phase 2 which it will be used in, that's a 2015 deployment. So we're many years in front of it right now.

Senator NELSON. The delay is just a structural technological delay, not as a result of not having enough money to be able to do the testing?

General O'REILLY. No, sir. It's not related to funding.

Senator NELSON. I want to add my appreciation to all of you today. I think we've set a record for an abbreviated hearing, but I think if there are other questions we'll be submitting them, and the record will remain open until next Tuesday to try to get as many questions answered if there are remaining questions.

Thank you very much.

Senator SESSIONS. Mr. Chairman, I just would say how much I've enjoyed working with you on this. Your leadership, your commitment to developing the kind of strategic capability this Nation

needs to protect us, that's been your goal from the beginning. You've been an honest and strong advocate for those issues. So it's been a good hearing and I appreciate the opportunity to be with you again.

Senator NELSON. Thank you very much for those kind remarks. I'm really glad that you did arrive at the hearing in time to be able to make those remarks as well. [Laughter.]

General FORMICA. Mr. Chairman, can I make one closing thought?

Senator NELSON. Sure.

General FORMICA. I appreciate the discussion today and the investment of the technology and the systems that will deliver BMD, and we appreciate this committee's support for that. We recognize that there will never be enough and so there are other opportunities that we have to take in the offense/defense mix. But most importantly, we appreciate the support of the committee in investing in the soldiers, sailors, airmen, marines, and civilians who will operate these systems, and we appreciate your commitment to them.

Senator NELSON. Thank you, and we should never forget them. They are essentially what makes this country strong and what will help our defense against these kinds of threats.

So thank you all and thank them for us, too.

General FORMICA. Thank you, Senator. I will.

STATEMENT OF BRADLEY H. ROBERTS, PH.D., DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR NUCLEAR AND MISSILE DEFENSE POLICY

[The oral and prepared statements of Dr. Roberts follow:]

ORAL STATEMENT BY DR. BRADLEY H. ROBERTS

Chairman Nelson, Ranking Member Sessions, members of the committee, it is my pleasure to appear before you today in support of the President's fiscal year 2013 budget request for ballistic missile defense (BMD). I have prepared a formal written statement and would like to submit that for the record. That statement:

- reviews the key policy priorities as set out in the administration's 2010 Ballistic Missile Defense Review (MDR) and
- describes our progress in advancing three of those goals:
  - sustaining a strong Homeland defense posture
  - strengthening regional defense, and
  - increasing international cooperation for missile defense.

In these introductory remarks, I would like to focus in on the overall balance in our missile defense strategy and investments. Specifically, I want to address the concern expressed by some that we have put regional defense ahead of Homeland defense.

On regional defense, in our assessment there is both a need and opportunity to strengthen our defensive posture.

- The need arises from the rapidly emerging threats to our forces in Europe, the Middle East, and East Asia from regional missile proliferators and the basic challenge such proliferation poses to the safety and security of our forces and allies and to our power projection strategy.
- The opportunity to strengthen our regional posture arises from the fact that investments made over the last 2–3 decades have resulted in effective and affordable protection against these missiles.
- There is also an important knock-on effect for Homeland defense, which can be made more effective with the deployment of some assets closer to the threat.

Accordingly, we have put in place an investment program to ramp up these regional defense capabilities over the years ahead. These regional missile defense programs also provide an increasingly promising opportunity for burden sharing with our allies and partners. They are not along for a free ride.

Our first priority, however, is and remains Homeland defense. We are committed to strengthening the Homeland defense posture and to ensuring that it remains overwhelmingly advantageous for the United States even in the face of future missile proliferation. Therefore, the question is not whether we should continue to strengthen Homeland defense—I believe we are in agreement on this—but how best to strengthen it.

A simple way to grow the posture is to put more ground-based interceptors (GBI) into the ground, whether at one of the existing sites or at a new one. We prefer a different approach, one that relies on a pairing of GBIs and Standard Missile-3 (SM–3)–IIBs. Here is our case:

1. For regional defense, we now have two layers of protection. The homeland deserves the same. Depth and redundancy are better than reliance on a single system.
2. Effectively exploiting the full missile defense battle space requires forward and rear basing of interceptors. A shoot-look-shoot capability is more effective—and more efficient—with forward placement of the first shooter.
3. Forward placement of the first shooter becomes even more important if and as proliferators field missile defense countermeasures.
4. A ramp up of SM–3–IIB capability will be much more affordable than a ramp up of GBIs. With the SM–3–IIB projected to be roughly one-third the cost of the GBI, we can grow capability at triple the rate for each dollar invested.

Until the SM–3–IIB becomes available, our focus for Homeland defense needs to be on improving the performance of the Ground-based Midcourse Defense (GMD) system. Working closely with the Missile Defense Agency (MDA), we have determined that significant improvement is possible in the performance of the existing GMD system. Indeed, the performance can be at least doubled. In essence, we can double the number of ICBMs the current force is capable of defeating without adding a single new GBI.

This paired strategy (GBI and SM–3–IIB) for strengthening the Homeland defense posture directly informs the work we have had underway in the Department of Defense since conclusion of the Ballistic Missile Defense Review (BMDR) on how best to hedge against new threats to the homeland that could call into question the viability ofthe existing posture before the SM–3–IIB becomes available. The hedge analysis has informed the budget you are now considering: for example, the proposed addition of the east coast data relay center derives from that work, as does the decision to keep the GBI production line open. We continue to analyze additional steps that might be taken, as well as the intelligence information that informs such decisions. No option has been ruled out, but nor have we determined a need for additional steps at this time. We recognize our obligation to report to you on this work in a classified session and are committed to doing so as soon as the current cycle of analysis is complete.

The budget before you reflects this balanced approach to missile defense. Approximately one third of that budget is uniquely associated with regional missile defense. The rest is either uniquely associated with Homeland defense or supports both domains. As a result of the Budget Control Act, we have had to accept some additional risk in these programs. But the budget before you preserves our full set of commitments to homeland and regional defense.

In sum, in the BMDR we promised:

- a balanced approach and
- an affordable approach that would ensure stronger protection for our forces and allies abroad and effective Homeland defense in both the near-term and longer-term.

We believe that the current budget effectively supports these commitments and hope that it will benefit from your support. I look forward to answering your questions.

PREPARED STATEMENT BY DR. BRADLEY H. ROBERTS

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, and members of the subcommittee, thank you for the opportunity to testify in support of the Department's fiscal year 2013 budget request for missile defense. As the new defense strategy makes clear, ballistic missile defense is a key capability for the United States with important ramifications in several of the Department's key mission areas.

In February 2010, the administration completed the statutorily required review of missile defense policies and plans, the Ballistic Missile Defense Review (BMDR). This comprehensive review set out the following key policy priorities:

- First: The United States will continue to defend the homeland against the threat of limited ballistic missile attack.
- Second: The United States will defend against regional missile threats to U.S. forces, while protecting allies and partners—and enabling them to defend themselves.
- Third: Before new capabilities are deployed, they must undergo testing that enables assessment under realistic operational conditions.
- Fourth: The commitment to new capabilities must be fiscally sustainable over the long term.
- Fifth: Ballistic Missile Defense (BMD) capabilities must be flexible enough to adapt as threats change.
- Sixth: The United States will seek to lead expanded international efforts for missile defense.

A year ago, we provided you an update on the status of our efforts to implement these policies. That testimony highlighted our progress with our North Atlantic Treaty Organization (NATO) allies in implementing the European Phased Adaptive Approach (EPAA).

This year I would like to focus on our progress in three key areas: sustaining a strong Homeland defense, strengthening regional missile defense, and fostering increased international cooperation.

SUSTAINING A STRONG HOMELAND DEFENSE

On Homeland defense, our policy is informed by the following key judgments:

- The homeland is currently protected against potential limited intercontinental ballistic missile (ICBM) attacks from states like North Korea and Iran. This is a result of the steady progress over the past decade in developing and deploying the Ground-based Midcourse Defense (GMD) system. This system consists of Ground-Based Interceptors (GBIs), early-warning radars, sea-based radar systems, and a sophisticated command and control architecture. With 30 GBIs in place, the United States is in an advantageous position vis-a-vis the threats from North Korea and Iran. Although both countries have active programs to develop long-range ballistic missiles and space-launch vehicles, most recently evidenced by North Korea's failed attempt to launch a Taepo Dong-2 missile, neither has successfully tested an ICBM or demonstrated an ICBM-class warhead.
- Maintaining this advantageous position is essential. This requires continued improvement to the GMD system, including enhanced performance by the GBIs and the deployment of new sensors. It also requires the development of the Precision Tracking Space System (PTSS) to handle larger raid sizes and the Standard Missile-3 (SM–3) Block IIB as the ICBM threat from states like Iran and North Korea matures. These efforts will help to ensure that the United States possesses the capability to counter the projected threat for the foreseeable future.
- The United States must also be well hedged against the possibility that new threats may emerge so rapidly as to call into question the currently advantageous position. It is also prudent for the United States to have a hedge strategy to address possible delays in the development of our missile defense. Key elements of the hedge strategy were set out in the BMDR 2 years ago, including completion of the second field of 14 silos at Fort Greely, AK. This increases the availability of silos in the event that additional GBI deployments become necessary. Additionally, we continue to develop the two-stage GBI. In addition, the BMDR conveyed the administration's commitment to pursue additional programs to hedge against future uncertainties.

The commitment to continued improvement of the GMD system is reflected in budget requests to:

- Implement an aggressive GBI reliability improvement program;
- Deploy forward-based AN/TPY–2 radars;
- Develop the Precision Tracking Space System;
- Upgrade the Command, Control, Battle Management, and Communications (C2BMC) system;
- Emplace an additional In-Flight Interceptor Communications System Data Terminal on the U.S. East Coast; and

- Upgrade the Early Warning Radars at Clear, AK, and Cape Cod, MA, by 2017; and
- Accelerate C2BMC development and discrimination software to handle larger raid sizes.

These improvements in sensor coverage, command and control, and interceptor reliability will have a significant impact on the expected performance of the GMD system. Their net effect will be to reduce the number of GBIs required per intercept, which will increase the number of ICBMs that can be defeated by the GMD system.

The commitment to the SM–3 IIB as part of the longer-term solution is reflected in a request for a renewal of full funding for its development. Due to congressional actions , the SM–3 IIB program has been delayed by a year. The SM–3 IIB interceptor is now scheduled to be available for deployment in 2021 timeframe. When deployed in Europe, the SM–3 IIB will provide an opportunity for early intercept of potential Iranian ICBMs. This will also provide the United States with an additional type of interceptor for defeating ICBMs.

The commitment to being well hedged is reflected in a request to purchase an additional five GBIs. This will ensure the capability to emplace additional missiles rapidly in Missile Field 2, if necessary. It will also maintain enough GBIs for testing and operational spares. This decision also keeps the GBI production line "warm" in case the purchase of additional GBIs is needed in the future. These decisions follow the Department's commitment to pursue "additional programs to hedge against future uncertainty," as stated in the 2010 BMDR Report. To support those decisions, the Department is conducting a comprehensive review of possible future developments in the threat and of how best to ensure timely response to currently unpredicted developments. The Department will provide a classified summary of this work to the Subcommittee.

STRENGTHEN REGIONAL MISSILE DEFENSES

On regional missile defense, our policy is informed by the following key judgments:

- After a decade of significant progress in developing and fielding capabilities for protection against short- and medium-range ballistic missiles, the United States is capable now of significantly strengthening protection of its forces abroad and assisting its allies and partners in providing for their own defense.
- The need to strengthen protection significantly is clear, as the threat is rapidly expanding in regions where the United States offers security assurances.
- Fixed architectures lack the flexibility to meet rapid and unexpected developments in the regional missile threat, so a more flexible approach is needed.
- Regional approaches must be tailored to the unique deterrence and defense requirements of each region, which vary considerably in their geography, history, and character of the threat faced, and in the military-to-military relationships on which we seek to build cooperative missile defenses.
- Because the demand for missile defense assets within each region over the next decade will exceed supply, the United States will develop capabilities that are mobile and relocatable.
- Missile defense is an integral part of a comprehensive U.S. effort to strengthen regional deterrence architectures. It plays a central role in the new strategic guidance the Department released in January 2012.
- Regional missile defense architectures are not meant as a substitute for the defense of the homeland. However, over time they can become effective means to that end if threats to the homeland appear in specific regions as states like Iran and North Korea develop and deploy intercontinental-range capabilities.

The BMDR set out this new policy framework and committed the United States to pursue a phased adaptive approach (PAA) to missile defense within each region. The 2010 BMDR Report set out in detail the first regional application—in Europe. It also indicated that the approach would be applied in East Asia and the Middle East. A short summary of our progress on each of these projects follows.

PAA IMPLEMENTATION: EUROPE

A year ago, we were pleased to be able to report to you substantial progress within NATO in support of missile defense. At the November 2010 NATO Summit in

Lisbon, NATO Heads of State and Government had taken the unprecedented step of deciding to put in place full coverage and protection for the Alliance's European populations, territories, and forces against ballistic missile attacks. NATO also decided at Lisbon to expand its existing missile defense command-and-control backbone—the Active Layered Theater Ballistic Missile Defense (ALTBMD)—to encompass territorial missile defense. ALTBMD's initial capability is now in place, and will continue to evolve towards full capacity in 2018. EPAA will be the U.S. contribution to NATO missile defense. More than 1 year ago, the first deployment of EPAA capabilities came when the guided missile cruiser USS *Monterey,* carrying SM–3 interceptors, deployed to Europe in March 2011.

We also have continued to make steady progress in implementing all four phases of the EPAA.

The elements of the first phase of EPAA are now in place. As noted, Phase 1 began with deployment of the first BMD-capable ship in March 2011. We have continued to maintain a sea-based missile defense presence in the region since that time. In August of 2011, Turkey announced that it would host the forward-based radar as part of NATO's missile defense plan. By the end of 2011, the radar was deployed to the Turkish military base at Kürecik. Additionally, associated command and control capabilities are now operational, such as the U.S. Air Operations Center at Ramstein Air Base, Germany. Also of note, ALTBMD's interim capability is operational, and will continue to evolve towards full capability in the 2018–2020 timeframe.

In Phase 2, the architecture will be expanded with a land-based SM–3 site, or Aegis Ashore, in Romania, and with SM–3 Block IB interceptors that will be deployed on land and at sea. The Ballistic Missile Defense Agreement (BMDA) with Romania entered into force in December 2011, so the groundwork has been set for the site to become operational in the 2015 timeframe.

In Phase 3, a second land-based SM–3 site will be deployed in Poland. The more capable SM–3 Block IIA interceptors will be deployed on land and at sea, extending coverage to all NATO European countries. The Polish BMDA entered into force in September 2011.

Finally, with respect to Phase 4, the Department has begun concept development of a more advanced version of the SM–3 interceptor, the Block IIB, for deployment in the 2021 timeframe. This interceptor will be an especially important enhancement to the EPAA because Iran continues to develop ballistic missiles that are capable of threatening all of NATO Europe and the technology needed to field an ICBM that could threaten the U.S. Homeland. The SM–3 IIB will be the most capable interceptor for addressing intermediate-range ballistic missile (IRBM) threats to Europe and will enhance the protection of the United States by providing an early shot against an Iranian ICBM headed towards the U.S. Homeland.

We have also taken steps to resource the requirement for sea-based BMD capabilities efficiently in all phases of the EPAA. Spain has agreed to host four U.S. Aegis destroyers at the existing naval facility at Rota. These multi-mission ships will support the EPAA, as well as other U.S. European Command and NATO maritime missions. The first two ships are scheduled to arrive in 2014, and two more ships will arrive in 2015.

NATO MISSILE DEFENSE

As we continue to implement the EPAA, we are also supporting the President's commitment to contribute the EPAA capabilities to NATO missile defense. The U.S. decision to implement the EPAA in a NATO context was instrumental in building a strong consensus among the allies in support of missile defense.

NATO is now focusing on defining the command and control procedures that will guide how NATO missile defense will operate. At the May 2012 NATO Summit in Chicago, the United States and the allies plan to declare that NATO has achieved an "Interim BMD Capability."

In essence, this will mean that each nation's missile defense contributions, including the U.S. EPAA assets, will operate under the same "playbook" developed and agreed by allies. Much of this work has already been completed, and the United States will continue to support and guide these efforts to ensure that NATO missile defense procedures result in the most effective and efficient missile defense protection of NATO European populations, territory, and forces possible.

As the EPAA continues to evolve, so will NATO missile defense. In the coming years, NATO will work towards future milestones for territorial missile defense. NATO is fully engaged in developing the details necessary to implement fully the alliance missile defense decisions announced at the Lisbon Summit. Key enhancements of the future NATO missile defense capability will include:

- Engagement coordination among allies to ensure the most efficient defense;
- Real-time sharing of engagement-quality data to improve the chances of engagement success;
- The ability to coordinate and manage "upper-layer" missile defense capabilities (defense against longer-range threats).

As a result, NATO's capacity to accommodate and coordinate additional allied contributions will grow. Meanwhile, the United States will continue to deploy all four phases of the EPAA as a contribution to NATO missile defense.

There are still some complicated issues that must be resolved, as there are with any new capability at NATO, but the work is being driven by the political consensus achieved at Lisbon. The allies agree that the ballistic missile threat to NATO is growing more urgent, not less. Furthermore, we agree that missile defense is a critical new capability in order to meet this threat and adapt to the evolving 21st century security landscape.

PHASED ADAPTIVE APPROACHES IN OTHER REGIONS

We are also working to implement the principles of the phased adaptive approach in the Asia-Pacific region and the Middle East, building on the existing foundations of U.S. defense cooperation in these regions. These regional approaches must be tailored to the unique mix of threat and geography in each region. In Asia, the security environment is largely maritime in character, with some vast distances. The Middle East is far more compact, and the threat comes from missiles of short and medium range. Moreover, the footprint of U.S. military presence is different in each region, and will evolve in different ways over the coming decade. The potential threat to the U.S. Homeland from regional actors varies, and with it requirements for the role that regional defenses play in protection of the United States change as well.

These regional approaches to ballistic missile defense should allow strong partnerships with regional allies and partners in meeting emerging security challenges, and provide opportunities for building partner capacity.

STRENGTHENING INTERNATIONAL COOPERATION

There has been significant progress in the area of international cooperation on missile defense. Let me highlight a few areas of particular note.

Europe

Within NATO, allies are stepping up as contributors to the NATO missile defense effort. Germany and the Netherlands currently field Patriot PAC–3, Greece and Spain operate Patriot PAC–2, and France and Italy have the SAMP/T system, which has capabilities similar to those of the Patriot.

Other allies plan to commit additional capabilities to contribute to NATO missile defense. The Netherlands has approved plans and funding to upgrade the SMART–L radar on four air defense frigates, giving the ships a BMD sensor capability. Additional sensor capabilities can greatly enhance the effectiveness of a BMD architecture. Germany is also exploring airborne sensor concepts that could support NATO BMD. In addition, France has proposed a concept for a shared-early warning satellite, and is developing a transportable midcourse radar for BMD and early warning.

NATO allies have shown their financial, political, and military support for the implementation of EPAA and NATO missile defense in other ways. The commitment to upgrade the ALTBMD command and control system noted above was backed with an alliance funding commitment. Turkey, Romania, Poland, and Spain have all agreed to host U.S. assets in support of NATO missile defense. These host governments will bear the costs of providing perimeter defense and security for the U.S. assets and infrastructure.

Looking to the future, the United States will continue to encourage its NATO allies to do even more to cooperate and invest in missile defense. Several allies have modern surface combatant ships that could be upgraded with a BMD sensor or shooter capability. A number of NATO allies also have proposed concepts for a multinational interceptor "pool" concept, whereby allies collectively purchase interceptors such as the SM–3 to support NATO missile defense. Additionally, some allies are considering the purchase of Patriot PAC–3.

Asia-Pacific

In the Asia-Pacific region, Japan has acquired its own layered missile defense system, and the United States and Japan regularly train together, learn from each other, and have successfully executed cooperative BMD exercises and operations.

The United States and Japan are also partnering in the co-development of an advanced version of the SM–3 interceptor, the SM–3 Block IIA.

The United States and Australia signed a memorandum of understanding on missile defense cooperation in 2004 and partner on ballistic missile defense research and development, most notably in the field of sensors.

The United States also continues to consult with the Republic of Korea regarding its future ballistic missile defense requirements.

The United States engages in a trilateral dialogue with Japan and Australia, and separate trilateral dialogue with Japan and the Republic of Korea. In each, we address a wide range of regional security issues, including missile threats and defenses. These trilateral dialogues support U.S. efforts to deepen missile defense cooperation and strengthen regional security architectures.

Middle East

The United States and Israel cooperate extensively on missile defense issues. We have a long history of cooperation on plans and operations as well as specific missile defense programs. We hold regular consultations, and have conducted joint exercises since 2001 that are aimed at improving interoperability between U.S. and Israeli missile defense systems. In 2008, our countries worked together to deploy a forward-based radar in Israel to enhance U.S. and Israeli missile detection capabilities. U.S. support to the security of Israel remains steadfast. U.S. security assistance to Israel has increased every year since fiscal year 2009. The administration has requested nearly $450 million for Israeli rocket and missile defense between fiscal year 2010 and 2013 and secured an additional $205 million in fiscal year 2011 to procure Iron Dome defense systems.

Separately, the United States is working with a number of Gulf Cooperation Council (GCC) countries on missile defense, including exploring the purchase of U.S. missile defenses through the Foreign Military Sales (FMS) program. For example, the United Arab Emirates (UAE) recently signed an FMS case to purchase Terminal High Altitude Aerial Defense (THAAD) batteries, interceptors, and associated equipment, and had earlier made a decision to purchase Patriot systems from the United States. These systems will greatly enhance the UAE's defense against ballistic missile attack. As our partners acquire greater missile defense capabilities, the United States will work to promote interoperability and information sharing among the GCC states. This will allow for more efficient missile defenses and could lead to greater security cooperation in the region.

A primary purpose of the phased adaptive approaches to regional missile defense is to build upon this solid foundation of cooperation in each of these regions to achieve needed protection improvements over the coming decade.

Russia

The United States has sought cooperation with Russia on missile defense, both bilaterally and with our allies through the NATO-Russia Council. We are pursuing this cooperation because it would be in the security interests of the United States, NATO, and Russia by strengthening the defensive capabilities of both NATO and Russia. Allies embraced such cooperation with the hope of advancing broader strategic partnership with Russia. The United States has pursued missile defense cooperation with Russia with the clear understanding that we would not accept constraints on missile defense, we would implement all four EPAA phases, and Russia would not have command and control over the defense of NATO territory. NATO would be responsible for the defense of NATO, and Russia would be responsible for the defense of Russia.

The United States has kept Congress and our allies informed about our efforts to reach agreement with Russia to cooperate on missile defense, which have included the proposal of two missile defense cooperation centers in Europe. The United States has been open and transparent with Russia about our plans for missile defenses in Europe, and explained our view that missile defense in Europe does not negate the Russian strategic nuclear deterrent.

Although we have had no breakthroughs, the administration remains committed to pursuing substantive missile defense cooperation with Russia because it remains in our security interests to do so and, as President Medvedev noted in a statement last fall, Russia indicates that it remains open to further discussions and seeks a mutually acceptable agreement on the way forward.

THE PRESIDENT'S BUDGET FOR FISCAL YEAR 2013

The fiscal year 2013 budget requests $9.7 billion in fiscal year 2013 and $47.4 billion over the next 5 years to develop and deploy missile defense capabilities that protect the U.S. Homeland and strengthen regional missile defenses. This number

is less than last year's request, but it nevertheless demonstrates a continued high-level commitment to developing cost-effective missile defense capabilities while maintaining our commitments to homeland and regional defense. The phased adaptive approach to regional missile defense is fully in line with the main themes of U.S. defense strategy in a period of budget austerity.

This approach puts emphasis on a flexible military toolkit with forces that are mobile and scaleable so that they underwrite deterrence in peacetime, but can be surged in crisis to support additional warfighter requirements.

On Homeland defense, the budget takes advantage of savings from the GMD system competition, while continuing to improve the performance of the system and at the same time hedging against uncertainty. With regard to regional missile defenses, the budget request continues to increase the pool of mobile, relocatable assets for the phased adaptive approaches—but at a somewhat slower rate. This budget includes the purchase of an additional THAAD battery, an AN/TPY–2 radar, and SM–3 IB interceptors, as well as the conversion of 3 Aegis ships to bring the total number of BMD-capable ships to 32. The budget also includes $46.9 million for directed energy research. The budget forced us to make difficult choices that entail some risk. However, the missile defense capabilities we are pursuing enable us to field a force that is flexible and adaptive, and that can surge to meet the requirements of an uncertain future.

The fiscal year 2013 budget request also includes funding for the SM–3 IIB and PTSS, two programs that faced congressional reductions in the previous budget that will cause delays in their deployment timelines. These programs are vital to addressing the long-term threats from regional actors such as Iran and North Korea, so slips in the program schedules due to budget reductions introduce additional risk. The SM–3 IIB will provide improved protection against IRBM threats as well as supplement the protection of the homeland provided by the GMD system against ICBM threats with a significantly lower cost interceptor than the GBI. PTSS will also contribute to both homeland and regional missile defense by providing persistent coverage and tracking of ballistic missiles over their entire flights and address larger raid sizes. This will improve the performance of our missile defenses by providing better data to the interceptors and allowing us to allocate terrestrial sensor resources more efficiently.

CONCLUSION

With your support, we have been able to make significant progress in strengthening the protection of the United States, our forces, and our allies and partners abroad from the threat of coercion and attack by ballistic missiles. We appreciate congressional support for the President's missile defense annual budget requests, and in these more austere budget times, we hope for your continued support. We have had to make some difficult choices in this year's budget, but the result is fully consistent with the policy commitments set out in the BMDR.

Again, thank you for the opportunity to speak here today before the members of this subcommittee. I look forward to answering your questions.

STATEMENT OF LTG PATRICK J. O'REILLY, USA, DIRECTOR, MISSILE DEFENSE AGENCY

[The oral and prepared statements of General O'Reilly follow:]

ORAL STATEMENT BY LTG PATRICK J. O'REILLY, USA

Good afternoon, Chairman Nelson, Ranking member Sessions, and other distinguished members of the subcommittee. The Missile Defense Agency's (MDA) $7.75 billion fiscal year 2013 President's budget request balances: the Secretary of Defense's policies; U.S. Strategic Command's Missile Defense Priorities; the MDA's technical feasibility assessments; budget affordability; and Intelligence Community estimates. I describe our past year's accomplishments and justification of this year's budget request in my written statement submitted to this committee. However, I'd like to highlight that last year we improved our Homeland defense by activating our newest missile field and an additional fire control node at Fort Greely, AK, and an Upgraded Early Warning Radar in Thule Greenland. The agency's highest priority is to intercept a missile with the newest version of our Ground-Based Interceptor (GBI) after two previous flight test failures. We conducted a failure review by renowned experts, redesigned critical GBI components, and established more stringent component manufacturing requirements. We incurred delays meeting those stringent requirements, but we will not execute flight tests until our engineers and inde-

pendent experts are convinced that we have resolved all issues. We anticipate our next non-intercept flight test by the end of this year to verify issue resolution and then conduct an intercept flight test early next year before we re-activate the GBI production line. This year, we will also activate our hardened power plant at Fort Greely, AK, and we will increase the firepower of fielded GBIs by upgrading the reliability of GBI components. Finally, we continue to enhance the Sea-Based X-band radar, but we have cost-effectively limited its operations to flight testing and contingency deployments under the command of the Navy's Pacific Fleet.

During the past year we: deployed on-time the first phase of the European Phased Adaptive Approach, demonstrated an Aegis intercept of a 3,700 km target, and simUltaneously intercepted two missiles with the Terminal High Altitude Area Defense (THAAD) system. This year, the first two THAAD batteries will be available for deployment; the number of total Aegis BMD capable ships will reach 29; we will conduct three SM–3 Block IB flight tests to demonstrate the resolution of last year's flight test failure; and we will conduct the largest missile defense test in history by simultaneously intercepting three ballistic missiles and two cruise missiles with an integrated Patriot, THAAD. Aegis BMD and forward based radar systems. We also continue to work with over 20 countries. including cooperative development programs with Israel and Japan, the first foreign military sale of THAAD to the UAE, and support discussions with the Russians on cooperative missile defense.

I am concerned about developing the critically needed, persistent, and cost effective missile tracking capability of the Precision Tracking Space System and developing a second, independent, and layer of Homeland defense with the SM–3 IIB interceptor due to fiscal year 2012 congressional funding reductions to both programs. These programs allow our homeland to benefit from the same layered missile defense approach we successfully employ for our regional defenses.

Finally, while some concurrency of development, test, and limited production is needed to sustain our industry base during testing, I concur with the Government Accountability Office's (GAO) recent report that concurrency must be balanced with program and technical risk. We already implemented six of the seven GAO recommendations prior to the GAO's review. For example, GMD schedule concurrency was high risk, but in 2009 and 2010 we reviewed the risks and reduced the schedule concurrency of the SM–3 IB and SM–3 IIA programs. However, I disagree that the European Phased Adaptive Approach (EPAA) program schedules are driven by Presidential directed dates. EPAA programs have risk-based concurrency; knowledge-based program decisions, and historically-based schedules. Finally, causes of the GBI flight test failures were workmanship and unknown flight environments, not schedule concurrency.

Thank you and I look forward to the committee's questions.

PREPARED STATEMENT BY LTG PATRICK J. O'REILLY, USA

Good afternoon, Chairman Nelson, Ranking Member Sessions, other distinguished members of the subcommittee. I appreciate the opportunity to testify before you today on the Missile Defense Agency's (MDA) $7.75 billion fiscal year 2013 budget request to develop protection for our Nation, our Armed Forces, allies, and partners against the proliferation of increasingly capable ballistic missiles. The Department developed the fiscal year 2013 President's budget request in accordance with the February 2010 Ballistic Missile Defense Review (BMDR), which balanced warfighter needs as expressed in the U.S. Strategic Command (STRATCOM) Integrated Air and Missile Defense (IAMD) Prioritized Capability List (PCL) with technical feasibility and affordability constraints and Intelligence Community updates. We continue to demonstrate and improve the integration of sensor, fire control, battle management, and interceptor systems that transforms individual missile defense projects into a Ballistic Missile Defense System (BMDS) capable of defeating large raids of a growing variety of ballistic missiles over the next decade. For Homeland defense, last year we completed the construction of the Ground-based Midcourse Defense (GMD) infrastructure for protection of the U.S. Homeland against future limited intercontinental ballistic missile (ICBM) threats from current regional threats including the activation of our newest hardened missile field at Fort Greely, AK (FGA). This year, we will continue to aggressively pursue the Agency's highest priority—successful return to flight and intercept tests of the Capability Enhancement II (CE II) version of the Ground-Based Interceptor (GBI). We will prepare for the next GMD non-intercept flight test by the end of this year and our next intercept early in the following year, activate the hardened power plant at FGA, prepare to restart the GBI production line, and aggressively conduct component testing and refurbish currently deployed missiles to test and improve their reliability. For regional

defenses, last year we deployed Phase 1 of the European Phased Adaptive Approach (EPAA) consisting of a command and control, battle management system in Germany, forward-based radar in Turkey, and an Aegis Ballistic Missile Defense (BMD) ship in the Eastern Mediterranean Sea. This year, we will have 2 operational THAAD batteries, convert 5 Aegis ships and upgrade 1 for a total of 29 ships with BMD capability installed, and increase the number of associated SM–3 interceptors. In our test program, we will conduct three flight tests of the SM–3 Block IB to demonstrate resolution of last year's flight test failure and its ability to intercept complex short-range ballistic missile (SRBM) (up to 1,000km) targets. Finally, this year we will demonstrate the maturity of our layered regional defense with the first simultaneous intercepts of three short- and medium-range ballistic missiles (MRBM) and two cruise missiles by an integrated architecture of Patriot Advanced Capability (PAC)-3, THAAD, and Aegis BMD systems assisted by a remote AN/TPY–2 forward based radar—the largest, most complex, live fire missile defense test in history.

ENHANCING HOMELAND DEFENSE

MDA's highest priority is the successful GMD intercept flight test of the newest GBI Exo-atmospheric Kill Vehicle (EKV)—the CE II EKV. Last year, we concluded the Failure Review Board (FRB) evaluation for the December 2010 FTG–06a flight test by identifying the most probable cause of the failure and revising the CE II EKV design to correct the problem. As a result of that FRB, we have redesigned critical GBI Exo-atmospheric Kill Vehicle (EKV) components and established more stringent manufacturing and component test standards—standards previously not used anywhere in the U.S. aerospace industry. As a result of these stringent manufacturing standards, we have encountered several delays in preparing for our next non-intercept and intercept flight tests. MDA is fully committed to test the GMD system as soon and often as possible, but we will not approve executing a flight test until our engineers, and independent government and industry experts, have been convinced that we have resolved all issues discovered in previous testing and will be successful in our next test. Flight testing as often as possible is our goal, but we risk further failure if we conduct GMD testing prior to verification that we resolved problems discovered in previous flight tests. Also, conducting flight tests at a pace greater than once a year prohibits thorough analysis of pre-mission and post-mission flight test data and causes greater risk of further failure and setbacks to developing our Homeland defense capability as rapidly as possible. If our CE II non-intercept (Controlled Test Vehicle (CTV) flight) is not successful later this year, we will be prepared to conduct the next test of the previous version of the EKV (the CE I EKV) GBI test while we continue to resolve any CE II issues in order to continue to test other improvements in our Homeland defense. Other improvements to Homeland defense include: the upgrades and integration of the Thule Early Warning Radar into the BMDS to view and track threats originating in the Middle East; upgrade of three emplaced FGA GBIs as part of our ongoing GMD fleet refurbishment and reliability enhancement program; fielding improved GMD fire control software to allow testing or exercises to be conducted while simultaneously controlling the operational system; and upgrading the FGA communications system. We activated Missile Field 2 earlier this year, thus increasing the number of total GBI operational silos to 38 (34 at FGA and 4 at Vandenberg Air Force Base ((VAFB)) in California). This past December, we awarded the GMD Development and Sustainment contract, one of the Agency's largest and most complex competitive acquisitions, with a price of almost $1 billion less than the independent government cost estimate. For the next 7 years, this $3.5 billion contract will provide for sustainment and operations as well as improvements and enhancements of the current capability, provide for a robust and vigorous testing program, and deliver new and upgraded interceptors. A key part of the scope of this new contract is comprehensive verification and reliability testing, and upgrades as needed, of every component of our GBIs. These component reliability improvements and tests will require 3 years to complete and will provide the U.S. Northern Command (NORTHCOM) commander convincing GBI reliability data resulting in a greater number of ICBMs that can be engaged with a higher probability of protection of our homeland.

We are requesting $903.2 million in fiscal year 2013 in RDT&E funding for the GMD program. We plan to continue to upgrade our fleet of 30 operational GBIs and acquire 5 additional GBIs for enhanced testing, stockpile reliability, and spares, for a total of 57 GBIs. We will continue GBI component vendor requalifications for the future GBI avionics upgrade and obsolescence program.

Today, 30 operational GBIs protect the United States against a limited ICBM raid size launched from current regional threats. If, at some point in the future, this ca-

pability is determined to be insufficient against a growing ICBM threat, it is possible that we can increase the operational GBIs' fire power by utilizing all 38 operational silos, refurbishing our 6-silo prototype missile field, and accelerating the delivery of new sensor and interceptor capabilities. Additionally, our GBI reliability improvement program will enable more successful intercepts with fewer GBIs with the same probability of successful intercept. In fiscal year 2013, we will begin construction of the GBI In-Flight Interceptor Communication System (IFCS) Data Terminal (IDT) at Fort Drum, New York, with a completion date by 2015. The East Coast IDT will enable communication with GBIs launched from FGA and VAFB over longer distances, thus improving the defense of the eastern United States. We will also continue to develop and assess the two-stage GBI to preserve future deployment options, including an intercept flight test in fiscal year 2014.

Because the defense of our homeland is our highest priority, we are pursuing a layered defense concept—similar to that in regional missile defense—to achieve high protection effectiveness by deploying more than one independently developed missile defense interceptor system; therefore, we will continue development of the SM–3 Block IIB to protect our homeland in the future by creating a new first layer of intercept opportunities, expanding the forward edge of our Homeland defense battle space, and providing our warfighters highly feasible "Shoot-Assess-Shoot (SAS)" firing doctrine. The recent Defense Science Board (DSB) agreed with our assessment that the SM–3 IIB will be challenged to destroy ICBMs before their earliest possible deployment of countermeasures. The DSB also supports MDA's development of the SM–3 IIB to significantly expand the forward edge of our ICBM battle space and enable SAS to obtain very high levels of ICBM protection of our homeland. The fiscal year 2012 congressional reduction of the SM–3 IIB funding has increased the challenge of fielding this improvement in Homeland Defense against ICBMs in the 2020 timeframe. My additional concern is the impact of reducing funding for the SM–3 IIB will eliminate the only new interceptor design and development opportunity for our Nation's missile defense industrial base for the foreseeable future. The three SM–3 IIB industry teams lead by Lockheed Martin, Boeing and Raytheon have shown rapid progress in developing very effective and feasible SM–3 IIB interceptor design concepts. To terminate, or slow down, the SM–3 IIB development effort will have a significant negative impact on missile defense aerospace industrial base at this time and risk our ability to cost-effectively respond to emerging regional ICBM threats to our homeland for decades in the future.

This year, we will begin upgrading the Clear Early Warning Radar in Alaska for full missile defense capability by 2016. We will also continue operations of the Sea-Based X-band (SBX) radar and development of algorithms to improve its discrimination capability. We are requesting $347.0 million in fiscal year 2013 for BMDS Sensors development for Homeland defense, including support of the Cobra Dane radar, the Upgraded Early Warning Radars (UEWRs) at Beale AFB (California), Fylingdales (United Kingdom), and Thule (Greenland). We are requesting $192.1 million to operate and sustain these radars and $227.4 million to procure additional radars and radar spares. In fiscal year 2013, we will also place the SBX in a limited test operations status for affordability reasons, but we will be prepared to activate the SBX if indications and warnings of an advanced threat from Northeast Asia become evident. We will also continue to upgrade the GMD system software to address new and evolving threats, including enhancing EKV discrimination algorithms by 2015, improving GBI avionics, and increasing GBI interoperability with the Command and Control, Battle Management and Communications (C2BMC) system.

ENHANCING REGIONAL DEFENSE

This year, we will demonstrate integrated, layered regional missile defense in the largest, most complex missile defense test ever attempted. We will simultaneously engage up to five air and ballistic missile targets with an Aegis, THAAD, Patriot and Forward Based Mode AN/TPY–2 radar integrated C2BMC system operated by soldiers, sailors, and airmen from multiple Combatant Commands. This live-fire test will allow our warfighters to refine operational doctrine and tactics while providing confidence in the execution of their integrated air and missile defense plans.

Last year, in addition to deploying EPAA Phase 1, we successfully supported negotiations for host nation agreements to deploy Aegis Ashore batteries to Romania (Phase 2) and Poland (Phase 3); we successfully tested the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) Interim Capability with EUCOM C2BMC to enhance NATO situational awareness and planning; we installed the Aegis BMD 3.6.1 weapon system on 3 Aegis ships and upgraded one Aegis BMD ship to Aegis BMD 4.0.1 (increasing the Aegis BMD fleet to 22 operationally configured BMD ships); and we delivered 19 SM–3 Block IA interceptors and the first

SM–3 Block IB interceptor. We continued SM–3 Block IIA system and component Preliminary Design Reviews. We delivered 11 interceptors for THAAD Batteries 1 and 2 and flight test, and started production of Batteries 3 and 4. We also delivered the latest C2BMC upgrades to Northern Command, Strategic Command, Pacific Command, and Central Command. These software builds will improve situational awareness, sensor management, and planner functions.

We also demonstrated critical BMDS regional capabilities in key tests over the past year. In April 2011, we conducted an Aegis BMD flight test (FTM–15) using the SM–3 Block IA interceptor launched using track data from the AN/TPY–2 radar passed through the C2BMC system to intercept an Intermediate-Range Ballistic Missile (IRBM), target (3,000km to 5,500km) to demonstrate the EPAA Phase 1 capability. This mission also was the first Launch-on-Remote Aegis engagement and intercept of an IRBM with the SM–3 Block IA. In October 2011, the BMDS Operational Test Agency (OTA), with the oversight of the Director, Operational Test & Evaluation, conducted a successful Initial Operational Test & Evaluation test (FTT–12) of THAAD's ability to detect, track, and engage SRBM and MRBM targets simultaneously.

Enhanced MRBM Defense in Europe by 2015 (EPAA Phase 2)

Our goal in this phase is to provide a robust capability against SRBMs and MRBMs by deploying several interceptors to engage each threat missile multiple times in its flight. The architecture includes the deployment of the Aegis BMD 5.0 weapon systems with SM–3 Block IB interceptors at sea and at an Aegis Ashore site in Romania. When compared to the current SM–3 Block IA, the IB will be more producible, have an improved two-color seeker for greater on-board discrimination, and have improvements to enhance reliability of the SM–3 Block IB's divert and attitude control system. These improvements also provide an enhanced capability to simultaneously engage larger sized raids of threat missiles.

We are requesting $992.4 million in fiscal year 2013 for sea-based Aegis BMD to continue development and testing of the SM–3 Block IB, continue outfitting of ships with the BMD 4.0.1 system as well as spiral upgrades to Aegis 5.0 to support the operation of the SM–3 Block IB and IIA interceptors and associated flight tests. We are requesting $389.6 million in fiscal year 2013 for the procurement of 29 SM–3 Block IB interceptors and $12.2 million to operate and maintain already deployed SM–3 Block IA interceptors. In fiscal year 2013, we are also requesting $276.3 million to develop and build the Aegis Ashore Test Facility at the Pacific Missile Range Facility in Hawaii and $157.9 million to construct the first Aegis Ashore Missile Defense System battery in Romania by fiscal year 2015. We request $366.5 million in fiscal year 2013 to operate and sustain C2BMC at fielded sites and continue C2BMC program spiral development of software and engineering to incorporate enhanced C2BMC capability into the battle management architecture and promote further interoperability among the BMDS elements, incorporate boost phase tracking, and improve system-level correlation and tracking. We will also continue communications support for the AN/TPY–2 radars and PAA-related C2BMC upgrades.

In September 2011, we conducted FTM–16 to demonstrate Aegis BMD 4.0.1 fire control and the first flight test of the SM–3 Block IB interceptor. While we did not achieve the intercept of the SRBM separating payload, we demonstrated critical system functions, including the exceptional performance of the kinetic warhead divert system, which allowed the Navy's partial certification of the Aegis BMD 4.0.1 computer program. In the third quarter of fiscal year 2012, we will conduct FTM–16 (Event 2a) to demonstrate the resolution of the previous flight test issue and the SM–3 Block IB's Kill Warhead's capability. We will also demonstrate the ability of the SM–3 Block IB to intercept more complex SRBM targets in FTM–18 and FTM–19 later this summer. In the third quarter fiscal year 2013, we will conduct the first operational flight test led by the BMDS OTA team involving a coordinated and simultaneous engagement involving Aegis BMD, THAAD and PAC–3 systems against three targets and two cruise missiles. Our fiscal year 2013 testing program continues to demonstrate the SM–3 Block IB and Aegis BMD 4.0.1 (FTM–21 and FTM–22), including a salvo engagement involving two interceptors against an SRBM.

Enhanced IRBM Defenses in Europe by 2018 (EPAA Phase 3)

The SM–3 Block IIA interceptor, being co-developed with the Japanese government, is on schedule for deployment at Aegis Ashore sites in Romania and Poland, and at sea, in 2018 to provide enhanced protection for European NATO countries from all ballistic missile threats from the Middle East. This year we completed the SM–3 Block IIA preliminary design review, and continue shock and vibration testing of the SM–3 Block IIA interceptor canister, and development of Aegis BMD 5.1 fire control system. We also reduced the execution risk of the SM–3 Block IIA pro-

gram by increasing the time between flight tests while maintaining the original initial capability date of 2018. The fiscal year 2013 request for SM–3 Block IIA co-development is $420.6 million.

Expanded Interceptor Battle Space by 2020 (EPAA Phase 4)

The SM–3 Block IIB will provide a pre-apogee intercept capability against IRBMs and an additional layer for a more enhanced Homeland defense against potential non-advanced ICBMs launched from today's regional threats. This program is in the technology development phase, and its 7-year development timeline is consistent with typical interceptor development timelines according to Government Accountability Office data. Last year we awarded risk reduction contracts for missile subsystem components, including advanced propulsion, seeker, and lightweight material technologies. We also awarded concept design contracts for the SM–3 Block IIB interceptor to three aerospace industry teams. In fiscal year 2013, we are requesting $224.1 million to develop the Request For Proposal and begin source selection for the SM–3 Block IIB Product Development Phase, which we propose to begin in early 2014. The SM–3 Block IIB is leveraging advanced tracking and discrimination technologies planned for deployment during EPAA Phase 4, as well as the entire sensor network, with PTSS and C2BMC upgrades to maximize Homeland defense.

ADDITIONAL MISSILE DEFENSE CAPABILITIES

This year, we are procuring 42 THAAD interceptors for Batteries 1 and 2, 6 launchers, and 2 THAAD Tactical Station Groups. We are requesting $316.9 million in RDT&E funding in fiscal year 2013 to enhance communications and debris mitigation, which will allow THAAD to be more interoperable with PAC–3 and Aegis BMD and connected to the BMDS, and $55.7 million for THAAD operations and maintenance. We also request $460.7 million to procure 36 THAAD interceptors. THAAD will complete delivery of the first fifty interceptors in June 2012, demonstrating the capacity of the contractor supply chain and the main assembly factory in Troy, AL, to deliver interceptors. The next production lots are under contract, with delivery beginning this summer. We will maintain a production rate of four THAAD missiles per month through June 2012 due to components on hand and enhance the supply chain's production capacity to sustain a three missile per month production rate beginning in spring 2013. In late fiscal year 2012, we will demonstrate THAAD's ability to intercept an MRBM as part of an integrated operational test with PAC–3 and Aegis BMD.

Additional BMDS improvements include expanded coordination of missile defense fire control systems and improvements in radar discrimination. We are requesting $51.3 million for the Space Tracking and Surveillance System (STSS) in fiscal year 2013. We continue to operate the two STSS demonstration satellites to conduct cooperative tests with other BMDS elements and demonstrate the capability of STSS satellites against targets of opportunity. These tests demonstrate the ability of a space sensor to provide high precision, real-time tracking of missiles and midcourse objects that enable closing the fire control loops with BMDS interceptors. In fiscal year 2013, we plan the first live intercept of a threat missile by the Aegis Ballistic Missile Defense (BMD) system using only STSS data to form the fire control solution for the SM–3 IB interceptor. Additionally, lessons learned from the two STSS demonstration satellites inform Precision Tracking Space System (PTSS) design development decisions.

DEVELOPING NEW CAPABILITIES

We are requesting $80 million in fiscal year 2013 to continue development of fiscally sustainable advanced BMD technologies that can be integrated into the BMDS to adapt as threats change. Intercepts early in the battle space will provide additional opportunities to kill threat missiles, enlarge protection areas, and improve the overall performance of the BMDS.

Last year, we accelerated our test campaign with the Airborne Laser Test Bed (ALTB) to collect data on tracking and atmospheric compensation, system jitter, and boundary layer effects on propagation for future directed energy applications. This year, in accordance with the funding reduction enacted by Congress, we grounded the ALTB aircraft and are examining the technical feasibility of high efficiency directed energy technology for the next decade. In fiscal year 2013, we are requesting $46.9 million to pursue Diode Pumped Alkaline-gas Laser System and coherent fiber combining laser technologies, which promise to provide high efficiency, electrically-driven, compact, and light-weight high energy lasers for a wide variety of missions of interest to MDA and the Department of Defense and support concept development for the next generation of airborne missile defense directed energy systems.

We request $58.7 million in fiscal year 2013 to continue support for research and development of advanced remote sensing technologies, demonstrate acquisition, tracking and discrimination of multi-color infrared sensors, and investigate techniques to improve the system's data fusion capability to further strengthen the Nation's missile defense sensor network. We have integrated our international and domestic university research programs into the same structure, allowing the Agency to capitalize on the creativity and innovation within our small business and academic communities to enhance our science and technology programs.

The greatest future enhancement for both homeland and regional defense in the next 10 years is the development of the Precision Tracking Space System (PTSS) satellites, which will provide fire control quality track data of raids of hostile ballistic missiles over their entire flight trajectories and greatly expand the forward edge of the our interceptors' battle space for persistent coverage of over 70 percent of the Earth's landmass. The need for persistent, full trajectory, tracking of ballistic missiles is one of the warfighter's highest development priorities as stated in the 2012 STRATCOM PCL. PTSS will enhance the performance of all missile defense interceptors at an operational cost significantly less (and with much greater ability to track large raid sizes of threat missiles) than forward based AN/TPY–2 radars, based on MDA's experience with STSS program costs. The emerging concept design of the PTSS spacecraft is much simpler than STSS because it relies on the mature Air Force Space Based Infra-Red (SBIR) satellite system to acquire threat ballistic missiles, leverages PTSS's ability to provide precision tracks of the remainder of threat missiles' trajectories, and uses only satellite components with high technology readiness levels. Due to the intrinsic simplicity and component maturity of the PTSS design, the integration of concurrent developments is considered to be a low acquisition risk. Key to our acquisition strategy is MDA partnering Air Force Space Command and the Naval Research Laboratory with Johns Hopkins University Applied Physics Laboratory (APL), with participation of six aerospace corporations, to develop a fully government owned preliminary design and technical data package to enable full competitions by our aerospace industry for the production for the first and subsequent PTSS satellite constellations. MDA is requesting $297.4 million for PTSS in fiscal year 2013 to continue development of preliminary design requirements to create these multi-mission satellites (e.g., missile defense, space situation awareness, DOD and Intelligence Community support). APL has a noteworthy track record, dating back to 1979, for meeting planned development cost and schedule projections involving 17 significant spacecraft missions. We will complete final design and engineering models for the PTSS bus, optical payload, and communications payload in fiscal year 2013. PTSS project scope includes delivery of PTSS ground segments and launch of the first two PTSS spacecraft in fiscal year 2017. We are fully cooperating in an Independent Cost Estimate (ICE) of the development and 20 year life cycle cost of the PTSS constellation by the Office of the Secretary of Defense, Office of Capability Assessment and Program Evaluation (CAPE), to achieve a high confidence cost estimate of the development and 20 year life of the PTSS constellation. Of note, this ICE will provide great insight into the validity of the recent National Academy of Science (NAS) Boost Phase Intercept study cost estimate for the PTSS constellation that we believe is considerably higher than our estimates. Although the NAS study was critical of PTSS's ability to discriminate a Re-entry Vehicle (RV) from other objects accompanying a missile, the NAS did not benefit from an understanding of our sensor discrimination architecture concept nor our classified programs developing PTSS's future RV discrimination capability. However, the NAS study did benefit from understanding our disciplined systems engineering process that scrutinizes capability trades to achieve urgent, cost-effective, satisfaction of the warfighters BMD needs as documented in STRATCOM's PCL.

INTERNATIONAL COOPERATION

As stated in the 2010 BMDR, developing international missile defense capacity is a key aspect of our strategy to counter ballistic missile proliferation. A significant accomplishment of international cooperation in 2011 was the signing of the first foreign military sale case for the THAAD system to the United Arab Emirates, valued at nearly $3.5 billion. In Europe, we successfully completed interoperability testing of our C2BMC system with the Active Layer Theater Ballistic Missile Defense (ALTBMD) Interim Capability, demonstrating U.S. and NATO's ability to share situational awareness of missile defense execution and status and planning data. NATO plans to invest more than 600M Euros for the ALTBMD capability. Moreover, we are working with our NATO allies on developing requirements for territorial NATO missile defense. We continue to pursue potential missile defense contributions of NATO countries such as the Netherlands' announcement that they are

upgrading their maritime radars with missile defense surveillance and tracking capability. In East Asia, we are supporting the BMDR-based objective in leading expanded international efforts for missile defense through bilateral projects and efforts with Japan, the Republic of Korea, and Australia. In the Middle East, we continue to work with long-term partners, such as Israel, and are pursuing strengthened cooperation with various Gulf Cooperation Council countries that have expressed interest in missile defense. MDA is currently engaged in missile defense projects, studies and analyses with over 20 countries, including Australia, the Czech Republic, Denmark, France, Germany, Israel, Japan, Poland, Romania, Saudi Arabia, the United Arab Emirates, the United Kingdom, and NATO.

MDA continues its close partnership with Japan on the SM–3 IIA interceptor (Japan is leading the development efforts on the SM–3 Block IIA second and third stage rocket motors and the nosecone), studying future missile defense architectures for defense of Japan, and supporting that nation's SM–3 Block IA flight test program, to include the successful intercept flight test in October 2010 involving a Japanese SM–3 Block IA. This test completed the first foreign military sale of Aegis BMD to a key maritime partner. Japan now has four Aegis destroyers equipped with Aegis BMD systems and a complement of SM–3 Block IA interceptors.

We also continue collaboration with Israel on the development and employment of several missile defense capabilities that are interoperable with the U.S. BMDS. Last year, at a U.S. test range off the coast of California, the Arrow Weapon System successfully intercepted a target representative of potential ballistic missile threats facing Israel today. This year, we plan to conduct several first time demonstrations of significant David's Sling, Arrow-2 block 4, and Arrow-3 system capabilities. We are requesting $99.8 million for Israeli Cooperative Programs (including Arrow System Improvement and the David's Sling Weapon System) in fiscal year 2013 to continue our cooperative development of Israeli and U.S. missile defense technology and capability. MDA will conduct a David's Sling flight test to demonstrate end game and midcourse algorithms and initiate David's Sling and Arrow-3 Low Rate Initial Production.

CONCLUSION

Our fiscal year 2013 budget funds the continued development and deployment of SRBM, MRBM, IRBM, and ICBM defenses while meeting the warfighters' near-term and future missile defense development priorities. We are dedicated to returning to successful GMD flight testing as soon as possible as well as developing an additional layer of Homeland defense with the SM–3 IIB to ensure we have a robust and responsive ICBM defense for our Nation, during this decade and for many decades in the future. Additionally, we are committed to develop a persistent, space based, PTSS constellation to ensure always available, early tracking of large size raids of missiles to enable cost-effective homeland and regional missile defense. We are also dedicated to creating an international and enhanced network of integrated BMD capabilities that is flexible, survivable, affordable, and tolerant of uncertainties of estimates of both nation-state and extremist ballistic missile threats.

Thank you, Mr. Chairman. I look forward to answering the committee's questions.

STATEMENT OF LTG RICHARD P. FORMICA, USA, COMMANDER, U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND/ARMY FORCES STRATEGIC COMMAND, AND COMMANDER, JOINT FUNCTIONAL COMPONENT COMMAND FOR INTEGRATED MISSILE DEFENSE

[The oral and prepared statements of General Formica follow:]

ORAL STATEMENT BY LTG RICHARD P. FORMICA, USA

Mr. Chairman, Ranking Member Sessions, and distinguished members of the subcommittee, thank you for your ongoing support of our soldiers, civilians, and families. I am honored to testify again before this panel. This subcommittee is a strong supporter of the Army, the Department of Defense, and the missile defense community. As the Commander of the U.S. Army's Space and Missile Defense Command (USAMDC) and Army Forces Strategic Command, the Army's specified proponent for missile defense, and as the Commander of the U.S. Strategic Command's (STRATCOM) Joint Functional Component Command for Integrated Missile Defense (JFCC IMD), we value your continued support.

My intent today is to briefly highlight our missile defense force provider role for both the Army and Global Combatant Commanders and our JFCC IMD role as an operational integrator of joint missile defense for STRATCOM.

USASMDC/ARSTRAT FORCE PROVIDER

USASMDC/ARSTRAT, a force provider for missile defense capabilities, has a vital role in missile defense as JFCC IMD, STRATCOM, and U.S. Northern Command are able to leverage the capabilities of USASMDC/ARSTAT.

To accomplish our assigned mission, we focus on three core tasks within the missile defense arena:

- To provide trained and ready missile defense forces and capabilities to the combatant commanders—our operations function, capabilities that we provide today.
- To build future missile defense forces-our capability development function, the capabilities we will provide tomorrow.
- To research, test, and integrate missile defense related technologiesour materiel development function, those capabilities we will provide the day-atter-tomorrow.

JFCC IMD—SYNCHRONIZING MD OPERATIONAL LEVEL PLANNING & SUPPORT

JFCC IMD serves an integrating role for missile defense across geographic regions as we operationalize new capabilities, evolve command relationships, and reinforce our missile defense partnerships with allies. Our missile defense capability continues to strengthen as warfighters gain increased competence with and confidence in the Ballistic Missile Defense System (BMDS). Continued progress has been made to evolve the global missile defense capabilities, strengthening the defense of the homeland, and to advance our capability to defend our forces, allies, and friends abroad.

CONCLUSION

Mr. Chairman, as a member of the joint missile defense community, the Army will continue to pursue operational, capability, and materiel enhancements to the Nation's BMDS. Our trained and ready soldiers operating the Ground-based Missile Defense elements in Colorado, Alaska, and California remain on point to defend the homeland against a limited intercontinental ballistic missile attack. As a force provider to the global combatant commanders, our soldiers ensure essential regional sensor capabilities and ballistic missile early warning. STRATCOM, through the JFCC IMD, will continue to integrate BMDS capabilities to counter global asymmetric threats and protect our Nation, deployed forces, friends, and allies.

I appreciate having the opportunity to speak on these important matters and look forward to addressing any questions you may have. Secure the High Ground and Army Strong!

PREPARED STATEMENT BY LTG RICHARD P. FORMICA, USA

Mr. Chairman, Ranking Member Sessions, and distinguished members of the subcommittee, thank you for your ongoing support of our soldiers, civilians, and families. Following my previous appearances on the importance of space and space-based capabilities to the Army, I am honored to testify before this subcommittee as the Joint and Service advocate for effective missile defense capabilities. This subcommittee is a strong supporter of the Army, the Department of Defense (DOD), and the missile defense community. Your support is important as we continue to enhance missile defense capabilities and development of future capabilities for the Nation and our global partners.

In my present assignment, I have three distinct responsibilities in support of our Warfighters. First, as the commander of the U.S. Army Space and Missile Defense Command (USASMDC), I have Title 10 responsibilities to train, maintain, and equip space and missile defense forces for the Army. Second, I am the Army Service Component Commander (ASCC) to the U.S. Strategic Command (STRATCOM) as the Commander of the Army Forces Strategic Command (ARSTRAT). I am responsible for planning, integrating, and coordinating Army forces and capabilities in support of STRATCOM missions. Third, I serve as the Commander of STRATCOM's Joint Functional Component Command for Integrated Missile Defense (JFCC IMD), supporting the Joint Force to synchronize operational-level planning and global missile defense operations support. I am honored to testify with these distinguished

witnesses—all firm advocates in support of a strong missile defense capability for our Nation, forward deployed forces, friends, and allies.

During my appearance before you today, my purpose is threefold. The first is to highlight USASMDC/ARSTRAT's responsibilities as a force provider of missile defense capabilities for the Army and the Global Combatant Commanders (GCCs). I will also underscore our force modernization proponent as well as our research and development roles for the Army. The second is to outline JFCC IMD's role as an operational integrator of joint missile defense for STRATCOM. Finally, I will provide a summary of some of the Army's missile defense programs of record that contribute to the Nation's ability to defend against ballistic missiles, both today and tomorrow.

USASMDC/ARSTRAT—ACCOMPLISHING OUR THREE CORE MISSILE DEFENSE TASKS

USASMDC/ARSTRAT, a force provider for missile defense capabilities, is one command that is split-based with dispersed locations around the globe, manned by multi-component soldiers, civilians, and contractors. I am proud of the capabilities they deliver to the warfighter. As our command name implies, USASMDC/ARSTRAT has a vital role in missile defense; JFCC IMD, STRATCOM, and U.S. Northern Command (NORTHCOM) are able to leverage the capabilities of USASMDC/ARSTAT. USASMDC/ARSTRAT's Title 10 responsibilities include operational as well as planning, integration, control, and coordination of Army forces and capabilities in support of STRATCOM's missile defense mission. USASMDC/ARSTRAT also serves as the Army's operational integrator for missile defense, the Army's missile defense force modernization proponent, and conducts missile defense related research and development in support of Army Title 10 responsibilities.

To accomplish our assigned mission, we focus on three core tasks within the missile defense arena:

- To provide trained and ready missile defense forces and capabilities to the combatant commanders—our operations function that addresses today's requirements.
- To build future missile defense forces—our capability development function that is responsible for meeting tomorrow's requirements.
- To research, test, and integrate missile defense related technologies—our materiel development function that aims to advance the Army's and warfighter's missile defense capabilities the day-after-tomorrow.

Our first core task is to provide trained and ready missile defense forces and capabilities to the GCCs and the warfighter—our operations function that addresses today's requirements. For missile defense, USASMDC/ARSTRAT soldiers, serving on the homeland and in forward deployed locations, operate the Ground-Based Midcourse Defense (GMD) consoles and the Army Navy/Transportable Radar Surveillance Forward-Based Mode (AN/TPY–2 FBM) radars. A summary of the critical missile defense capabilities provided by our missile defense professionals is highlighted below.

Support to Global Ballistic Missile Defense (BMD)

Soldiers from the 100th GMD Brigade, headquartered at Colorado Springs, CO, and the 49th GMD Battalion, headquartered at Fort Greely, AK, stand ready, 24/7/365, to defend our Nation and its territories from a limited intercontinental ballistic missile attack. Under the operational control of NORTHCOM, Active component and Army National Guard soldiers operate the GMD Fire Control Systems located at the Missile Defense Element in Colorado, the Fire Direction Center in Alaska, and the GMD Command Launch Element at Vandenberg Air Force Base, CA. These soldiers, in conjunction with JFCC IMD and NORTHCOM, also oversee the maintenance of GMD interceptors and ground system components. At Fort Greely, soldiers that serve as military police are assigned to the 49th GMD Battalion to secure the interceptors and communications capabilities at the Missile Defense Complex from physical threats.

Support to Regional Capabilities

The 100th GMD Brigade is also a force provider to other GCCs for the AN/TPY–2 FBM radar detachments at isolated locations and provides subject matter expertise on training and certification of the radar's operations.

GMD System Test and Development

Soldiers from the 100th GMD Brigade actively participate in GMD test activities and routinely work with Missile Defense Agency (MDA) developers on future improvements to the GMD system.

Ballistic Missile Early Warning

Critical to the Joint Force Commander's theater force protection, USASMDC/ARSTRAT provides ballistic missile early warning within the various theaters. The 1st Space Brigade's Joint Tactical Ground Station (JTAGS) Detachments, under the operational control of STRATCOM's Joint Functional Component Command for Space, but operated by USASMDC/ARSTRAT space-professional soldiers, monitor enemy missile launch activity and other infrared events. They provide this essential information to members of the air and missile defense and operational communities. Our JTAGS Detachments are forward-stationed across critical regions, providing 24/7/365, dedicated, assured missile warning to STRATCOM in support of deployed forces.

Our second core task is to build future missile defense forces—our capability development function. These are the missile defense capabilities we will provide tomorrow. The Army uses established and emerging processes to document its missile defense needs and pursue Army and Joint validation of its requirements. As a recognized Army Center for Analysis, USASMDC/ARSTRAT conducts studies to determine how best to meet the Army's missile defense assigned responsibilities. With this information, we develop the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) domains to mitigate threats and vulnerabilities for the MDA developed GMD and AN/TPY–2 FBM missile defense systems. This disciplined approach helps ensure limited resources are applied where warfighter operational utility can be most effectively served.

In our third core task, USASDMC/ARSTRAT provides critical technologies to address future needs that will enhance warfighter effectiveness—our materiel development function. These are the capabilities we will provide for the day-after-tomorrow. In USASMDC/ARSTRAT, our technology development function is primarily focused on space and high altitude. While MDA is the principal materiel developer for missile defense, we do have a number of ongoing missile defense related materiel development efforts. A brief summary of two of these research and development efforts as well as an overview of an essential Army testing range follows.

High Energy Laser Mobile Demonstrator

As we have learned often during the Afghanistan and Iraq wars, insurgents posed serious dangers to U.S. forward operating bases by employing quick-attack, low-trajectory, rockets, artillery, and mortars (RAM) strikes. The technology objective of the High Energy Laser Mobile Demonstrator (HEL MD) is to demonstrate a solid state laser weapon system that will serve as a defensive complementary resource to kinetic energy capabilities in countering RAM projectiles. When completed and if successful, the HEL MD will consist of a ruggedized and supportable high energy laser and subsystems installed on a tactical military vehicle that greatly enhance the safety of deployed forces.

Economical Target-1

Replicating an enemy missile threat is expensive. The Economical Target-1 (ET–1) is a research and development effort to supplement present flight test inventories and to provide a cost effective alternative. The ET–1, which recently successfully completed its initial flight test objectives, uses existing technology and hardware to develop a new missile defense target configuration that permits enhanced kinematic capabilities and signature tailoring.

Missile Defense Testing

In addition, USASMDC/ARSTRAT operates the Reagan Test Site at Kwajalein Atoll. Located in the Marshall Islands, the U.S. Army Kwajalein Atoll/Reagan Test Site is critical to the testing of missile defense capabilities, testing of the U.S. Air Force's strategic ballistic missiles assets, and other testing requirements. In addition to its testing mission, we conduct continuous operational space surveillance and tracking at the Reagan Test Site.

JOINT FUNCTIONAL COMPONENT COMMAND FOR INTEGRATED MISSILE DEFENSE—SYNCHRONIZING MISSILE DEFENSE OPERATIONAL LEVEL PLANNING AND SUPPORT

JFCC IMD, STRATCOM's missile defense integrating element, has been operational for 7 years. Like the other JFCCs, JFCC IMD was formed to operationalize STRATCOM missions and allow the headquarters to focus on strategic-level integration and advocacy. Headquartered at Schriever Air Force Base in Colorado Springs, CO, the JFCC IMD is manned by extremely capable Army, Navy, Air Force, Marine Corps, and civilian personnel.

STRATCOM has been assigned seven Unified Command Plan (UCP) responsibilities for missile defense. As the operational and functional component command of

STRATCOM, JFCC IMD has derived four key mission tasks from the STRATCOM UCP responsibilities:

- Synchronize operational level ballistic missile defense (BMD) planning across the Areas of Responsibility (AORs).
- Optimize the deployed force as the BMD Joint Functional Manager.
- Plan and coordinate developmental and operational activities by conducting BMD asset management.
- Provide alternate missile defense execution support in times of crisis.

To accomplish each of these four tasks, we maintain close collaborative relationships with the GCCs, the MDA, the Services, the Office of the Secretary of Defense (OSD), the Joint Staff, our coalition allies, and our industry partners. Through collaborative processes, we continually add to our deployed capability while gaining operational experience and confidence in our collective ability to defend our Nation, deployed forces, and our friends and allies. Following, I will highlight some of our collaborative efforts to enhance missile defense planning and capabilities for both the homeland and regional architectures.

Expansion and Integration of a Missile Defense Architecture

While Homeland defense remains the missile defense priority, the Nation is expanding regional capabilities to deployed forces, friends and allies. The phased adaptive approach (PAA) is meant to address the unique regional threat environments and partnerships that, in turn, will serve to further Homeland defense. Given many of the challenges associated with implementation of these architectures, JFCC IMD, supporting STRATCOM as the synchronizer for missile defense, collaborates with the GCCs to assess and address the cross regional gaps in the areas of planning, policy, capabilities, and operations to enhance our global defense capabilities.

Global BMD Assessment

While PAAs mature and with Homeland defense at the forefront, JFCC IMD collaborates closely with the GCCs to assess the level of risk associated with the execution of their operational plans given their allocation of BMD capabilities. The overall assessment serves to shape recommendations for global force management and advocacy efforts for future capability investments. STRATCOM will soon forward the most recent theater assessments, consolidated into a global BMD viewpoint, to OSD.

With regards to regional threats, JFCC IMD assessments indicate that addressing missile defense threats will remain a challenge. Our analysis, reinforced by a recent senior leader tabletop exercise, bolsters the fact that GCCs demands for missile defense capabilities will always exceed the available BMD inventory. The shortfall highlights the need for an Offense/Defense Integration approach to missile defense. We must be able to address some of the ballistic missile threats before they are in the air. In the short term, we will address this mismatch through a comprehensive force management process. Over the longer term, we plan to continue to assess the evolving threat and look at procurement pathways to meet surging demand while emphasizing deterrence alternatives, to include diplomatic, information, and economic strategies.

Multi-Regional BMD Asset Management

While maintaining a holistic, multi-regional perspective but with priority on defense of the homeland, JFCC IMD manages the availability of missile defense assets to balance operational readiness conditions, scheduled and unscheduled maintenance activities, and MDA's test requirements. This important process allows us to assess, at all times, our readiness to defend against a ballistic missile attack.

Training, Exercises, and War Games

The PAAs also focus on the expansion of international efforts to integrate allies into our regional missile defense architectures. We leverage training, exercises, and war games to increase dialogue and partnership with our allies. Just last week, we concluded Nimble Titan 12, a global BMD war game involving 14 participating nations and the North Atlantic Treaty Organization. It enabled us to collectively examine issues such as command and control, consequence management, and rules of engagement. Efforts such as Nimble Titan allow us to explore opportunities and continue to develop those cooperative relationships that will be critical to developing our combined architectures. Conclusions derived from training, exercises, and war games will continue to shape our recommendations on asset allocation, resources, and operational planning through the existing DOD and missile defense community management structures.

Warfighter Acceptance and Integrated Master Test Plan

As the missile defense architectures mature, we must ensure a credible, comprehensive assessment of new abilities to inform warfighter decisions for capability acceptance. The MDA, in coordination with the Office of the Director, Operational Test and Evaluation, executes a robust, operational Integrated Master Test Plan. A rigorous test program builds the confidence of stakeholders and bolsters deterrence. As part of the Warfighters' Operational Readiness and Acceptance process, JFCC IMD works closely with MDA and the GCCs to ensure our warfighters take full advantage of these tests to better understand the capabilities of the system, to rapidly integrate new capabilities into the architecture, and to provide improvement recommendations back to the developer.

In summary, JFCC IMD serves an integrating role for missile defense across multiple regions as we operationalize new capabilities, evolve command relationships, and reinforce our missile defense partnerships with allies. Our missile defense capability continues to strengthen as warfighters gain increased competence and confidence in the BMDS. While work remains to be done, significant progress has been made to evolve the global missile defense capabilities, thereby strengthening the defense of the homeland, and to advance our partnership with our allies in this important endeavor.

ARMY CONTRIBUTIONS TO THE NATION'S BALLISTIC MISSILE DEFENSE SYSTEM

In addition to the MDA's materiel development BMD systems and capabilities, the Army continues to develop and field systems that are integral contributors to our Nation's BMDS. A summary of the Army's major missile defense systems, aligned within the assistant Secretary of the Army for Acquisition, Logistics, and Technology organizational structure, follows.

Army Integrated Air and Missile Defense (AIAMD) Program: Within the air and missile defense arena, AIAMD is the Army's highest priority developmental effort. This initiative will provide a common network-centric system that integrates sensors, weapons, and command and control technologies. The fielded program will provide an enhanced capability for unparalleled situational awareness, an ability to tailor the force to optimize battle space protection, and a smaller logistics footprint. The initial operational capability for the AIAMD architecture is scheduled for fielding in 2016.

Medium Extended Air Defense System

As Congress is aware, based on previous and projected cost and schedule growth, the DOD decided to complete only the design and development phase of the Medium Extended Air Defense System (MEADS) program. The fiscal year 2013 budget request is the last in which the Army will seek MEADS funding. The Army's intent is to harvest technology from past program investments. Based on enactment of the fiscal year 2012 MEADS request, execution is underway to complete prototypes, demonstrate and document capabilities, and complete limited system integration.

Patriot/Patriot Advanced Capability-3

Patriot/Patriot Advanced Capability-3 (PAC–3) is the Army's primary weapon system against air, cruise, and tactical ballistic missile threats. With the DOD decision on the MEADS program, the Army is investing in improvements to Patriot system reliability and driving down operational and sustainment costs. This year, we will complete the effort to "Grow the Army" to field 15 Patriot Battalions and intend to continue to reduce system life cycle costs while supporting ongoing operational requirements. The Army is integrating Patriot and other air defense assets into the AIAMD architecture. PAC–3 interceptors continue to expand the battle space allowing operational flexibility to our Army, GCCs, and international partners. The next generation PAC–3 missile, the Missile Segment Enhancement, is on track for a 2015 delivery to the force.

Terminal High Attitude Area Defense System

Developed by the MDA, the Terminal High Attitude Area Defense System (THAAD) is a long-range, land-based, theater defense weapon designed to intercept threat missiles during late mid-course or final stage flight. THAAD capability for our GCCs is on the near-term horizon as the MDA-designed system transfers capability to the Army. Just last month, THAAD Batteries 1 and 2 were granted conditional material release. Each of the batteries, consisting of 95 soldiers, an AN/TPY–2 radar, a fire control and communications element, a battery support center, and an interim contractor support element, has completed equipment and unit collective training. The two batteries currently have three THAAD launching systems each but will soon have their full complement of six systems. Equipment fielding is also

underway for THAAD Battery 3 and production has begun on Battery 4 equipment. The addition of THAAD capabilities to the Army's air and missile defense portfolio brings an unprecedented level of protection against missile attacks to deployed U.S. forces, friends, and allies.

CONCLUSION

Mr. Chairman, as a member of the Joint missile defense community, the Army will continue to pursue operational, capability, and materiel enhancements to the Nation's BMDS. As a Service, we have lead responsibility for GMD, AN/TPY–2 FBM, Patriot, and THAAD. Our trained and ready soldiers operating the GMD elements in Colorado, Alaska, and California remain on point to defend the homeland against a limited intercontinental ballistic missile attack. As a force provider to the GCCs, our soldiers ensure essential regional sensor capabilities and ballistic missile early warning. STRATCOM, through the JFCC IMD, will continue to integrate BMDS capabilities to counter global asymmetric threats and protect our Nation, deployed forces, friends, and allies. The fiscal year 2013 budget proposal supports the modernization and improvements of the Army's missile defense systems and forces to support the Nation's global BMDS.

I appreciate having the opportunity to speak on these important matters and look forward to addressing any questions you may have. Secure the High Ground and Army Strong!

STATEMENT OF HON. J. MICHAEL GILMORE, PH.D., DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

[The prepared statement of Dr. Gilmore follows:]

PREPARED STATEMENT BY DR. J. MICHAEL GILMORE

Chairman Nelson, Senator Sessions, distinguished members of the subcommittee, thank you for the opportunity to discuss missile defense test planning, processes, and programs, including my assessment of the Ballistic Missile Defense System (BMDS) and the Integrated Master Test Plan (IMTP). I will focus my remarks in four areas:

First, my assessment of the Missile Defense Agency (MDA) flight and ground test program during the past year, the details of which are in my annual report submitted to you on February 13th;

Second, the major events this last fiscal year that influenced the most recent update to the IMTP, version 12.1;

Third, my assessments of the Terminal High Altitude Area Defense (THAAD), the AN/TPY–2 Radar, and the Phased Adaptive Approach for the defense of Europe; and

Finally, I will provide my assessment of the current IMTP.

FISCAL YEAR 2011 FLIGHT AND GROUND TEST PROGRAM

The MDA conducted four intercept flight tests this past year: two for Aegis Ballistic Missile Defense (BMD), one for Ground-based Midcourse Defense (GMD), and one for THAAD. The U.S. Army conducted four Patriot intercept flight tests, one for the PAC–3 Missile Segment Enhancement interceptor, and three supporting Post Deployment Build 7. The MDA conducted 11 ground tests and exercises, with the most significant ground test, the Ground Test Distributed-04 (GTD–04) series, occurring late in the calendar year supporting the implementation of the European Phased Adaptive Approach (EPAA) Phase 1 capability on December 31, 2011. These flight and ground tests were included in the Director of Operational Test and Evaluation (DOT&E)-approved IMTP.

During this period, Aegis BMD 3.6.1 and THAAD demonstrated progress toward intermediate and short-range threat class capability, respectively. Aegis BMD successfully completed Flight Test Standard Missile-15 (FTM–15) and THAAD successfully completed Flight Test THAAD–12 (FTT–12). However, in its first flight test of the Standard Missile-3 (SM–3) Block IB missile, the MDA failed to achieve a successful intercept during FTM–16 Event 2, although the MDA was successful in demonstrating many other 4.0.1 Aegis Weapon System capabilities. The cause of the FTM–16 failure is under investigation.

In April 2011, Aegis BMD completed FTM–15, the first intercept of an intermediate-range ballistic missile. In this test, an SM–3 Block IA interceptor was

launched from an Aegis BMD 3.6.1 destroyer, set up with remote engagements authorized. The ship used up-range track data from an AN/TPY–2 radar in forward-based mode as well as data from its organic Aegis radar to prosecute the engagement and intercept the target.

In October 2011, THAAD completed an Initial Operational Test and Evaluation (IOT&E) (FTT–12) in which the system intercepted two incoming threat missiles nearly simultaneously. In February 2012, DOT&E published a detailed report supporting a decision to proceed with material release of the system to the Army for operational use.

GMD suffered a second consecutive flight test failure flying the Capability Enhancement II Exo-atmospheric Kill Vehicle, and did not demonstrate any progress toward intermediate-range or Intercontinental Ballistic Missile (ICBM) threat class capability. A Failure Review Board has identified the root cause of the failure of the kill vehicle to intercept and the MDA has developed and is implementing corrective actions on the associated kill vehicle components to correct the problems that caused the failure. It will first test these fixes on a non-intercept flight test this spring followed several months later with a repeat of the previously attempted intercept flight test.

For the first time, the Command, Control, Battle Management, and Communications (C2BMC) element demonstrated during a ground test in December 2011 the capability to control two operationally-deployed AN/TPY–2 radars in forward-based mode, using existing operational communications architectures, personnel, and tactics, techniques, and procedures.

My assessment, based on the testing, is that the MDA flight and ground test program for fiscal year/calendar year 2011 was adequate to support the development of the BMDS. The flight test program allowed the MDA to collect important data on Empirical Measurement Events and Critical Engagement Conditions (such as THAAD's near-simultaneous intercept of two short-range targets during FTT–12 and an Aegis BMD intercept conducted at high closing velocity during the FTM–15 intercept of an intermediate-range target, respectively) that support model and simulation verification, validation, and accreditation. During the reporting period, the MDA continued to incorporate elements of operational realism when planning for and conducting both ground and flight testing.

The MDA and the BMDS Operational Test Agency have now collected sufficient data to permit a quantitative assessment of Aegis BMD and THAAD capability. This allowed me to include estimates of the probability of engagement success over the tested battlespace of these two weapon systems in my 2011 Annual BMDS Assessment Report.

EVENTS AFFECTING TEST PLANNING

Four events affected the development of version 12.1 of the IMTP, approved in March 2012:

1. The FTM–16 Event 2 flight test failure,
2. Funding changes to the 2013 test baseline and the Future Years Defense Program,
3. The availability of the targets originally planned for use in FTO–01 in the fourth quarter of fiscal year 2012, and
4. A Space Tracking and Surveillance System (STSS) tracking exercise, demonstrating target detection and stereo tracking, that enabled the inclusion of a launch-on-STSS in future flight testing.

Due to the FTM–16 Event 2 failure, the MDA added FTM–16 Event 2a as part of the SM–3 return-to-flight plan. This flight test will also support the future SM–3 Block IB production decision and provide data to certify the performance of the 4.0.1 Aegis Weapon System.

The MDA maintained the GMD test sequence in IMTP version 12.1. The MDA will conduct their first engagement of an ICBM, with the target flying a range of greater than 5,000 kilometers, in fiscal year 2015. This will also be the first salvo test of two interceptors fired at a single target. The MDA will conduct a multiple simultaneous engagement of two interceptors on two targets in fiscal year 2018.

The MDA slowed the THAAD test cadence to 18-month test centers due to budget constraints within the agency. As a result, FTT–11a (exoatmospheric engagement of a complex short-range target) is delayed by five quarters to the fourth quarter of fiscal year 2014, FTT–15 (endo-atmospheric engagement of a medium-range target with an Aegis BMD cue) by 11 quarters to the second quarter of fiscal year 2017, FTT–16 (endoatmospheric engagement of a unitary short-range target with high re-entry heating effects), and FTT–17 (engagement of a maximum range medium-range target) deferred beyond the Future Years Defense Program. However,

THAAD will nonetheless participate in several previously planned integrated and operational BMDS tests to be conducted through fiscal year 2015.

The FTO–01 operational test of layered defenses comprising THAAD, Aegis, and Patriot was delayed, primarily due to the unavailability of the originally planned targets. Analysis conducted last year also raised currently unresolved issues regarding the performance of THAAD under the planned conditions of the test. As a result, MDA now plans to conduct an integration test using the ballistic and cruise missile targets that will be available to provide data needed to resolve the identified performance issues, as well as to provide operational commanders with information they will use to develop tactics, techniques, and procedures for employing layered theater missile defenses. The MDA moved FTO–01 from the fourth quarter of fiscal year 2012 to the third quarter of fiscal year 2013 and, in its place, added the walk-up event FTI–01 in the fourth quarter of fiscal year 2012. FTI–01 will be conducted as a combined developmental/operational test utilizing Aegis BMD, THAAD, and Patriot simulating a layered defense of the Central Command Area of Responsibility.

The MDA added FTM–20 in fiscal year 2014 to demonstrate launch-on-STSS capability. The STSS-generated track will be forwarded by the C2BMC to an Aegis BMD 3.6.1 ship that will engage the target with an SM–3 Block 1A interceptor.

ASSESSMENTS OF THAAD, THE AN/TPY–2 RADAR, AND THE EPAA

In February, I published a report on the initial operation test and evaluation (IOT&E) of THAAD and the AN/TPY–2 radar. I based my assessment primarily on FTT–12, the IOT&E conducted at the Pacific Missile Range Facility from August to October 2011. However, I used significant contributing data from prior flight tests, lethality testing, and other testing of mobility, safety, and electromagnetic/environmental effects conducted from 2006 through 2011. To assess AN/TPY–2 performance in its Forward-Based Mode (FBM), I also used data from FTG–06a, FTM–15, and ground testing associated with the radars currently deployed in Israel, Japan, and Turkey.

THAAD is operationally effective against simple short-range ballistic missile threats intercepted in both the endo- and low exo-atmosphere. Although THAAD has not yet demonstrated its capability against medium-range threats, ground testing and analyses indicate it has an inherent capability to deal with those threats. The AN/TPY–2 (FBM) radar is operationally effective at providing track data on intermediate-range threats to the C2BMC, the BMDS command and control architecture, for use by Aegis BMD or GMD.

THAAD is operationally suitable, but examination of reliability data, ground test results, problems encountered during testing, and soldier feedback indicate that the THAAD system has a number of limitations that the MDA should investigate or correct to increase the suitability of the system. Available contractor data, combined with THAAD test results, indicate the AN/TPY–2 (FBM) radar is operationally suitable.

In February, I also published my annual BMDS Assessment Report that includes an assessment of EPAA Phase 1 capability. I based my assessment primarily on FTM–15, an operational test featuring an Aegis BMD launch-onremote engagement of an intermediate-range ballistic missile using up-range track data provided by an AN/TPY–2 (FBM) radar. However, I also used data from previous Aegis BMD 3.6.1 testing and ground testing conducted from July to October 2011. I also used Technical Assessment-04 that explored EPAA Phase 1 capability by simultaneously executing multiple theater engagements with Aegis BMD, AN/TPY–2 (FBM), and C2BMC in a digital modeling and simulation environment. All of this testing supported an assessment of capability over a limited region of the overall EPAA battlespace.

As currently deployed, Aegis BMD 3.6.1 provides some BMDS capabilities against short-, medium-, and intermediate-range ballistic missiles targeted at Europe. Aegis BMD 3.6.1 includes midcourse-phase engagement capabilities with SM–3 Block IA interceptors and terminal-phase engagement capabilities with modified SM–2 Block IV interceptors.

While the MDA has made progress toward achieving and demonstrating integrated engagement planning and execution to support the EPAA, such capability for use against all potential threat classes during all relevant phases of flight has not yet been demonstrated. BMDS battle management includes engagement planning, sensor management, track forwarding, sensor-weapon system pairing, and BMDS engagement direction. C2BMC is the element that is planned to perform global battle management while BMD weapon elements retain element-level battle management and fire control functionality. In December 2011, the U.S. European Command

upgraded C2BMC to Spiral 6.4 (S6.4), replacing S6.2, as part of the EPAA Phase 1 deployment.

The capability to launch on remote track data is crucial to the defense of Europe as it increases battlespace. In the fully implemented EPAA, Aegis BMD will rely upon at least two AN/TPY–2 (FBM) radars to provide radar cues and launch-on-remote track data. Aegis BMD executed a launch-on-remote engagement of an intermediate range target using AN/TPY–2 (FBM) tracks forwarded by C2BMC during FTM–15. Several ground tests in the GT–04 campaign also exercised launch-on-remote capability culminating in GTD–04d Part 3, which used assets that are part of the initial EPAA Phase 1 deployment.

C2BMC software demonstrated track forwarding of single AN/TPY–2 (FBM) tracks to Tactical Digital Information Link J (Link 16) users in multiple ground tests and FTM–15 in fiscal year 2011. C2BMC also exercised the forwarding of track data from two AN/TPY–2(FBM) radars in two integrated and one distributed ground tests as part of the EPAA Phase 1 capability demonstration. However, there has been no demonstration of this capability using multiple AN/TPY–2 (FBM) radars and Aegis BMD ships in a flight test.

As the MDA executes the IMTP during the next several years, additional test data supporting more comprehensive quantitative assessments of the EPAA, as well as other elements of the BMDS will become available. However, complete quantitative assessments of EPAA capability are still a number of years away because it will take time to collect the test data needed to verify, validate, and accredit the models and simulations required to perform these assessments.

ASSESSMENT OF THE CURRENT IMTP

The Director of MDA, General O'Reilly, has continued to pursue a rigorous IMTP development process that has produced a rigorous and well-justified set of tests. My office continues to be involved throughout the 6-month review and revision process leading to each update of the IMTP. This process has worked well during the preparation of the five previous semiannual plans, including the most recent IMTP (version 12.1), that I approved jointly with General O'Reilly in March. The process has enabled each version of the IMTP to be revised in a timely manner consistent with policy changes, flight test results (including unsuccessful intercepts) such as those I have mentioned previously, or, fact-of-life changes in budgetary resources. The current IMTP is a rigorous plan for obtaining the test information needed to assess BMDS performance quantitatively.

However, the IMTP continues to be success-oriented, which is the case for most of the Department's test programs. It does not explicitly include plans for backup or repeat tests that would be needed in the event of flight test mission failures. Therefore, the effects of unsuccessful tests, such as the FTG–06a and FTM–16 Event 2 failures, need to be mitigated through future updates of the IMTP. Nonetheless, the 6-month revision process has allowed MDA to make the necessary adjustments and create flexibility when it has been needed.

CONCLUSION

The ability to conduct comprehensive quantitative assessments of all BMDS capability across the full battlespace for each of the elements is still a number of years away. Nonetheless, BMDS testing has now produced sufficient data to enable a quantitative assessment of capability for both THAAD and Aegis BMD covering a portion of their battlespace. Notwithstanding the reductions made to the overall MDA budget as a result of the Budget Control Act, the pace and content of GMD testing has been sustained relative to previous IMTPs. In particular, the pace of GMD flight testing continues to be consistent with the best that has been achieved historically. Fact-of-life limitations on flight testing make it impossible for such testing alone to provide sufficient data to perform a statistically rigorous assessment of the performance of any BMDS element across its full battlespace. This is why a key focus of the IMTP has been since its inception to collect the data needed to validate the models and simulations that will provide the means to assess BMDS operational capability across that full battlespace. The rigorous testing incorporated in the IMTP will inevitably lead to flight test failures. These failures, although often perceived as setbacks, provide information that is absolutely critical to assuring that our ballistic missile defenses will work under realistic and stressing conditions.

STATEMENT OF CRISTINA T. CHAPLAIN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

[The prepared statement of Ms. Chaplain follows:]

PREPARED STATEMENT BY CRISTINA CHAPLAIN

Chairman Nelson, Ranking Member Sessions, and members of the subcommittee: I am pleased to be here today to discuss the progress made by the Department of Defense's (DOD) Missile Defense Agency (MDA). In 2002, MDA was charged with developing and fielding the Ballistic Missile Defense System (BMDS), expected to be capable of defending the United States, deployed troops, friends, and allies against ballistic missiles of all ranges in all phases of flight. To enable MDA to field and enhance a missile defense system quickly, the Secretary of Defense in 2002 delayed entry of the BMDS program into DOD's traditional acquisition process until a mature capability was ready to be handed over to a military service for production and operation. To meet a presidential directive to deliver an initial capability by 2004 and to meet a presidential announcement in 2009 to deploy missile defenses to Europe, the program concurrently developed and fielded assets and continues to utilize this approach. Since its inception, MDA has spent more than $80 billion and plans to spend an additional $44 billion through 2016 to develop a highly complex system of systems.

Since 2002, National Defense Authorization Acts have mandated that we prepare annual assessments of MDA's ongoing cost, schedule, testing, and performance progress.[1] We recently issued our report covering MDA's progress during fiscal year 2011 as well as challenges related to MDA's use of highly concurrent acquisition strategies.[2] My statement today will focus on the issues covered in that report as well our June 2011 report on parts quality issues affecting space and missile defense systems.[3] Our work highlighted a number of causal factors behind the parts quality problems being experienced at MDA and space agencies.

We conducted the work underlying this testimony according to generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Additional information on our scope and methodology is available in each of the issued reports.

BACKGROUND

MDA's BMDS is being designed to counter ballistic missiles of all ranges—short, medium, intermediate, and intercontinental.[4] Since ballistic missiles have different ranges, speeds, sizes, and performance characteristics, MDA is developing multiple systems that when integrated provide multiple opportunities to destroy ballistic missiles before they can reach their targets. The BMDS architecture includes space-based and airborne sensors as well as ground- and sea-based radars; ground- and sea-based interceptor missiles; and a command and control, battle management, and communications system to provide the warfighter with the necessary communication links to the sensors and interceptor missiles.

Table 1 provides a brief description of 10 BMDS elements and supporting efforts currently under development by MDA.

---

[1] National Defense Authorization Act for Fiscal Year 2002, Pub. L. No. 107–107, § 232(g) (2001); Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, Pub. L. No. 108–375, § 233 (2004); National Defense Authorization Act for Fiscal Year 2006, Pub. L. No. 109–163, § 232; John Warner National Defense Authorization Act for Fiscal Year 2007, Pub. L. No. 109–364, § 224 (2006); and National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110–181, § 225. See also National Defense Authorization Act for Fiscal Year 2012, Pub. L. No. 112–81, § 232 (2011).

[2] GAO, Missile Defense: Opportunity Exists to Strengthen Acquisitions by Reducing Concurrency, GAO–12–486 (Washington, DC: Apr. 20, 2012).

[3] GAO, Space and Missile Defense Acquisitions: Periodic Assessment Needed to Correct Parts Quality Problems in Major Programs, GAO–11–404 (Washington, DC: June 24, 2011).

[4] Ballistic missiles are classified by range: short-range ballistic missiles have a range of less than1,000 kilometers (621 miles), medium-range ballistic missiles have a range of from 1,000 to 3,000 kilometers (621–1,864 miles), intermediate-range ballistic missiles have a range of from 3,000 to 5,500 kilometers (1,864–3,418 miles), and intercontinental ballistic missiles have a range of greater than 5,500 kilometers (3,418 miles).

TABLE 1: DESCRIPTION OF MDA'S BMDS ELEMENTS AND SUPPORTING EFFORTS

BMDS Element/Supporting Effort	Description
Aegis Ballistic Missile Defense (Aegis BMD) with Standard Missile-3 (SM–3) Block IA and Block IB.	Aegis BMD is a sea-based missile defense system being developed in capability-based increments to defend against ballistic missiles of all ranges. Key components include the shipboard SPY–1 radar, SM–3 missiles, and command and control systems. It also is used as a forward-deployed sensor for surveillance and tracking of ballistic missiles. The SM–3 missile has multiple versions in development or production. The first two variants are referred to as the SM–3 Block IA and SM–3 Block IB.[a]
Aegis Ashore	Aegis Ashore is a future land-based variant of the ship-based Aegis BMD. It is expected to track and intercept ballistic missiles in their midcourse phase of flight using SM–3 interceptor variants as they become available. Key components include a vertical launch system and a reconstitutable enclosure that houses the SPY–1 radar and command and control system known as the deckhouse. DOD plans to deploy the first Aegis Ashore with SM–3 Block IB in the 2015 time frame as part of the missile defense of Europe called the European Phased Adaptive Approach (EPAA).
Aegis BMD SM–3 Block IIA	The SM–3 Block IIA is the third SM–3 variant to be developed for use with the sea-based and future land-based Aegis BMD. This program began in 2006 as a joint development with Japan, and it was added to the EPAA when that approach was announced in 2009. As part of EPAA Phase III, the SM–3 Block IIA is planned to be fielded with Aegis Weapons System version 5.1 by the 2018 timeframe.
Aegis BMD SM–3 Block IIB	The SM–3 IIB is the fourth SM–3 variant planned. It is intended to defend against medium- and intermediate-range ballistic missiles and provide early intercept capabilities against some intercontinental ballistic missiles. The SM–3 Block IIB program began in June 2010 and is planned to be fielded by the 2020 time frame as part of the EPAA Phase IV. Given its early stage of development, program management officials stated that the SM–3 Block IIB is not managed within the Aegis BMD Program Office and has not been baselined.
BMDS Sensors	MDA is developing various sensors for fielding. These include forward-based sensors; mobile, sea-based, space-based, and airborne sensors; as well as upgrades to existing early warning radars. The BMDS uses these sensors to identify and continuously track ballistic missiles in all phases of flight.
Command, Control, Battle Management, and Communications (C2BMC).	C2BMC is the integrating element of the BMDS. Its role is to provide deliberate planning, situational awareness, sensor management, and battle management for the integrated BMDS.
Ground-based Midcourse Defense (GMD).	GMD is a ground-based missile defense system designed to destroy intermediate and intercontinental ballistic missiles during the midcourse phase of their flight. Its mission is to protect the U.S. Homeland against ballistic missile attacks from North Korea and the Middle East. GMD has two Ground-based Interceptor (GBI) variants—the Capability Enhancement I (CE–I) and the Capability Enhancement II (CE–II). MDA has emplaced its total planned inventory of 30 interceptors at two missile field sites—Fort Greely, AK, and Vandenberg, CA.
Precision Tracking and Space System (PTSS).	PTSS is being developed as an operational component of the BMDS designed to support intercept of regional medium- and intermediate-range ballistic missile threats to U.S. Forces and allies and long-range threats to the United States. PTSS will track large missile raid sizes after booster burnout, which could enable earlier intercepts.
Targets and Countermeasures	MDA develops and manufactures highly complex targets for short, medium, intermediate, and eventually intercontinental ranges used in BMDS flight tests to present realistic threat scenarios. The targets are designed to encompass the full spectrum of threat missile ranges and capabilities.
Terminal High Altitude Area Defense (THAAD).	THAAD is a ground-based missile defense system designed to destroy short- and medium-range ballistic missiles during the late-midcourse and terminal phases of flight. Its mission is to defend deployed U.S. Forces and friendly foreign population centers.

Source: MDA data.

Note: The EPAA is a policy announced by the President in 2009 that articulates a schedule for delivering four phases of capability to defend Europe and augment current protection of the U.S. Homeland in the following timeframes: Phase 1 in 2011, Phase 2 in 2015, Phase 3 in 2018, and Phase 4 in 2020.

[a] MDA is currently developing or producing four versions of the SM–3 interceptor—IA, IB, IIA, and IIB. The SM–3 Block IA and SM–3 Block IB are the earlier variants of the missile. The SM–3 Block IIA and SM–3 Block IIB are planned to provide successively greater range and velocity to intercept medium to long-range ballistic missiles.

MDA EXPERIENCED MIXED PROGRESS IN DEVELOPMENT AND DELIVERY EFFORTS

MDA experienced mixed results in executing its fiscal year 2011 development goals and BMDS tests. For the first time in 5 years, we are able to report that all of the targets used in fiscal year 2011 test events were delivered as planned and performed as expected. In addition, the Aegis BMD program's SM–3 Block IA missile was able to intercept an intermediate-range target for the first time. Also, the THAAD program successfully conducted its first operational flight test in October 2011. However, none of the programs we assessed were able to fully accomplish their asset delivery and capability goals for the year.

See table 2 for how each of these programs met some of its goals during the fiscal year. Our report provides further detail on these selected accomplishments.[5]

TABLE 2: BMDS FISCAL YEAR 2011 SELECTED ACCOMPLISHMENTS

Element	Fully Accomplished Goals	Partially or Not Accomplished Goals
Aegis BMD SM–3 Block IA	An April 2011 flight test demonstrated capability required for European Phased Adaptive Approach (EPAA) Phase I. Deployed first ship in support of EPAA Phase I.	Delivered 6 out of 19 planned missiles by the end of fiscal year 2011; delivery of 12 missiles is on hold pending the results of the failure investigation of the anomaly that occurred during an April 2011 flight test. Depending on the results, delivered missiles may have to be retrofitted.
Aegis BMD SM–3 Block IB	Delivered first SM–3 Block IB developmental interceptor and fired it in the first flight test in September 2011.	The SM–3 Block IB failed to intercept the target during its first flight test, resulting in a failure review board investigation of the cause of the failure. The flight test is scheduled to be reconducted in 2012, delaying the certification of the Aegis BMD 4.0.1 weapon system.
Aegis BMD SM–3 Block IIA	None.	Subsystem preliminary design review failures led to a program replan that adjusted the preliminary design review date to fiscal year 2012 and included new subsystem reviews for the failed components. The new subsystem reviews were completed in fiscal year 2011 and early fiscal year 2012.
Aegis BMD SM–3 Block IIB	Awarded three concept definition and program planning contracts in April 2011 and approved to begin technology development in July 2011.	Demonstration of low-cost divert and attitude control system components was delayed until the first quarter of fiscal year 2012.
Aegis Ashore	Completed preliminary design review in August 2011.	A new deckhouse fabrication plan delayed the award of the deckhouse fabrication contract, procurement of deckhouse fabrication materials, and the start of construction.
GMD	Completed three of the five limited interceptor upgrades, partially to resolve component issues identified in developmental testing and manufacturing.	Flight test failure in the first quarter of fiscal year 2011 resulted in interceptor production suspension pending the completion of an investigation and a successful non-intercept flight test.
PTSS	Completed system requirements and system design reviews in the second quarter of fiscal year 2011.	Approval to begin technology development was delayed to the fourth quarter of fiscal year 2012.
Targets	Launched all 11 targets as planned.	Delivered 11 out of 14 targets it had planned.
THAAD	Successfully conducted first operational flight test in October 2011. Delivered 11 missiles.	Materiel release to Army delayed to the second quarter of fiscal year 2012. THAAD delayed plans to deliver first battery to fiscal year 2012 because of production issues with the interceptor.

Source: GAO analysis of MDA data.
Note: BMDS fiscal year 2011 asset and capability deliveries for Airborne Infrared; C2BMC; joint U.S.-Israel BMDS; Sea-based X-band radar; and Space Tracking and Surveillance System elements were not reviewed.

[5] GAO–12–486.

Although some programs completed significant accomplishments during the fiscal year, there were also several critical test failures. These as well as a test anomaly and delays disrupted MDA's flight test plan and the acquisition strategies of several components. Overall, flight test failures and an anomaly forced MDA to suspend or slow production of three out of four interceptors currently being manufactured.

- The Aegis BMD SM–3 Block IA program conducted a successful intercept in April 2011, but there was an anomaly in a critical component of the interceptor during the test. This component is common with the Block IB missile. Program management officials stated that the SM–3 Block IA deliveries have been suspended while the failure reviews are being conducted.
- The Aegis BMD SM–3 Block IB program failed in its first intercept attempt in September 2011. The Aegis program has had to add an additional flight test and delay multiple other flight tests. Program management officials stated that the SM–3 Block IB production has been slowed while the failure reviews are being conducted.
- The GMD program has been disrupted by two recent test failures. As a result of a failed flight test in January 2010, MDA added a retest designated as Flight Test GMD–06a (FTG–06a).[6] However, this retest also failed in December 2010 because of a failure in a key component of the kill vehicle. As a result of these failures, MDA has decided to halt flight testing and restructure its multiyear flight test program, halt production of the interceptors, and redirect resources to return-to-flight activities.

Production issues forced MDA to slow production of the THAAD interceptors, the fourth missile being manufactured.

HIGHLY CONCURRENT ACQUISITION STRATEGIES OFTEN LEAD TO PERFORMANCE, COST, AND SCHEDULE CONSEQUENCES

To meet the 2002 presidential direction to initially rapidly field and update missile defense capabilities as well as a 2009 presidential announcement to deploy missile defenses in Europe, MDA has undertaken and continues to undertake highly concurrent acquisitions. While this approach enabled MDA to rapidly deploy an initial capability in 2005 by concurrently developing, manufacturing, and fielding BMDS assets, it also led to the initiation of large-scale acquisition efforts before critical technologies were fully understood and allowed programs to move forward into production without having tests completed to verify performance. After delivering its initial capability in 2005, MDA continued these high-risk practices that have resulted in problems requiring extensive retrofits, redesigns, delays, and cost increases. While MDA has incorporated some acquisition best practices in its newer programs, its acquisition strategies still include high or elevated levels of concurrency that result in increased acquisition risk—including performance shortfalls, cost growth, and schedule delays—for these newer programs.

Concurrency is broadly defined as overlap between technology development and product development or between product development and production of a system. This overlap is intended to introduce systems rapidly, to fulfill an urgent need, to avoid technology obsolescence, and to maintain an efficient industrial development and production workforce. However, while some concurrency is understandable, committing to product development before requirements are understood and technologies mature as well as committing to production and fielding before development is complete is a high-risk strategy that often results in performance shortfalls, unexpected cost increases, schedule delays, and test problems.[7] At the very least, a highly concurrent strategy forces decisionmakers to make key decisions without adequate information about the weapon's demonstrated operational effectiveness, reliability, logistic supportability, and readiness for production. Also, starting production before critical tests have been successfully completed has resulted in the purchase of systems that do not perform as intended. These premature commitments mean that a substantial commitment to production has been made before the results of testing are available to decisionmakers. Accordingly, they create pressure to avoid production breaks even when problems are discovered in testing. These premature

[6] The failed January 2010 flight test—FTG–06—was planned as the first test of GMD's enhanced version of the kill vehicle—the CE–II.

[7] GAO, Best Practices: Capturing Design and Manufacturing Knowledge Early Improves Acquisition Outcomes, GAO–02–701 (Washington, DC: July 15, 2002), and Defense Acquisitions: Production and Fielding of Missile Defense Components Continue with Less Testing and Validation Than Planned, GAO–09–338 (Washington, DC: Mar. 13, 2009).

purchases have affected the operational readiness of our forces and quite often have led to expensive modifications.

In contrast, our work has found that successful programs that deliver promised capabilities for the estimated cost and schedule follow a systematic and disciplined knowledge-based approach, in which high levels of product knowledge are demonstrated at critical points in development.[8] This approach recognizes that development programs require an appropriate balance between schedule and risk and, in practice, programs can be executed successfully with some level of concurrency. For example, it is appropriate to order long-lead production material in advance of the production decision, with the pre-requisite that developmental testing is substantially accomplished and the design confirmed to work as intended. This knowledge-based approach is not unduly concurrent. Rather, programs gather knowledge that demonstrates that their technologies are mature, designs are stable, and production processes are in control before transitioning between acquisition phases, which helps programs identify and resolve risks early. It is a process in which technology development and product development are treated differently and managed separately. Technology development must allow room for unexpected results and delays. Developing a product culminates in delivery and therefore gives great weight to design and production. If a program falls short in technology maturity, it is harder to achieve design stability and almost impossible to achieve production maturity. It is therefore key to separate technology from product development and product development from production—and thus avoid concurrency. A knowledge-based approach delivers a product on time, within budget, and with the promised capabilities.

See figure 1 for depictions of a concurrent schedule and a schedule that uses a knowledge-based approach.

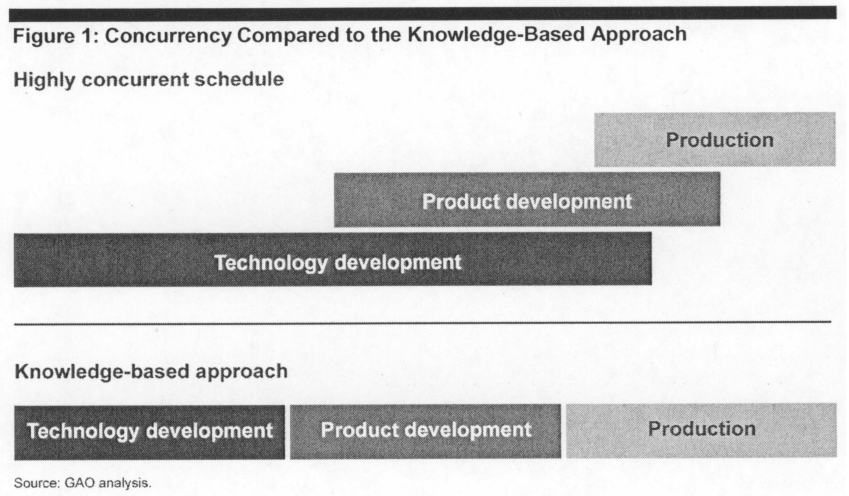


Figure 1: Concurrency Compared to the Knowledge-Based Approach

Source: GAO analysis.

MDA's Concurrent Acquisition Strategies Allowed It to Deliver Assets Quickly but Also Led to Performance Issues with Cost and Schedule Consequences

To meet the 2002 presidential direction to initially rapidly field and update missile defense capabilities as well as the 2009 presidential announcement to deploy missile defenses in Europe, MDA has undertaken and continues to undertake highly concurrent acquisitions. Such practices enabled MDA to quickly ramp up efforts in order to meet tight presidential deadlines, but they were high risk and resulted in problems that required extensive retrofits, redesigns, delays, and cost increases.

Table 3 illustrates concurrency in past efforts and its associated effects. Among earlier MDA programs, concurrency was most pronounced in the GMD program, where the agency was pressed to deliver initial capabilities within a few years to meet the 2002 presidential directive. The consequences here have been significant,

[8] GAO, Defense Acquisitions: Assessments of Selected Major Weapon Programs, GAO–06–391 (Washington, DC: Mar. 31, 2006).

in terms of production delays and performance shortfalls, and are still affecting the agency.

TABLE 3: EXAMPLES OF CONCURRENCY IN MDA PROGRAMS' ACQUISITION STRATEGIES AND ASSOCIATED EFFECTS

MDA Program	Acquisition Concurrency	Associated Effects
GMD's initial capability including CE–I interceptors in 2004 [a].	To meet the presidential directive to deploy an initial set of missile defense capabilities by 2004, the program concurrently matured technology, designed the system, tested the design, and produced and deployed an initial set of missile defense capabilities.	CE–I interceptors were rapidly delivered to the warfighter requiring an extensive and expensive retrofit and refurbishment program that is still ongoing.
GMD's enhanced interceptor production [a].	Prior to fully completing development and demonstrating the capability of the CE–I interceptor, MDA committed in 2004 to development of an enhanced version of the interceptor called the CE–II. MDA proceeded to concurrently develop, manufacture, and deliver 12 of these interceptors The first and second flight tests of the enhanced interceptor failed.	CE–II interceptors were delivered prematurely to the warfighter and will require an extensive and expensive retrofit. It will take several additional years to demonstrate full CE–II capabilities. Production has been halted and the flight test plan has been altered, increasing the cost to initially confirm the CE–II capability from $236 million to about $1 billion.
Aegis BMD SM–3 Block IB.	MDA approved production of the SM–3 Block IB missile before completing developmental testing to confirm that the technologies were fully mature and the design worked as intended. In addition, MDA decided to manufacture SM–3 Block IB missiles beyond those needed for developmental testing before some criteria were met, including a successful first flight test demonstrating that the system functioned as intended.	Production has been delayed, delivery of capability has been delayed, and development costs have grown. The program has had to add an additional flight test and delay multiple additional flight tests due to the failure of the program's first attempted intercept in September 2011. Because of the failure, MDA was unable to validate initial SM–3 Block IB capability. In addition, an anomaly occurred in an April 2011 flight test of the SM–3 Block IA in a booster component that is common with the Block IB missile. Block IB production is being slowed while failure reviews are being conducted.
THAAD.	The agency awarded a contract for the production of THAAD's first two operational batteries before its design was stable and developmental testing of all critical components was complete.	Problems encountered while THAAD was concurrently designing and producing assets delayed fielding of the first two THAAD batteries by more than 2 years and increased costs by $40 million.

Source: GAO analysis of MDA data.

[a] High levels of concurrency will continue for the GMD program with developmental flight testing extending until at least 2022, well after production of the interceptor is scheduled to be completed. MDA is accepting the risk that these developmental flight tests may discover issues that require costly design changes and retrofit programs to resolve.

In recent years, MDA has taken positive steps to incorporate some acquisition best practices, such as increasing competition and partnering with laboratories to build prototypes. For example, MDA took actions in fiscal year 2011 to reduce acquisition risks and prevent future cost growth in its Aegis BMD SM–3 Block IIA program. The agency recognized that the program's schedule included elevated acquisition risks, so it appropriately added more time to the program by revising the schedule to relieve schedule compression between its subsystem and system-level design reviews. In addition, it incorporated lessons learned from other SM–3 variants into its development to further mitigate production unit costs. Moreover, for its PTSS program, MDA has simplified the design and requirements.

However, table 4 shows that the agency's current acquisition strategies still include high or elevated levels of concurrency that set many of its newer programs up for increased acquisition risk, including performance shortfalls, cost growth, and schedule delays.

TABLE 4: MDA'S ACQUISITION CONCURRENCY AND ASSOCIATED RISKS IN ITS NEWER PROGRAMS

MDA Program	Acquisition Concurrency	Risks
Aegis BMD SM–3 Block IIB.	Based on a tentative schedule, the program plans to commit to product development more than a year prior to holding a preliminary design review. By contrast, major defense acquisition programs outside MDA are generally required to complete this review before committing to product development.	Without holding key system engineering events culminating in a preliminary design review, programs cannot ensure that requirements are defined and feasible and that the proposed design can meet those requirements within cost, schedule, and other system constraints.
Aegis Ashore.	The program began product development for two Aegis Ashore systems—one designated for testing and the other operational—and set the acquisition baseline before completing the preliminary design review. High levels of concurrency can be seen in its construction and procurement plan, and the program has not aligned its flight testing schedule with construction and component procurement decisions.	There are increased technical risks and increased risk of cost growth because the agency committed to product development for the two systems with less technical knowledge than recommended by acquisition best practices and without ensuring that requirements were defined, feasible, and achievable within cost and schedule constraints.
Precision Tracking and Space System.	An industry team will develop and produce two engineering and manufacturing development satellites while a laboratory-led contractor team is still in the development phase of building two lab development satellites.	This strategy may not enable decisionmakers to fully benefit from the knowledge gained through on-orbit testing of the lab-built satellites and its design before making major commitments on the industry-built development satellites since those will be under contract and under construction before the on-orbit testing can take place.

Source: GAO analysis of MDA data.

In our April 2012 report, we made two recommendations to strengthen MDA's longer-term acquisition prospects.[9] We recommended that the Secretary of Defense direct the Office of Acquisition Technology and Logistics to: (1) review all of MDA's acquisitions for concurrency and determine whether the proper balance has been struck between the planned deployment dates and the concurrency risks taken to achieve those dates; and (2) review and report to the Secretary of Defense the extent to which the directed capability delivery dates announced by the President in 2009 are contributing to concurrency in missile defense acquisitions and recommend schedule adjustments where significant benefits can be obtained by reducing concurrency. DOD concurred with both of these recommendations.

In addition, we recommended specific steps to reduce concurrency in several of MDA's programs. DOD agreed with four of the five missile defense element-specific recommendations and partially agreed with our recommendation to report to the Office of the Secretary of Defense and to Congress the root cause of the SM–3 Block IB developmental flight test failure, path forward for future development, and the plans to bridge production from the SM–3 Block IA to the SM–3 Block IB before committing to additional purchases of the SM–3 Block IB. DOD commented that MDA will report this information to the Office of the Secretary of Defense and to Congress upon completion of the failure review in the third quarter of fiscal year 2012. However, DOD makes no reference to delaying additional purchases until the recommended actions are completed. We maintain our position that MDA should take the recommended actions before committing to additional purchases of the SM–3 Block IB.

PARTS QUALITY ISSUES HAVE ALSO HAD A SIGNIFICANT EFFECT ON PERFORMANCE, COST, AND SCHEDULE

MDA parts quality issues have seriously impeded the development of the BMDS in recent years. For example, during a THAAD flight test in fiscal year 2010, the air-launched target failed to initiate after it was dropped from the aircraft and fell into the ocean. The test was aborted and a subsequent failure review board investigation identified as the immediate cause of the failure the rigging of cables to the missile in the aircraft and shortcomings in internal processes at the contractor as the underlying cause. This failure led to a delay of the planned test, restructuring

[9] GAO–12–486.

of other planned tests, and hundreds of millions of dollars being spent to develop and acquire new medium-range air-launched targets. In another widely-reported example, the GMD element's first intercept test of its CE–II GBI failed and the ensuing investigation determined the root cause of the failure to be a quality control event. This failure also caused multiple flight tests to be rescheduled, delayed program milestones, and cost hundreds of millions of dollars for a retest.

In view of the cost and importance of space and missile defense acquisitions, we were asked to examine parts quality problems affecting satellites and missile defense systems across DOD and the National Aeronautics and Space Administration (NASA). In June 2011, we reported that parts problems discovered after assembly or integration of the instrument or spacecraft had more significant consequences as they required lengthy failure analysis, disassembly, rework, and reassembly—sometimes resulting in a launch delay. For example, the Space Tracking and Surveillance System (STSS) program, a space-based infrared sensor program with two demonstration satellites that launched in September 2009, discovered problems with defective electronic parts in the Space-Ground Link Subsystem during system-level testing and integration of the satellite. By the time the problem was discovered, the manufacturer no longer produced the part and an alternate contractor had to be found to manufacture and test replacement parts. According to officials, the problem cost about $7 million and was one of the factors that contributed to a 17-month launch delay of two demonstration satellites and delayed participation in the BMDS testing we reported on in March 2009.[10]

Our work highlighted a number of causal factors behind the parts quality problems being experienced at MDA and space agencies.[11] While we present examples of the parts quality issues we found at MDA below, the June 2011 report also describes the parts quality issues we found with other space agencies.

- Poor workmanship. For example, poor soldering workmanship caused a power distribution unit to experience problems during vehicle-level testing on MDA's Targets and Countermeasures program. According to MDA officials, all units of the same design by the same manufacturer had to be X-ray inspected and reworked, involving extensive hardware disassembly. As a corrective action, soldering technicians were provided with training to improve their soldering operations and ability to perform better visual inspections after soldering.
- The use of undocumented and untested manufacturing processes. For example, MDA's Aegis BMD program reported that the brackets used to accommodate communications and power cabling were improperly bonded to SM–3 Block IA rocket motors, potentially leading to mission failure. A failure review board determined that the subcontractor had changed the bonding process to reduce high scrap rates and that the new process was not tested and verified before it was implemented.
- Poor control of manufacturing materials and the failure to prevent contamination. The GMD program reported a problem with defective titanium tubing. The defective tubing was rejected in 2004 and was to be returned to the supplier; however, because of poor control of manufacturing materials, a portion of the material was not returned and was inadvertently used to fabricate manifolds for two complete CE–II GBIs. The vehicles had already been processed and delivered to the prime contractor for integration when the problem was discovered.
- Prime contractor's failure to ensure that its subcontractors and suppliers met program requirements. The GMD program experienced a failure with an electronics part purchased from an unauthorized supplier. According to program officials, the prime contractor required subcontractors to only purchase parts from authorized suppliers; however, the subcontractor failed to execute the requirement and the prime contractor did not verify compliance.

At the time of our June 2011 report, MDA had instituted policies to prevent and detect parts quality problems. The programs reviewed in the report—GMD, Aegis BMD, STSS, and Targets and Countermeasures—were initiated before these recent policies aimed at preventing and detecting parts quality problems took full effect. In addition to new policies focused on quality, MDA has developed a supplier road map database in an effort to gain greater visibility into the supply chain to more effectively manage supply chain risks. In addition, according to MDA officials, MDA

[10] GAO, Defense Acquisitions: Assessments of Selected Weapon Programs, GAO–09–326SP (Washington, DC: Mar. 30, 2009).
[11] GAO–11–404.

has recently been auditing parts distributors in order to rank them for risk in terms of counterfeit parts.

MDA also participates in a variety of collaborative initiatives to address quality, in particular, parts quality. These range from informal groups focused on identifying and sharing news about emerging problems as quickly as possible, to partnerships that conduct supplier assessments, to formal groups focused on identifying ways industry and the government can work together to prevent and mitigate problems.

Moreover, since our report, MDA has added a new clause in one of its GMD contracts to provide contractor accountability for quality. We have not yet fully assessed the clause but it may allow the contracting officer to make an equitable reduction of performance incentive fee on two contract line items for certain types of quality problems. This new clause shows some leadership by MDA to hold contractors accountable for parts quality. But, we do not yet know what the impact of this clause will be on improving MDA's problems with parts quality.

Our June 2011 report recommended greater coordination between government organizations responsible for major space and missile defense programs on parts quality issues and periodic reporting to Congress. DOD partially concurred with our recommendation for greater coordination but responded that it would work with NASA to determine the optimal government-wide assessment and reporting implementation to include all quality issues, of which parts, materials, and processes would be one of the major focus areas. In addition, DOD proposed an annual reporting period to ensure planned, deliberate, and consistent assessments. We support DOD's willingness to address all quality issues and to include parts, materials, and processes as an important focus area in an annual report. DOD further stated that it had no objection to providing a report to Congress, if Congress wanted one. We believe that DOD should proactively provide its proposed annual reports to Congress on a routine basis, rather than waiting for any requests from Congress, which could be inconsistent from year to year.

The parts quality issues will require sustained attention from both the executive and legislative branches to improve the quality of the systems in development, particularly because there are significant barriers to addressing quality problems, such as an increase in counterfeit electronic parts, a declining government share of the overall electronic parts market, and workforce gaps within the aerospace sector.

CONCLUDING OBSERVATIONS

In conclusion, as the MDA completes a decade of its work, it continues to make progress in delivering assets, completing intercept tests, and addressing some of the quality issues that have plagued it in the past. This year, there were significant accomplishments, such as the successful operational test for THAAD, but also setbacks, including failed tests and their aftermath. Such setbacks reflect inherent risks associated with the challenging nature of missile defense development, but they are also exacerbated by strategies that adopt high levels of concurrency that leave decisionmakers with less knowledge than needed to move programs forward. Given that initial capabilities are now in place and broader fiscal pressures require sound and more efficient management approaches, it is now time for DOD to reassess MDA's strategy of accelerating development and production to determine whether this approach needs to be rethought for current and future BMDS programs.

Chairman Nelson, Ranking Member Sessions, and members of the subcommittee, this concludes my statement. I am happy to answer any questions you have.

Senator NELSON. This hearing is now adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

DEFECTS CLAUSE IN CONTRACTS

1. Senator LEVIN. General O'Reilly, several years ago, after a string of contractor failures, you and I discussed the need for a defects clause in Missile Defense Agency (MDA) contracts to protect taxpayers from paying for defective work. I understand that the new Ground-based Missile Defense (GMD) Development and Sustainment Contract (DSC) contains such a clause. Under the new clause, who would pay for defective work—the contractor responsible for the defective work or the taxpayers—and will you pursue that as a standard clause for future contracts?

General O'REILLY. Under the new clause, the government may reduce a contractor's potential performance incentive fee, and recover previously awarded fees, to off-

set the cost of defective work accomplished. At present, this clause is only in the Ground-based Interceptor (GBI) contract line item numbers (CLINs).

The clause provides the government the latitude to reduce the performance incentive fee if the following three criteria are reasonably determined: (1) a quality escape[1] occurred; (2) the contractor or any subcontractors solely caused the quality escape; and (3) the quality escape caused substantial harm to the government.

The GMD DSC Contractor Accountability for Quality clause was approved for one-time use. If determined to be beneficial and product quality is improved, MDA will request the Under Secretary of Defense for Acquisition, Technology, and Logistics approve using a similar clause in future competitively awarded contracts.

SAVINGS UNDER NEW CONTRACT

2. Senator LEVIN. General O'Reilly, I understand that the new GMD DSC cost nearly $1 billion less than the government cost estimate, and that you reduced the cost of each GBI by some $20 million below the previous contract cost. How did you achieve such savings and will you seek to achieve such cost savings with future MDA contracts?

General O'REILLY. The GMD DSC savings are attributable to a full and open competitive environment. The $1 billion less than the government cost estimate is expected to be realized during the next 7 years of GMD DSC period of performance through innovations and efficiencies proposed by the winning contractor, including:

- An integrated weapon system management approach with a flat organizational structure using lower cost centers and rate structures
- Prime contractor teaming with existing GMD Original Equipment Manufacturers
- Reducing program risk through upfront investment in software development, procurement of obsolete interceptor parts, and development of an Integrated Digital Environment to provide a collaborative work environment tool that is projected to both reduce and contain costs and risks
- Consolidating and relocating interceptor, ground systems, test, development facilities and laboratories, personnel, and equipment items
- No fee on Other Direct Costs (ODC) and a no fee-on-fee approach, which means that the prime contractor will not charge fee on the profit/fee portion of its subcontractors.

MDA will execute appropriate market research as part of future acquisition strategy development to pursue if competition can achieve similar benefits for other programs.

3. Senator LEVIN. General O'Reilly, are there other advantageous features of the new contract that you will seek to include in future MDA contracts?

General O'REILLY. There are features in the GMD DSC that would be appropriate for other MDA programs. Those features under consideration for future acquisition strategies include:

- Quality clause for contractor accountability that will incentivize delivery of quality, non-defective interceptors and hold the contractor liable for all harm to the government, including an ability to make previously earned performance incentives subject to rescission
- Standard contract clause for direct government access to subcontractors
- Performance-based logistics approach to maintain and incentivize system operational availability
- Contractual provision that eliminates cost inefficiencies by requiring the contractor's proposal, as well as future change order proposals, to reflect a no fee on ODC and a no fee-on-fee approach. This provision eliminates the fee prime contractors would add on top of their subcontractors' fee.

WHY U.S. MISSILE DEFENSE CAN'T THREATEN RUSSIA

4. Senator LEVIN. General O'Reilly, I understand you have had an opportunity to explain to the North Atlantic Treaty Organization (NATO)-Russia Council why our

[1] Quality escape is defined as: the contractor, or any subcontractors: (1) failed to detect a nonconformance or failed to follow command media (instructions); (2) the nonconformance or failure could adversely affect the component's performance or the performance of a system or subsystem; and (3) requires government or contractor action to bring the item back to compliance with specifications.

missile defense systems planned for Europe can't threaten Russia's nuclear deterrent missile force. Can you explain, on an unclassified basis, why our missile defenses can't threaten Russia's deterrent?

General O'REILLY. I briefed the NATO-Russia Council on May 5, 2011, on why missile defense cannot threaten Russia's deterrent. The missile defense interceptors planned for Europe have insufficient velocity to threaten Russia's nuclear deterrent missile force. Russian Intercontinental Ballistic Missile (ICBM) launch facilities are spread over 2,000 miles of distance and five time zones. ICBMs launched from Russia to the United States travel over the North Pole, not within reach of interceptors launched from Poland or Romania where the European missile defense interceptors are located.

INDEPENDENT REPORT ON COOPERATION WITH RUSSIA

5. Senator LEVIN. Dr. Roberts, in February, an independent group of international experts, known as the Euro-Atlantic Security Initiative, issued a report recommending that the United States and NATO should cooperate on missile defense with Russia by sharing satellite and radar early warning information in joint cooperation centers. One of the report's leaders was Stephen Hadley, the National Security Advisor to President George W. Bush. Is their proposal consistent with U.S. and NATO proposals for cooperating with Russia on missile defense and does the administration support their proposal?

Dr. ROBERTS. Cooperation with Russia on missile defense has long been a priority for both Republican and Democratic administrations. Successful U.S.-Russia cooperation in this area could send a strong signal to Iran that Iran's development of missiles and pursuit of nuclear capabilities are a waste of resources and are reducing rather than enhancing Iran's security. In addition, cooperation would add to the effectiveness of U.S., NATO, and Russian missile defenses, and it would help to improve U.S-Russia relations overall.

Russia initially proposed the creation of NATO-Russia missile defense centers. The United States has welcomed the idea of data sharing between Russia and NATO, which would improve early warning and defense of all parties. Such data sharing is envisioned to take place in a NATO-Russia missile defense data fusion center. Such sharing could have direct operational benefits, resulting in a more efficient and effective defense. A second potential center, the NATO-Russia Planning and Operations Center, would have the function of coordinating missile defense efforts. Any agreements on such centers or any other form of data sharing would have to be consistent with U.S. National Disclosure Policy and other applicable laws.

There would also be wider political benefits to cooperation. NATO and Russia working together on missile defense would send a strong signal to regional actors that ballistic missile proliferation will not go unchallenged. Cooperation would enhance strategic stability by improving the U.S.-Russia and NATO-Russia relationships, and could pay further dividends by building cooperative relationships that might flow to other areas.

6. Senator LEVIN. Dr. Roberts, is it correct that we already share such early warning information with numerous countries?

Dr. ROBERTS. Yes, the United States does share early warning information with select foreign countries. All sharing of classified military information is conducted in accordance with U.S. National Disclosure Policy and other applicable law and policy. Classified military information is only shared when there is a clearly defined benefit to U.S. security. In addition, the content and scope of such information shared is defined in a specific agreement with the country in question.

SHARING INFORMATION WITH RUSSIA

7. Senator LEVIN. General O'Reilly, you have indicated previously that Russian radar data would be useful in enhancing our missile defense capability relative to Iran. I want to clarify what sort of data you have in mind. As I understand it, there is relatively unspecific early warning data, which could be shared on an unclassified basis with other nations, that would provide warning that a missile had been launched and would land in a certain area at a certain time. But that information is not precise enough to enhance missile defense operations. There is also, however, very precise and specific information on the position and velocity of a threat missile, what is called a missile track, that would contribute to the ability to defeat a threat missile. I gather that missile track information is classified, but we have such information and Russia has it from radars in different places. If Russia and the United

States shared missile track information, would that enhance our ability to defeat Iranian ballistic missiles?

General O'REILLY. Yes, sharing missile track information has the potential to enhance both United States and Russian ability to defeat projected Middle Eastern threat ballistic missiles.

Sharing unclassified early warning data would speed reaction times and increase situational awareness. Beyond unclassified data, the potential exchange of classified missile tracks could increase raid capacity and probability of engagement success.

8. Senator LEVIN. General O'Reilly, given that Russia has radars in locations where we do not, if Russia shared missile track data, would it improve our missile defense capabilities relative to North Korea?

General O'REILLY. Yes, sharing missile track information with Russia would improve our ability to defeat North Korean ballistic missiles.

9. Senator LEVIN. General O'Reilly, in your view, could we share such information with Russia without compromising the security or capability of our missile defenses?

General O'REILLY. Yes. Sharing missile tracking data would not necessarily reveal capabilities of, or vulnerabilities to, the system. We informed the committee in November 2011 that since 2001, in accordance with National Disclosure Policy and procedures, the MDA disclosed limited classified missile defense information/data to Russian Federation personnel observing two missile defense test events. In both cases, MDA requested and was granted an Exception to National Disclosure Policy to enable this data release. The overall impact on security or capability of our missile defense depends on the decision regarding what information to share with the Russian Federation. As such, the U.S. ability to share early warning or other specific missile track data with the Russian Federation depends on the classification and the level of detail in the data.

In order to share information, we would need a formal Defense Technology Cooperation Agreement (DTCA). The United States will only provide the Russian Federation information that is consistent with both National Disclosure Policy, which limits information disclosure to the Russian Federation to unclassified information only, and guidance contained in the National Defense Authorization Act for Fiscal Year 2012, section 1244 "Sharing of Classified United States Ballistic Missile Defense Information With The Russian Federation."

FLY-BEFORE-YOU-BUY ACQUISITION STRATEGY

10. Senator LEVIN. General O'Reilly, General Formica, Mr. Gilmore, Dr. Roberts, and Ms. Chaplain, the Ballistic Missile Defense Review (BMDR) stated our policy that before new missile defense systems are deployed they must be tested in a manner that permits evaluation in a realistic manner. This policy indicates that we will not deploy a new system before it has demonstrated its capability through realistic testing. Would you agree that we should not deploy any new missile defense systems unless and until they have demonstrated their capability through realistic flight testing—even if that means taking longer than the original timelines announced for the European Phased Adaptive Approach (EPAA)?

General O'REILLY. I agree. The Fly-Before-You-Buy acquisition strategy, and demonstrating capability through realistic flight-testing, are Ballistic Missile Defense System (BMDS) priorities. Operationally realistic testing is also a priority highlighted in the 2010 BMDR report. Comprehensive testing has always been the cornerstone of the MDA's development efforts.

Flight testing of BMDS capabilities planned for different phases of the EPAA is scheduled for completion before production decisions and fielding timelines. For example, the SM–3 Block IB is being flight-tested this year, including the recent successful intercept in early May. Production decisions for the SM–3 Block 1B will depend on successful completion of additional flight tests.

General FORMICA. The policy expressed in the BMDR is sound. As a warfighter, I'm interested in the timely delivery of relevant capabilities. MDA, utilizing a robust test program, delivers those capabilities. MDA's approach provides a reasonable balance of getting tested capabilities to the warfighter in a timely manner.

Mr. GILMORE. I agree that we should not deploy any new missile defense systems unless and until they have demonstrated their capability through realistic flight testing. Prior to a system or element transitioning to a service for deployment, the system should undergo adequate flight testing to verify, validate, and accredit the modeling and simulation and operational testing to determine the system's capability with a reasonable level of statistical confidence. Recent examples include ex-

tensive Aegis Ballistic Missile Defense (Aegis BMD) 3.6.1 testing leading up to FTM–15 in support of Phase 1 of the EPAA, and the Terminal High Altitude Area Defense (THAAD) Initial Operational Test and Evaluation (FTT–12) in support of a full rate production decision. Deployment timelines should be event-driven, where required system capabilities have been adequately demonstrated, and not schedule-driven. The Integrated Master Test Plan (IMTP), Version 12.1, that General O'Reilly and I approved on March 1, 2012, includes extensive flight testing supporting the Phase 2 EPAA. This testing will consist of 9 Aegis BMD 4.01/5.0 intercept flight tests (10 intercepts) using SM–3 Block IB (9)/Block IA (1) missiles; 3 Aegis BMD 4.01/5.0 flight test simulating 7 intercepts; 3 Aegis Ashore flight tests (2 intercept tests); and a final operational test (FTO–02) involving an Aegis BMD ship-board intercept, an Aegis Ashore intercept, a THAAD intercept, and a Patriot intercept. The MDA has planned all this testing to be complete by December 31, 2015, to meet the President's Phase 2 EPAA timeline.

Dr. ROBERTS. Before new capabilities are deployed, they must undergo testing that enables an assessment under realistic operational conditions against threat-representative targets to demonstrate that they can reliably and effectively help U.S. forces accomplish their mission. The administration is committed to this approach, best characterized as fly-before-you-buy, which will result in a posture based on proven technology in order to improve reliability, confidence, and cost control. To date, the only anticipated delay to the EPAA schedule is due to the funding cut to the SM–3 IIB program from the President's budget request for fiscal year 2012.

Ms. CHAPLAIN. The GAO concurs with the administration's commitment in the BMDR to deploy capabilities that have been proven under extensive testing and assessment and are affordable over the long term. Extensive testing is a key tenet of GAO's knowledge-based approach, which we have found in our work in both government and commercial acquisitions helps to ensure delivery and deployment of systems with the performance desired at a cost and schedule that is both affordable and on time. While we concur with the BMDR commitment, our knowledge-based approach goes further in finding that extensive testing is also crucial to the production decision, which usually occurs many years before capabilities are deployed. We have found that premature commitments to production have led to expensive efforts to resolve or mitigate problems after systems are fielded. We reported this year that the GBI continues to suffer from the premature commitment to production.

In our April 2012 report, we determined that MDA has undertaken and continues to undertake highly concurrent acquisitions in response to the 2002 presidential direction to initially rapidly field and update missile defense capabilities as well as the 2009 presidential announcement to deploy missile defenses in Europe. This concurrency can be seen in programs that proceed into product development before technologies are mature or appropriate system engineering has been completed. But it also exists in programs that proceed into production before a significant amount of independent testing is conducted to confirm that the product works as intended. While MDA has embraced the value of reducing unknowns before making key decisions in some of its newer programs, such as the SM–3 Block IIA, and adopted good practices, such as awarding competitive contracts to multiple contractors in the SM–3 Block IIB program, it continues to plan and implement highly concurrent approaches. In fact, today, MDA is still operating at a fast pace, as production and fielding of assets remains, in many cases, ahead of the ability to test and validate them. In light of MDA's long history of pursuing highly concurrent acquisitions in order to meet challenging deadlines set by the administration, we recommended in our report that DOD review the extent to which the EPAA capability delivery dates are contributing to concurrency in missile defense acquisitions and recommend schedule adjustments where significant benefits can be obtained by reducing concurrency.

QUESTIONS SUBMITTED BY SENATOR E. BENJAMIN NELSON

HEDGING STRATEGY STATUS AND RESULTS

11. Senator NELSON. Dr. Roberts, as indicated in the BMDR, the Department of Defense (DOD) has been engaged in a Homeland defense hedging strategy review, considering options to enhance our defensive capability in case the threat emerges more quickly or robustly than anticipated. I understand that quite a number of actions have already been decided or implemented, and others are still under consideration. Can you explain what actions have already been decided or implemented as a result of the hedging strategy review?

Dr. ROBERTS. Key elements of the hedge were set out in the BMDR 2 years ago, including completion of the second field of 14 silos at Fort Greely, AK. This increases the availability of silos in the event that additional GBI deployments become necessary. Additionally, we continue to develop the two-stage GBI.

The commitment made in the BMDR to being well hedged is further reflected in a request to purchase an additional five GBIs in the fiscal year 2013 budget. This action provides an option to emplace additional missiles in Missile Field 2 rapidly, if necessary. It will also maintain enough GBIs for testing and operational spares. This decision also keeps the GBI production line warm in case the purchase of additional GBIs is needed in the future. These decisions follow the commitment in the BMDR to pursue additional programs to hedge against future uncertainty. To support those decisions, DOD is conducting a comprehensive review of possible future developments in the projected threat and of how best to ensure timely response to unpredicted threat developments.

12. Senator NELSON. Dr. Roberts, what is the current status of the review, do you expect any further decisions soon, and will the review process continue as the threat evolves?

Dr. ROBERTS. DOD is continuing to work to deliver the hedge report to Congress as soon as possible. Given the sensitive intelligence basis of the hedging strategy review, and also the classified performance characteristics of U.S. systems, the results of the review can only be discussed in an appropriate setting. As stated in the BMDR, DOD is committed to pursuing additional programs to hedge against future uncertainty.

GBI RELIABILITY IMPROVEMENT PROGRAM

13. Senator NELSON. Dr. Roberts, regarding our efforts to improve our GBIs for Homeland defense, in previous testimony you noted that we have "an aggressive GBI reliability improvement program" that is intended to "reduce the number of GBIs required per intercept, which will increase the number of ICBMs that can be defeated by the GMD system." You also noted that we could "double the number of ICBMs the current force is capable of defeating without adding a single new GBI." Can you describe how this GBI reliability effort fits into our strategy?

Dr. ROBERTS. The GMD system currently protects the United States from limited ICBM attacks. Due to continuing improvements in the GMD system and the number of GBIs now deployed compared to potential North Korean and Iranian long-range ballistic missile capabilities, the United States possesses a capability to counter the projected threat from North Korea and Iran for the foreseeable future. The GBI reliability effort is a key part of our continuing commitment to improve the GMD system.

The GMD milestones for increasing reliability include successful GBI flight testing, GBI component reliability growth testing, upgrade of current GBIs, and delivery of the new version of GBIs. While component reliability testing will be conducted over the life of the program, additional GBI component testing is being planned for fiscal years 2013 to 2015. Capability Enhancement (CE)–I interceptors will continue to be upgraded through fiscal year 2017. Manufacturing of CE–II interceptors will restart in the second quarter of fiscal year 2013.

The milestones for increasing discrimination include completion of testing to provide the capability to process near-term discrimination data from BMDS sensors. Options to improve Exoatmospheric Kill Vehicle (EKV) on-board discrimination capabilities are under study and will be incorporated in the next EKV software upgrades.

14. Senator NELSON. General O'Reilly, can you describe the scope of the program in unclassified terms?

General O'REILLY. The MDA's plan to improve the reliability of GBIs consists of four initiatives: Fleet Upgrade Program, Flight Test Rotation Program, Reliability Growth Testing Program, and Component Reliability Program. These initiatives will be guided by a Boeing-led GBI reliability assessment, part of the recently awarded DSC. The assessment, to be completed in early fiscal year 2013, will evaluate all GBI components against known risks, design operating life requirements, and environments. The results will identify components for additional reliability growth that require development, procurement, testing, and replacement.

GBI Fleet Upgrade Program removes fielded interceptors from silos, upgrades them to remove known risks, performs mandatory maintenance, and replaces limited-life items. After acceptance testing, the program returns the upgraded intercep-

tors to the operational fleet. Replaced components are used in the Component Reliability Program. All currently fielded interceptors will be upgraded by the end of fiscal year 2017. Reliability and performance upgrades to the GBI booster and EKV are in development and planned for integration into five new-build GBIs. Four of the new-build interceptors will be placed into service in fiscal year 2016 through fiscal year 2017. One is planned for flight test as described in the IMTP.

Flight Test Rotation Program removes older interceptors from silos, performs a limited upgrade to meet flight test configuration requirements, performs mandatory maintenance, and replaces limited-life items. After acceptance testing, the program delivers what is now a test interceptor for the flight test program. The removed interceptors are replaced by new or upgraded GBIs.

The GBI Reliability Growth Testing Program ensures that corrections to known risks are effective and eliminate risks. In the near-term, Control Test Vehicle-One (CTV–01) and Flight Test Ground-based Interceptor (FTG)-06b are the final verification test milestones to demonstrate the design fixes to correct the problems uncovered in the FTG–06a flight test. There will be additional ground testing of components and assemblies to verify design fixes, demonstrate component reliability, qualify the item, and increase confidence in component reliability.

The Component Reliability Program includes testing, analyzing trends, and identifying reliability improvements for GBI component hardware. Service life extension testing will continue for one-shot devices, including the firing of all one-shot devices removed from fielded interceptors during upgrade and flight test rotation to obtain performance reliability data. The program identifies older interceptors for disassembly and component reliability testing. Over the next 7 years, four interceptors will be removed from service and undergo reliability testing.

15. Senator NELSON. General Formica, from a warfighter perspective, how significant would it be if we could double the number of ICBMs we could defeat with our current number of GBIs?

General FORMICA. While there may be strategic considerations to take into account, from an operational perspective, it would be a significant advantage if we could double the number of ICBMs we can defeat with the current inventory of GBIs. The current U.S. Northern Command (NORTHCOM) shot doctrine is optimized to balance risk against system capability. Improvements to the GBI, sensor capabilities, and deterrence would be key considerations for the commander of NORTHCOM to revise shot doctrine.

BENEFIT OF PRECISION TRACKING SPACE SYSTEM

16. Senator NELSON. General O'Reilly, your prepared testimony includes the following statement about the value of the Precision Tracking Space System (PTSS) under development: "The greatest future enhancement for both Homeland and regional defense in the next 10 years is the development of the PTSS satellites, which will provide fire-control quality track data of raids of hostile ballistic missiles over their entire flight trajectories.... " Can you explain why you believe PTSS would provide such a significant contribution to missile defense and how it would differ from our current radar-based sensor system?

General O'REILLY. PTSS is being designed and developed to meet the needs documented in the Air and Missile Defense Prioritized Capabilities List (PCL), the primary input from the U.S. Strategic Command (STRATCOM)-led Warfighter Involvement Process to MDA's requirements process. Specifically, as an agile, effective sensor against mobile and emerging threats, it will uniquely address the post-boost challenge, continuous tracking of ballistic missile objects, increased raid capacity, and object characterization and discrimination. PTSS track data will be available to any missile defense weapon system connected to the BMDS fire control network.

PTSS will contribute to missile defense by expanding interceptor access to the early post-boost phase of a ballistic missile's flight, preventing an adversary missile from traversing undetected into midcourse and using advanced countermeasures. PTSS will increase BMDS capability by providing the warfighter a shoot-assess-shoot engagement tactic essential to the efficient use of interceptor inventory, and will defeat adversary attempts to evade defense in all phases of flight.

The constellation will support simultaneous missile defense operations against widely separated adversaries, and provide simultaneous coverage from threats to the United States, deployed forces, and friends and allies without the logistic or political challenges to basing terrestrial sensors in other countries. PTSS will increase BMDS raid handling capacity and engagement success by providing early views of midcourse countermeasures and preferential tracking of threats that carry multiple

warheads or complex countermeasures. The system will provide fire control support to early thinning of raids to avoid saturation in subsequent layers, one of the first steps in the discrimination process through persistent track.

Consisting of multiple, mutually reinforcing sensor systems (radar and infrared, or IR), PTSS will provide on-demand sensor coverage, and will cover the ballistic missile battlespace from threat ignition to reentry. The low Earth orbit satellite constellation and ground-processing infrastructure will track medium-, intermediate-, and long-range ballistic missiles in the post-boost and midcourse phases of flight, providing early access to threats launched from land, sea, and the deepest interiors of countries. For comparison, PTSS will provide sensor coverage for over 70 percent of the Earth for approximately $75 million per year in operations and sustainment costs, compared to AN/TPY–2 sensor coverage of only one theater for approximately $150 million per year in operations and sustainment costs.

PTSS's precise and expanded sensor coverage, without the need for host nation basing agreements or advance warning of an impending attack, provides beyond line-of-sight tracking not possible with horizon-limited terrestrial sensors. PTSS's over-the-horizon capability will greatly extend the operating areas of land- and sea-based defense units, and will also expand the geographical territory that can be protected by a single fire unit, leading to significantly more efficient employment of limited interceptor inventory. Integrated with the BMDS sensor network, PTSS will fill the time gap between the end of overhead persistent IR satellite boost phase tracks and the start of midcourse radar tracks. Sensor coverage for critical threat corridors will be provided where early commit-quality radar coverage is fiscally and politically not sustainable. Post-boost IR tracking from space also increases BMDS survivability and denies adversaries the ability to optimize attacks to circumvent radar-only defenses. PTSS will increase BMDS sensor capability for an uncertain future where threats may come from new adversaries and geographically diverse regions not under consideration today.

17. Senator NELSON. General O'Reilly, in your view, what would be the impact on our missile defense capability if we did not develop and deploy the PTSS?

General O'REILLY. There will be several critical impacts to the BMDS if the PTSS is not developed and deployed:

(1) No realistic way to expand and rapidly adjust coverage to meet evolving threats. PTSS provides persistent, near-global fire control quality sensor coverage of prospective ballistic missile launch sites and attack corridors. PTSS coverage includes not just the land masses of current potential adversaries, but also broad ocean areas and new territories from which future adversaries could threaten the United States and its interests. Terrestrial deployment options with similar capabilities would necessitate impractical and unaffordable deployment of fixed and/or transportable radars, available on demand, and then only when their use was not outright precluded by geographical obstacles or host nation politics.

(2) Warfighter needs for the BMDS are documented in the Air and Missile Defense PCL, a major product of the STRATCOM-led Warfighter Involvement Process. PTSS is being designed and developed to meet these needs by providing persistent coverage for over 70 percent of the Earth's surface, specifically in the projected threat areas. As an agile, effective sensor against mobile and emerging threats, it uniquely addresses the post-boost challenge, continuous tracking of ballistic missile objects, increased raid capacity, and object characterization and discrimination through persistent track.

(3) Scores of ballistic missiles can be in flight simultaneously, placing severe loads on sensor and weapon resource managers. PTSS is the only sensor system in the architecture that can provide the track handling capacity and the engagement battlespace necessary to neutralize mass raids.

(4) Architecture would be susceptible to technical and tactical countermeasures designed to exploit the vulnerabilities of a radio frequency-only sensor architecture. It is more difficult and expensive for adversaries to design credible countermeasures against architectures that combine parallel or serial looks at a threat using both radio frequency and electro-optic sensors. Sensor coverage in depth would also result in adversaries being less effective with precursor suppression attacks against BMDS assets.

(5) Without PTSS BMDS will have gaps for threats and launch locations between Overhead Persistent Infrared boost phase tracking sensors and midcourse fire control radars. Within that sensor coverage gap the offense could choose to deploy, deceive, confuse, and/or evade the BMDS. PTSS fills that coverage gap, placing severe pressure on adversary timelines and depriving the offense of free rides into midcourse.

PRIORITIES FOR MISSILE DEFENSE

18. Senator NELSON. General Formica, each year STRATCOM creates the STRATCOM Integrated Air and Missile Defense PCL which expresses the integrated missile defense priorities of the combatant commands. General O'Reilly's prepared statement notes that, "the need for persistent full trajectory tracking of ballistic missiles is one of the warfighter's highest development priorities as stated in the 2012 STRATCOM PCL." Can you confirm in an unclassified manner that it is one of the highest priorities of the STRATCOM PCL to develop a persistent full trajectory missile tracking capability?

General FORMICA. Yes, the need for persistent full trajectory tracking of ballistic missiles is one of the highest priorities. Full trajectory tracking expands our options to defeat the missile threat, and enhances our early warning capability. PTSS would be a critical component of this capability as it could provide sensor coverage in depth, expands our tracking capability for large raid sizes, and reduces our reliance on terrestrial sensors.

FUTURE SENSORS STUDY

19. Senator NELSON. General Formica, I understand that you led a study for STRATCOM on future sensors for missile defense and that the study considered the PTSS now under development. In unclassified terms, can you explain whether your study indicated that PTSS would provide an important capability for future missile defense of the Homeland and of regional missile threats?

General FORMICA. STRATCOM led the Remote Sensor Assessment which included PTSS. At JFCC IMD, we participated directly in STRATCOM's assessment. While classified, the results of the study confirmed that PTSS would be a critical component of both Homeland and regional missile defense as it greatly enhances sensor coverage. The results of this study have been briefed to congressional staff, the Missile Defense Executive Board (MDEB), and informed the budget submission.

DEPLOYING STANDARD MISSILE-3 BLOCK IIB INTERCEPTOR

20. Senator NELSON. General O'Reilly, you are seeking to develop the SM–3 Block IIB interceptor for Phase 4 of the EPAA. That missile is planned for deployment at Aegis Ashore sites in Romania and Poland to intercept potential future long-range Iranian missiles. I understand that such a missile might not be deployed on ships for safety reasons if its fuel is too dangerous. Do you believe it is possible that the missile could be made safe for deployment on ships and, if so, do you believe that that would be a significant enhancement to our missile defense capability?

General O'REILLY. Yes, it is possible to safely deploy SM–3 Block IIB on ships. The MDA, in cooperation with the U.S. Navy, will design the SM–3 Block IIB to have both sea-based and ashore capability. The industry concept development teams have been given direction to propose ship-compatible SM–3 Block IIB concepts.

The SM–3 Block IIB design is being optimized for its primary mission to counter first generation ICBMs targeted at the U.S. Homeland as a first and independent interceptor layer. Developing and deploying the SM–3 Block IIB at sea and ashore will maximize deployment options for a flexible response to emerging and evolving threats. The SM–3 Block IIB will also provide a significant enhancement to current missile defense capability by expanding the battle space against medium-range and intermediate-range ballistic missiles.

21. Senator NELSON. General Formica, from a warfighter's perspective, would you support having the SM–3 Block IIB deployed at sea? Please explain your view.

General FORMICA. Yes, I am supportive of the SM–3 Block IIB capabilities and believe its fielding, both at sea and on land, will provide operational advantages against a limited ballistic missile attack. I understand there are significant technical challenges and safety concerns that would need to be resolved in order to deploy the SM–3 Block IIB on board ships.

EAST COAST MISSILE DEFENSE SITES

22. Senator NELSON. General O'Reilly, when the missile defense site in Alaska was being debated, we understood that no GBI flight tests would take place from Fort Greely, AK, because of concern that a booster might cause damage to people or property on the ground where it falls. If people are considering an east coast GBI site, which would be much more densely populated than Alaska, wouldn't there also

be a concern for possible damage that GBI boosters could cause within some distance from the site?

General O'REILLY. Potential siting locations for an east coast GBI site would have similar considerations with regard to possible damage to people or property on the ground from the two GBI booster stage drops, and would have to account for a 50 km radius for a first stage booster drop zone and a 600 km radius for a second stage booster drop zone.

If a decision were made to construct an east coast GBI site, the site selection and operational implementation would include hazard assessment and mitigation measures to limit potential damage from booster stage drops as a result of an operational launch in response to a ballistic missile attack. The evaluation of hazards to the public is part of the siting analysis process that would be completed prior to beginning any east coast missile field construction. As with the Alaska GBI missile field, an east coast GBI site would only be used to defend against an actual ballistic missile attack and not for testing.

BENEFIT OF RADAR IN TURKEY FOR HOMELAND DEFENSE

23. Senator NELSON. General O'Reilly, at the end of last year, the United States began operating a forward-based X-band radar (designated AN/TPY–2) in Turkey as part of Phase 1 of the EPAA to missile defense. In addition to improving protection of Europe against ballistic missiles from Iran, this radar also is said to improve our defense of the Homeland against potential future long-range missiles from Iran. Can you explain how this radar in Turkey helps our Homeland defense capability?

General O'REILLY. {Deleted.]

24. Senator NELSON. General Formica, do you believe this forward-deployed radar in Turkey is a significant contribution to our Homeland defense capability?

General FORMICA. The forward-based AN/TYP–2 radar in Turkey was deployed as a U.S. contribution to NATO territorial defense as part of the EPAA. It contributes to Homeland defense and supports deterrence and assurance. As future missile defense capabilities are deployed to the European region, the radar's contribution to Homeland defense will increase.

CONCERNS ABOUT CONTRACTOR QUALITY

25. Senator NELSON. Ms. Chaplain, your testimony included a discussion of quality problems with MDA's contractors, including problems that caused failed flight tests and cost hundreds of millions of dollars for the rescheduled tests. You note that MDA has included a quality clause in its new GMD contract, but that there has not yet been time to assess its effect. Do you plan to monitor the impact of this clause and other steps to improve contractor quality performance for missile defense?

Ms. CHAPLAIN. As part of our ongoing missile defense work, we regularly meet with the GMD program office and contractors and follow-up on programmatic and technical progress in the program. We plan to monitor quality issues as we have in the past, and to also monitor the effect of this clause should a quality problem occur and the government take action under this clause. We will report future findings, if they arise, as part of our mandated reviews of the BMDS.

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

GROUND-BASED MIDCOURSE DEFENSE

26. Senator SESSIONS. General O'Reilly, the recent GMD contract competition is indicative of the impact competition can have in benefiting taxpayers. The new DSC is estimated to achieve at least a 20 percent cost savings over the contract it replaces and provides for an option to procure five additional GBIs. Is this new contract a firm-fixed price contract?

General O'REILLY. The DSC, HQ0147–12–C–0004, is comprised of multiple contract types that vary by the requirement's complexity as follows:

Contract Line Item Numbers (CLINs) Categories	*Contract Type*	*% of DSC Contract Value with Options*
Test Planning and Execution CLINs	Cost-Plus-Award-Fee (CPAF)	7.5%
-Systems Engineering CLINs (6.7% of total CPIF) -Ground Systems CLINs (43.9% of total CPIF) -Ground Based Interceptor (GBIs) CLINs (13.1 % of total CPIF) -Performance Based Logistics (PBL) CLINs (36.3% of total CPIF)	Cost-Plus-Incentive-Fee (CPIF)	82.0%
-Program Management CLIN (79.4 % of total FPI) -Training CLINs (4.0% of total FPI) -Exercises/War Games CLINs (16.6% of total FPI)	Fixed-Price - Incentive (FPI)	8.1%
Travel and Other Direct Cost CLIN	Cost Reimbursable (CR)	2.4%

The Fixed Price Incentive-Firm Target (FPIF) structure is similar to a firm fixed price arrangement in that the contractor may reach a point of total assumption (PTA) in which the contractor bears all costs to complete the remainder of the requirement. A target cost is established, along with a share ratio which determines the percentage which the government and contractor share for overrun or underrun. For example, the share ratio may provide that the government pays 70 percent of the overrun and the contractor pays 30 percent. The contractor's share is paid out of the contractor's target profit until the PTA is reached. At the PTA, the contractor has reached a point where all remaining costs between the PTA and the FPIF ceiling price (equivalent to a firm fixed price) are paid for out of the contractor's remaining profit on the contract. Once the ceiling price is reached, the contractor's profit is exhausted, but the contractor must still complete performance, and pay any additional costs to complete out of corporate funding; there is no further liability by the government for any additional costs above the ceiling price. So, in essence, the FPIF contract provides some margin to address program and cost uncertainty, but at a certain point (PTA) the contractor becomes responsible for all remaining costs of performance (similar to a firm fixed price contract). In the case of the DSC FPIF, the share ratio is 50/50, and the ceiling price is 120 percent of target cost.

In the case of the Cost-Plus-Incentive-Fee (CPIF) arrangement (which constitutes 82 percent of the overall contract price), the arrangement enables the contractor to bill for actual costs of performance (subject to allowability criteria set forth in the Federal Acquisition Regulation), but the CPIF still provides a specific incentive for the contractor to control costs. Similar to the FPIF arrangement, in a CPIF a target cost is established, and then a share ratio is established which provides the basis by which the government and contractor share the overrun according to a predetermined formula. The difference between the FPIF and CPIF contract types is that the FPIF type reflects lower risk to the contractor, thus it has a ceiling price that converts to firm fixed price. The CPIF contract type has greater risk to the contractor, thus there is no ceiling price, and minimum and maximum fees are applicable. In the case of DSC, the CPIF arrangement calls for a 60/40 share ratio for overruns, meaning that the contractor must pay 40 percent of the overrun until the minimum fee is reached. The target fee is $162 million and the minimum fee is $72 million, which means that $90 million, or over half of the contractor's fee, is at risk in the event of any cost overruns. These dollar amounts and percentages were proposed by Boeing as part of the source selection. Generally speaking, a 60/40 share ratio is extremely steep for a CPIF contract; the government's interests are adequately protected.

The CPAF arrangement provides for an estimated cost and an award fee which is paid based on the government's subjective evaluation based on criteria contained in an Award Fee Plan. Those criteria typically deal with performance and responsiveness, and provide the government significant leverage. If the contractor is not performing well in areas that relate to the award fee criteria, then the government will normally reduce the fee as part of its determination.

27. Senator SESSIONS. General O'Reilly, does the MDA intend to exercise the option for five additional GBIs?

General O'REILLY. Yes. The MDA intends to exercise the DSC option to manufacture five additional CE–II interceptors in fiscal year 2013.

28. Senator SESSIONS. General O'Reilly, does MDA believe that the threat may merit the deployment of additional GBIs, and if so, why is the option only for five additional interceptors?

General O'REILLY. Based on current threat projections, 30 operational GBIs are sufficient to protect the United States from a limited ICBM raid launched from projected regional threats.

Procuring 5 additional GBIs (57 total) will make available 16 interceptors for IMTP events, and 11 interceptors for reliability growth program testing and spares in addition to the 30 operational interceptors. In doing so, IMTP events, reliability growth program, and spare interceptors will be supported through 2032.

If future threat assessments indicate this capability is insufficient against a growing ICBM threat, operational GBI firepower could be increased by filling out all 38 operational silos in the new Missile Field-2 (increase of 8), refurbishing and making available the 6-silo prototype missile field (MF–1) for a total of 44 operational silos, and accelerating delivery of new sensor and interceptor capabilities.

29. Senator SESSIONS. General O'Reilly, does MDA believe that long-term GMD sustainment and flight test needs may require additional GBIs?

General O'REILLY. {Deleted.]

30. Senator SESSIONS. General O'Reilly, is the option for additional GBIs a firm fixed price option, and if not, why not, and what prevents the contractor from recovering profit lost under the umbrella contract on the price it charges for the procurement of the five additional GBIs?

General O'REILLY.

(1) The option for additional GBIs is not firm fixed price.
(2) Due to the continuing research and developmental nature of the interceptors, the option for additional interceptor manufacturing is a CPIF-type CLIN. At this stage of the ongoing development and associated testing of the interceptors, a firm fixed price contract would be cost prohibitive to the government due to the contingencies the contractor could include in the proposed price.
(3) While a cost reimbursable arrangement would typically place the majority of risk on the government, the use of incentive fee with both performance and cost control incentives guarantees the contractor will lose potential fee should there be overrun on those affected CLINs.

31. Senator SESSIONS. General O'Reilly, if I remember correctly, the Multiple Kill Vehicle (MKV) program which was canceled in 2009 was supposed to be the successor to the CE–II kill vehicle. Does the GMD modernization strategy include plans for upgrading or replacing current kill vehicles with new ones?

General O'REILLY. {Deleted.]

32. Senator SESSIONS. General O'Reilly, could SM–3 IIA MKVs be integrated onto a GBI to increase the number of intercepts possible per GBI?

General O'REILLY. No. Though the GBI's physical dimensions can hold one or more SM–3 IIA kill vehicles, these kill vehicles are not compatible with the GBI mission. The SM–3 IIA kill vehicle is designed to engage intermediate, medium-range and certain short-range ballistic missile threats. The GBI EKV is designed to engage ICBM threats over a broader battle space.

The GBI mission requires that the GBI kill vehicle operate eight times longer than the currently designed SM–3 IIA kill vehicle. The in-flight communication frequencies of the SM–3 IIA kill vehicle are also incompatible with the GBI weapon system. These incompatibilities are also applicable in a GBI with multiple SM–3 IIA kill vehicles.

33. Senator SESSIONS. General O'Reilly, what is the current service life expectancy of the CE I and CE II MKVs?

General O'REILLY. {Deleted.]

SEA-BASED X-BAND RADAR

34. Senator SESSIONS. General O'Reilly, the fiscal year 2013 budget proposes to mothball the Sea-Based X-Band Radar (SBX) and transition it to limited test support status. However, I question whether everyone is in agreement with your pro-

posal given U.S. Pacific Command's (PACOM) recent request that SBX be deployed to observe the recent failed North Korean launch. Did PACOM endorse the MDA's proposal to mothball SBX? If so, do MDA and PACOM agree that the funding requested may not be enough to support multiple deployments like the one in response to the North Korean launch?

General O'REILLY. The SBX radar is not going to be mothballed. The President's budget request for fiscal year 2013 proposes to place the SBX radar in limited test support status. In this status, the SBX radar will retain its unique capabilities.

Its technical performance capability will continue to be tested and exercised, including connectivity to the GMD Fire Control System. SBX will also maintain its American Bureau of Shipping (ABS) and Coast Guard certifications, and will be staffed to maintain the vessel, X-band radar (XBR), and other critical systems for support to both testing and contingency activation.

The MDA is collaborating with all to optimize SBX availability and support for operating in future BMDS flight tests. MDA is also working with the Joint Staff, STRATCOM's Joint Functional Component Command for Integrated Missile Defense, and the combatant commands to determine SBX response times to support contingency operations when directed. The recent successful SBX deployment to observe the failed North Korean launch is an example of the support the SBX can provide, in limited test support status, to contingency operations.

Funding for contingency operations will be determined on a case-by-case basis.

35. Senator SESSIONS. General O'Reilly, in testimony before this committee back in June 2010, then Vice Chairman General Cartwright testified that SBX played a key role in facilitating a shoot-look-shoot capability for GMD. According to General Cartwright, "the addition of the SBX also took some of the stress off of the midcourse. It allowed us to tell—that was the first capability that we had that told us whether we actually hit the missile or not." Is it true that SBX helps facilitate a shoot-look-shoot capability? If so, what has changed to justify the early retirement of SBX?

General O'REILLY. {Deleted.]

HOMELAND HEDGING STRATEGY

36. Senator SESSIONS. Dr. Roberts, as I mentioned in my opening remarks, I am disappointed that little has been relayed to Congress on how this administration intends to hedge the technological and threat-based risk associated with missile defense in Europe. Secretary Gates told us that you would continue the development of the two-stage GBI as a contingency to the SM–3 IIB, but little to date has been provided to Congress to explain what that means. What is the current status of the hedging strategy and when will it be delivered to Congress?

Dr. ROBERTS. DOD is continuing to work to deliver the hedge report to Congress as soon as possible. Given the sensitive intelligence basis of the hedging strategy review, and also the classified performance characteristics of U.S. systems, the results of the review can only be discussed in an appropriate setting.

37. Senator SESSIONS. Dr. Roberts, protecting the Homeland from the possibility of a long-range Iranian threat is a real concern, a concern that could merit the development of an interceptor site located on the east coast of the United States. Will this report include a discussion regarding the construction of an east coast site for the deployment of either GBIs or Aegis Ashore?

Dr. ROBERTS. DOD is continuing to work to deliver the hedge report to Congress as soon as possible. Given the sensitive intelligence basis of the hedging strategy review, and also the classified performance characteristics of U.S. systems, the results of the review can only be discussed in an appropriate setting.

DOD is studying the benefit of placing a GBI field on the east coast of the United States as part of the hedge strategy. A detailed comparison of the operational utility of an east coast site to other deployment options is part of the ongoing hedge assessment, and will be contained in the hedge report.

38. Senator SESSIONS. Dr. Roberts, what additional benefit could an east coast site provide?

Dr. ROBERTS. DOD has studied the benefit of placing a GBI field on the east coast of the United States as part of the hedge strategy. A detailed comparison of the operational utility of an east coast site to other deployment options is part of the ongoing hedge assessment, and will be contained within the hedge report.

PRECISION TRACKING SPACE SYSTEM

39. Senator SESSIONS. General O'Reilly, this committee is painfully aware of the troubles associated with space system acquisition. What is your acquisition strategy for PTSS and why do you feel you are better suited than the Air Force Space Command to execute this strategy?

General O'REILLY.

PTSS Acquisition Strategy

The MDA is developing and acquiring PTSS in two program phases that combine the benefit of government-owned design and an integrated approach that leverages all Overhead Persistent Infrared and BMDS assets, with competitive forces to ensure contractor efficiencies are maximized:

- The development program will use a team of trusted laboratories and industry participation to develop and deploy two spacecraft and the required ground system. The government will have unlimited and/or government purpose rights to any changes to the PTSS design which will be approved by the government prior to incorporation into PTSS.
- The manufacturing and production program will be awarded to a competitively selected commercial entity that produces multiple spacecraft using the government acquired data rights.

The overarching PTSS acquisition strategy reflects these consistent recommendations of multiple GAO reports and studies:

- Establish a sound executable business case.
- Research and define requirements before programs are started. Limit changes after they are started.
- Shorten product development times.
- Deploy larger constellations of smaller, less complex satellites that gradually increase in sophistication.
- Follow an evolutionary path toward meeting mission needs rather than trying to satisfy all needs in a single step.
- Ensure competition whenever possible.

The PTSS program is a Hybrid Program Office (HPO) with colocated military department representatives. In the PTSS HPO, the Air Force and Navy have embedded personnel to speak for their Services' equities to facilitate a seamless transfer from development to operations. The Air Force provides key input to the PTSS design on satellite operations architecture integration and DOT–LPF considerations (i.e., doctrine, organization, training, leadership and education, personnel, and facilities). The Navy informs the PTSS operational implementation with critical Aegis BMD and SM–3 missile details on assured, timely communications and weapon system integration.

The development program will establish the performance baseline for the production program. The Johns Hopkins University Applied Physics Laboratory (JHU/APL), as the technical direction agent, will provide systems engineering continuity for the life cycle of the program.

Ball Aerospace, Boeing, Lockheed Martin, Northrop Grumman, Orbital Sciences, and Raytheon companies are part of the lab team studying manufacturing and production readiness. They will do this in an environment that is non-proprietary and free of organizational conflicts of interest to insert producibility solutions.

The manufacturing and production program will be a full and open competition. To maximize competition on the production program, MDA will encourage open, non-exclusive teaming between offerors on the manufacturing and production program. MDA will encourage similar teaming among subcontractors on the development program. It will be advantageous for proposing vendors to minimize changes to the government-developed system design, limiting them to lessons learned imperatives and component obsolescence issues.

MDA will competitively award launch services contracts using the Air Force as the contracting entity to leverage existing contract vehicles. The first two satellites are compatible with the Evolved Expendable Launch Vehicle (EELV) class of launch vehicles. Future satellites are planned to be compatible with multiple launch vehicles, including EELV-class, as they become available in the commercial marketplace.

MDA as Lead in PTSS Acquisition

PTSS is more than a collection of spacecraft. It is an integral part of the BMD fire-control system, and MDA has the requisite experience and expertise to integrate PTSS into the BMDS. PTSS development will take advantage of technical and design lessons learned from previous MDA satellite programs, the Space Tracking and Surveillance System-Demonstration (STSS–D) and the Near-Field Infrared Experi-

ment. For example, STSS–D is a pathfinder for designing and developing PTSS's ability to close the fire control loop with Aegis.

MDA developed PTSS requirements and system concepts over the past 3 years using JHU/APL as the technical direction agent. Industry has been incorporated and involved with the material solution analysis phase, and flight experiments using MDA spacecraft were executed to validate critical design concepts. We developed the core expertise necessary to successfully implement the PTSS development program. With the established team of trusted laboratories and industry participation, MDA is fully prepared to develop and deploy the PTSS spacecraft and ground system in collaboration with the Air Force and government technical experts from JHU/APL and Naval Research Laboratory.

40. Senator SESSIONS. Ms. Chaplain, the recently released Government Accountability Office (GAO) report highlights the increased risk of highly concurrent acquisition processes. MDA approved a new acquisition strategy for PTSS in January 2012 and acknowledges some concurrency and maintains there are benefits to this approach. How does the current PTSS acquisition strategy measure against GAO's knowledge-based acquisition practices?

Ms. CHAPLAIN. We issued a report on MDA's BMDS in April 2012. In this report we note that the new acquisition strategy for PTSS is at risk due to concurrency in the development of its satellites. While a laboratory-led contractor team is still in the development phase of building two development satellites, MDA plans to have an industry team develop and produce two engineering and manufacturing development satellites. The PTSS program plans to then have industry compete for the production of the follow-on satellites. While the strategy incorporates several important aspects of sound acquisition practices, such as competition and short development timeframes, acquisition risks remain because the industry-built development satellites will be under contract and under construction before on-orbit testing of the lab-built satellites. As such, the strategy may not give decisionmakers full benefit from the knowledge to be gained about the design and function of the lab-built satellites derived from on-orbit testing before making additional major commitments.

41. Senator SESSIONS. Ms. Chaplain, what steps can be taken to strengthen the PTSS acquisition?

Ms. CHAPLAIN. There are two areas related to the PTSS acquisition that could be strengthened. The first is to ensure that DOD is pursuing the right acquisition, and the second is to ensure that the acquisition is implemented in the right way. To ensure DOD is pursuing the right acquisition, we believe the agency would benefit from conducting an analysis of alternatives (AOA) for the PTSS program. An AOA is one of the inputs generally required for the initiation of a new program and our work has found that programs with only a limited assessment of alternatives tended to have poorer outcomes than those that had more robust AOAs.[1] MDA is developing the PTSS outside the normal DOD acquisition cycle and is not subject to this requirement. However, since MDA has not yet conducted a robust analysis to compare the operational effectiveness, cost, and risks of a number of alternative potential solutions, DOD may want to conduct an independent AOA to help ensure that a broad range of alternatives are considered in order to make fully informed programmatic and budgetary decisions going forward.

To ensure that the acquisition is implemented in the right way, decisionmakers would need a sound cost estimate as part of a business case and, if it were approved to proceed, MDA should ensure the design works as intended before committing to a large-scale constellation. As we reported in April 2012, although the PTSS satellite is intended to be a low-cost unit, the full cost of development has not yet been determined. DOD major defense acquisition programs are required to perform an Independent Cost Estimate (ICE) before advancing through certain major milestones.[2] Although not required to for PTSS, the agency is currently working with the Office of the Director of Cost Assessment and Program Evaluation (CAPE) to complete an ICE expected in the first quarter of fiscal year 2013. Having a sound cost estimate would help ensure that the program is affordable and executable. We also reported in April that the acquisition strategy includes some concurrency that puts a commitment for future production before the program has a full under-

[1] GAO, Defense Acquisition: Many Analyses of Alternatives Have Not Provided a Robust Assessment of Weapon System Options, GAO–09–665 (Washington, DC: Sept. 24, 2009).

[2] 10 U.S.C. § 2434 requires an ICE of the full life-cycle cost of the program before a major defense acquisition program can advance into system development and demonstration (now known as engineering and manufacturing development) or production and deployment. The full life-cycle cost must be provided to the decisionmaker for consideration.

standing of program performance. Under the current acquisition plan, an industry team will be approved for production of long-lead items for two development satellites, while a laboratory team is still working to complete the first two development satellites. The program intends to conduct on-orbit checkout and testing of the two laboratory-produced development satellites prior to the decision to complete the assembly of the two industry-built development satellites. This strategy may not enable decisionmakers to fully benefit from the knowledge to be gained and the risk reduction opportunity afforded through on-orbit testing of lab-built satellites before committing to industry-built developmental satellites.

42. Senator SESSIONS. Ms. Chaplain, do you have any confidence in the current $200 million per satellite cost estimate?

Ms. CHAPLAIN. In our March 2011 report, we reported that the MDA cost estimates we reviewed were not sufficiently credible and did not meet the characteristics of high-quality cost estimates based on GAO's Cost Estimating and Assessment Guide founded on best practices in cost estimating. We also made recommendations that MDA take steps to ensure that their cost estimates are high quality, reliable cost estimates that are documented to facilitate external review. In follow-on meetings with MDA, program officials outlined several steps that MDA intended to take to improve the quality of their cost estimates. However, in the results of our latest April 2012 review, we have yet to see the steps implemented.

We cannot assess whether the $200 million cost of each PTSS satellite is credible or be sure of what costs are included or excluded until we have the opportunity to review the cost estimate. For example, based on information provided by program officials, MDA plans to use a medium EELV to launch two PTSS satellites at one time. According to Air Force officials, the cost of launching a medium EELV would be about $142 to $179 million, depending on which launch vehicle is used and excluding some propellants, transportation, and launch capability costs. Without reviewing the PTSS cost estimate, we cannot be sure whether launch costs are included in the estimate. In addition, as we noted in our 2011 report, one of the criteria for a credible cost estimate is having an independent cost assessment. DOD's CAPE group is expected to complete its ICE for PTSS in the first quarter of fiscal year 2013, which will help provide an important independent view of PTSS costs.

SEQUESTRATION

43. Senator SESSIONS. General O'Reilly, General Formica, Mr. Gilmore, Dr. Roberts, and Ms. Chaplain, the Budget Control Act (BCA) requires DOD in January 2013 to reduce all major accounts over 10 years by a total of $492 billion through sequestration. This will result in an immediate $55 billion reduction to the fiscal year 2013 defense program. The Secretary of Defense has been quoted on numerous occasions that the impact of these cuts would be "devastating" and "catastrophic", leading to a hollow force and inflicting serious damage to our national defense. Yet, the Military Services must begin this month with some type of guidance on developing a service budget for fiscal year 2014. What are some of the specific anticipated implications of sequestration to missile defense programs?

General O'REILLY. DOD has not formed contingency plans or risk assessments in the event of a sequester. If budget sequestration reduced DOD's budget and, in turn, the MDA budget, MDA would propose options for budget reduction for presentation at the MDEB for approval by the Defense Management Advisory Group (DMAG). Resultant schedule delays and additional costs for termination of work would need to be assessed part of this process as well.

General FORMICA. The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command has not received direction from the Army to plan or budget for sequestration. As such, we have not assessed the potential implications or altered our fiscal year 2014 budget plan. However, if sequestration does occur, I expect that the implementation would negatively impact our missile defense operations and capabilities.

Mr. GILMORE. If sequestration occurs, automatic percentage cuts are required to be applied without regard to strategy, importance, or priority.

Dr. ROBERTS. As Secretary Panetta made clear in his letter to Senators McCain and Graham in November 2011, if maximum sequestration is triggered, DOD would face huge cuts in its budgets. The impacts of these cuts would be devastating for DOD, and missile defense would not be exempt from these large and indiscriminate cuts.

If budget sequestration reduces DOD's budget, we would propose options for budget reduction for discussion at the MDEB for approval by the DMAG. Resultant

schedule delays and additional costs for termination of work would need to be assessed as part of this process.

Ms. CHAPLAIN. We have not done work to project the impact of possible sequestration on DOD's projects and activities. Importantly, the execution and impact of any spending reductions will depend on the legal interpretations and actions taken by the Office of Management and Budget (OMB). As such, we are not in a position to provide you with an informed response. Generally, in terms of risks of cuts to the DOD missile defense budget, most of the missile defense capabilities DOD is pursuing are critical to strategic and regional defense plans.

We have in the past criticized across-the-board cuts—primarily across-the-board rescissions. This approach can result in protecting ineffective programs while cutting muscle from high-priority and high-performing programs. Across-the-board cuts are not substitutes for making tough and informed choices about the foundation of government.

44. Senator SESSIONS. General O'Reilly, General Formica, Mr. Gilmore, Dr. Roberts, and Ms. Chaplain, what programs would have the most significant impact to operations or readiness?

General O'REILLY. DOD has not formed contingency plans in the event of a sequester. If budget sequestration reduced DOD's budget and, in turn, the MDA budget, MDA would propose options for budget reduction for presentation at the MDEB for approval by the DMAG.

General FORMICA. Within the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, an assessment has yet to be conducted. However, I would expect our operational capabilities to be degraded.

Mr. GILMORE. In the most recently signed IMTP, Version 12.1, General O'Reilly and I worked hard to maintain the content of the BMDS test program in spite of fact-of-life budget pressures. Although we had to stretch out the THAAD test program to 18-month test centers, for the most part we maintained the schedules and test frequencies for the GMD and Aegis BMD programs. Sequestration required by the BCA will likely impact GMD and Aegis schedules and content.

Dr. ROBERTS. If budget sequestration reduces DOD's budget, we would propose options for budget reduction for discussion at the MDEB for approval by the DMAG.

Ms. CHAPLAIN. See response to question #43.

45. Senator SESSIONS. General O'Reilly, General Formica, Mr. Gilmore, Dr. Roberts, and Ms. Chaplain, would sequestration lead to a contract cancellation, termination, cost increase, or schedule delay?

General O'REILLY. DOD has not formed contingency plans in the event of a sequester. If budget sequestration reduced DOD's budget and, in turn, the MDA budget, MDA would propose options for budget reduction for presentation at the MDEB for approval by the DMAG.

General FORMICA. Within the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, we have not been directed by the Army to assess sequestration-caused contract cancellations, terminations, cost impacts, or possible schedule delays. But, I would expect an impact on our material development programs.

Mr. GILMORE. MDA is best qualified to answer this question.

Dr. ROBERTS. Yes, the large and indiscriminate cuts of sequestration would have a devastating effect on U.S. missile defense programs.

Ms. CHAPLAIN. See response to question #43.

46. Senator SESSIONS. General O'Reilly, General Formica, Mr. Gilmore, Dr. Roberts, and Ms. Chaplain, is DOD currently conducting any planning in your area of responsibility? If so, can you describe the plan?

General O'REILLY. DOD has not formed contingency plans in the event of a sequester. If budget sequestration reduced DOD's budget and, in turn, the MDA budget, MDA would propose options for budget reduction for presentation at the MDEB for approval by the DMAG.

General FORMICA. I am not aware of any DOD sequestration planning that impact U.S. Army Space and Missile Defense Command/Army Forces Strategic Command assigned missile defense responsibilities.

Mr. GILMORE. DOD is not currently preparing for sequestration, and OMB has not directed agencies, including DOD, to initiate plans for sequestration.

Dr. ROBERTS. DOD has not formed contingency plans or risk assessments in the event of a sequester. If budget sequestration reduces DOD's budget, we would propose options for budget reduction for discussion at the MDEB for approval by the DMAG.

Ms. CHAPLAIN. See response to question #43.

47. Senator SESSIONS. General O'Reilly, General Formica, Mr. Gilmore, Dr. Roberts, and Ms. Chaplain, how will you assess the risk of each cut?

General O'REILLY. DOD has not formed contingency plans in the event of a sequester. If budget sequestration reduced DOD's budget and, in turn, the MDA budget, MDA would propose options for budget reduction for presentation at the MDEB for approval by the DMAG.

General FORMICA. When directed to review programs under sequestration, we will assess risk to our ability to provide missile defense capabilities to the force. I do expect we would experience degradation in capabilities.

Mr. GILMORE. It is important that DOT&E remain neutral with respect to program decisions. My role as DOT&E is to specify what is required for adequate testing. I will not accept or approve inadequate testing for budgetary reasons.

Dr. ROBERTS. DOD has not formed contingency plans or risk assessments in the event of a sequester. If budget sequestration reduces DOD's budget, we would propose options for budget reduction for discussion at the MDEB for approval by the DMAG.

Ms. CHAPLAIN. See response to question #43.

48. Senator SESSIONS. General O'Reilly, General Formica, Mr. Gilmore, Dr. Roberts, and Ms. Chaplain, has any planning commenced to date to assess the impact of sequestration reductions, such as prioritizing programs in preparation for reprogramming actions or terminations?

General O'REILLY. DOD has not formed contingency plans in the event of a sequester. If budget sequestration reduced DOD's budget and, in turn, the MDA budget, MDA would propose options for budget reduction for presentation at the MDEB for approval by the DMAG.

General FORMICA. DOD is not currently preparing for sequestration, and OMB has not directed agencies, including DOD, to initiate plans for sequestration.

Mr. GILMORE. DOD is not currently preparing for sequestration, and OMB has not directed agencies, including DOD, to initiate plans for sequestration.

Dr. ROBERTS. DOD has not formed contingency plans or risk assessments in the event of a sequester. If budget sequestration reduces DOD's budget, we would propose options for budget reduction for discussion at the MDEB for approval by the DMAG.

Ms. CHAPLAIN. See response to question #43.

QUESTIONS SUBMITTED BY SENATOR JAMES M. INHOFE

EUROPEAN PHASED ADAPTIVE APPROACH

49. Senator INHOFE. General O'Reilly, my concerns about President Obama's PAA have been compounded by recent reporting by the Defense Science Board and the GAO. The reports voiced concerns about our EPAA stating that it faces major delays, cost overruns, and critical technological problems. I would like to see the current and planned funding, total procurement and fielding timeline for the SM–3 IB, IIA, and IIB, as well as original program costs and current project costs. Please provide the same information for radars, Aegis ships, command center, and other sensors required to fully field PAA and provide full coverage.

General O'REILLY. The EPAA is not a single program of record nor is it tied to a specific inventory of systems, but rather EPAA is an approach to fielding missile defense capabilities over time to meet evolving ballistic missile threats while providing opportunities to involve international partners. EPAA relies on mobile and relocatable assets in order to provide maximum adaptability and flexibility. These mobile and relocatable assets could be redeployed to other regions, depending on the crisis/conflict, making analysis of costs solely attributable to EPAA challenging. The Assistant Secretary of Defense for CAPE is completing a detailed accounting of EPAA costs.

MDA BMDS Accountability Report (BAR) Summary						
Element	Development Cost (Current Estimate)		APUC (Current Estimate)		IOC	
	2010 BAR	2012 BAR	2010 BAR	2012 BAR	2010 BAR	2012 BAR
SM-3 Block IB and BMD 4.0.1	4,498 [1] (BY10$M)	3,945 (BY11$M)	10 [2] (BY10$M)	11 [4] (BY11$M)	FY12	FY13
			36 [3] (BY10$M)	55 [3] (BY11$M)	FY12	FY12
SM-3 Block IIA [5]	N/A	N/A	N/A	N/A	FY17	
SM-3 Block IIB	N/A	467 [6] (BY11$M)	N/A	N/A [6]	TBD [6]	
Aegis Ashore [7]	966 (BY10$M)	1,284 (BY10$M)	272 [8] (BY10$M)	380 [8] (BY10$M)	FY15	FY15
AWS 5.0	858 (BY10$M)	1,115 (BY10$M)	7 [9] (BY10$M)	9 [9] (BY10$M)	FY15	FY15
AN/TPY-2	1,991 (BY10$M)	1,838 (BY11$M)	177 [10] (BY10$M)	187 [11] (BY11$M)	Fielded	
C2BMC [12]	859 (BY10$M)	917 (BY10$M)	N/A [13]	N/A [13]	Fielded	

Notes:

1. SM-3 Block IB Development Cost in the 2010 BAR was reduced by $591M by removing O&S costs. This O&S cost was originally included in the total Development Cost in 2010 BAR but was removed for proper comparison to the Development Cost reported in the 2012 BAR.
2. SM-3 Block IB APUC procures 160 All Up Rounds (AUR) missiles.
3. SM-3 Block IB APUC procures 13 BMD 4.0.1 Shipsets.
4. SM-3 Block IB Missile quantity increased from 160 AUR in 2010 BAR to 591 AUR in 2012 BAR.
5. SM-3 Block IIA not yet baselined in a 2010 or 2012 BAR.
6. SM-3 Block IIB 2012 BAR only reflects the cost for the Technology Development Phase; APUC and IOC for SM3-IIB not yet officially established.
7. Aegis Ashore 2010 & 2012 BAR were for PMRF & Romania only.
8. Aegis Ashore APUC procures 1 Unit.
9. AWS 5.0 procures a total of 27 Shipsets.
10. AN/TPY-2 APUC procures Radars 9-14, 6 Units for 2010 BAR.
11. AN/TPY-2 APUC procures Radars 8-11, 4 Units for 2012 BAR.
12. C2BMC develops Spiral 6.4.
13. C2BMC does not show an APUC because this is a total software development effort.

50. Senator INHOFE. General O'Reilly, are the current timelines of 2018 for the IIA and 2020 for the IIB still realistic?

General O'REILLY. The SM–3 Block IIA program is on schedule and within cost to complete the ongoing cooperative development program with Japan. Both the 5.1 Aegis Weapons System and the SM–3 Block IIA missile associated with the effort will meet all EPAA Phase 3 objectives.

The SM–3 Block IIB initial fielding timeline has been delayed from 2020 to 2021 due to fiscal year 2012 budget reductions. All three industry teams are pursuing viable concepts with capacity for the SM–3 Block IIB to achieve a 2021 fielding in support of EPAA Phase 4.

51. Senator INHOFE. General O'Reilly, does the President's Future Years Defense Program (FYDP) provide you with the resources necessary to field PAA as planned on schedule?

General O'REILLY. The President's fiscal year 2013 budget request for the BMDS and associated FYDP funding profile for the BMDS currently provides for the necessary resources to field the EPAA. Due to congressionally-directed reduction to the fiscal year 2012 budget request for the SM–3 Block IIB, fielding for that interceptor as part of Phase 4 of the EPAA will be 1 year later than stated in the fiscal year 2013 President's budget submission, moving from 2020 to 2021.

EXOATMOSPHERIC KILL VEHICLE

52. Senator INHOFE. General O'Reilly, you reference in your testimony the problems you have experienced with the EKV on the GMD system. I understand that you are nearing a fix for the problems most recently identified and I hope that those efforts are successful. However, I fear that this will not be the last problem to surface with the EKV, which has long been a source of concern. The EKV was never meant to be the permanent kill vehicle for GMD and the current system is heavier, less capable, and less reliable then I think it can or should be. But with the cancellation in 2009 of the MKV program, we are locked into the current system for the foreseeable future. At present, the only development effort underway at MDA that will result in a brand new kill vehicle is the SM–3 IIB program. Has the MDA given any thought to leveraging the kill vehicle development work from the SM–3 IIB to produce an interceptor that could be used for GMD as well?

General O'REILLY. Once all capabilities are enabled by software upgrades, the current EKV will be sufficient to meet all anticipated midcourse defense requirements for the next decade and beyond. The EKV intercept battle space is much larger than that of the SM–3 IIB, given its much higher thrust to weight ratio, greater acquisition range, and longer time of fight. Moreover, the EKV's guidance, navigation, and controls are optimized to handle ICBM signatures and the much higher intercept closing velocities. Though EKV performance is enhanced with in-flight data updates, it can autonomously execute its mission without post-launch ground communication. The EKV is designed with three-color optical sensor systems and state-of-the-art discrimination software to counter sophisticated threats and countermeasures. C0, CE–I, and CE–II EKVs have correctly discriminated the threat object in every flight test conducted since the first intercept test in 1999.

However, the MDA studied the feasibility of developing a common kill vehicle for SM–3 IIB and GBI in order to improve the manufacturability and reliability of EKVs. Results indicate that a common kill vehicle is not feasible. SM–3 IIB shipboard safety requirements, launcher size constraints, and weapon system interfaces reduce kill vehicle performance below GBI requirements. Conversely, changes are required to the SM–3 IIB kill vehicle to meet the more stringent GBI performance requirements, different communication frequency and data structure. These changes result in a significantly heavier kill vehicle, reducing SM–3 IIB missile velocity and its forward-based Homeland defense capability.

Additionally, establishing common component technologies may save money and improve reliability without sacrificing performance. This approach promotes developing, reusing, or scaling of common high-cost items in seeker technologies (focal plane arrays, read out integrated circuits, and optics), avionics technologies (processors, inertial navigation systems, telemetry systems, initiators, and encryption devices), algorithms, and software.

53. Senator INHOFE. General O'Reilly, what would it take to pursue a common kill vehicle approach?

General O'REILLY. A common kill vehicle cannot be developed without compromising the mission effectiveness of the GBI or SM–3 IIB. Establishing a common kill vehicle architecture with common interface standards may enable common component technologies and save money. Incorporating commonality at any level will require revising our SM–3 IIB and GMD acquisition strategies. It would take a business case study to determine if there is net cost/benefit.

RUSSIA AND MISSILE DEFENSE

54. Senator INHOFE. General O'Reilly and Dr. Roberts, at the end of President Obama's now infamous meeting with Russian President Dmitri Medvedev on March 26, President Obama said: "On all these issues, but particularly missile defense, this, this can be solved but it's important for him [incoming Russian President Vladimir Putin] to give me space. This is my last election. After my election, I have more flexibility." On March 13, Ellen Tauscher, the Department of State's Special Envoy on Strategic Stability and Missile Defense, led a U.S. delegation to Moscow and meet with Russia's Deputy Foreign Minister, Deputy Defense Minister, and Vice Premier. It has been reported that during that meeting, the Russians told the U.S. delegation they wanted limits on the speed and basing of U.S. missile defense interceptors in Europe. It has also been reported that the Obama administration is looking at providing the Russians with data on our missile defense interceptors to include velocity at burnout which tells how fast an interceptor is going when its rocket-booster motor fuel is spent and the motor burns out. Is the United States

considering providing Russia with classified data on our missile defense interceptors?

General O'REILLY. The U.S. State Department, the Under Secretary of Defense for Policy, and the Chairman of the Joint Chiefs of Staff have the lead for U.S. missile defense cooperation efforts with the Russian Federation on missile defense. Those organizations can more appropriately address this question. I have no knowledge of any initiative to transfer classified missile defense data to the Russians.

Dr. ROBERTS. DOD is continuing to examine projects that would benefit the United States through the Defense Technology Cooperation Subworking under the Defense Relations Working Group. A DTCA would permit the United States and Russia to undertake bilateral projects by providing a legal framework to conduct bilateral projects and by including required intellectual property and information security provisions for such projects. Any sharing of missile defense information with Russia would be conducted in accordance with U.S. National Disclosure Policy and other applicable laws.

55. Senator INHOFE. General O'Reilly, will the United States allow Russia to place any limitations on U.S. missile defense?

General O'REILLY. The U.S. State Department, the Chairman of the Joint Chiefs of Staff, and the Office of the Under Secretary of Defense for Policy have the lead for U.S. engagement with the Russian Federation on missile defense cooperation. Administration officials have been clear in testimony to Congress, as well as in international meetings with Russian officials, that the United States will not agree to limitations on the capabilities and numbers of U.S. missile defense systems.

MISSILE DEFENSE AND GLOBAL THREATS

56. Senator INHOFE. General O'Reilly, outside of our allies, Russia, and China, are there over 6,000 ballistic missiles currently deployed around the world?

General O'REILLY. According to the Defense Intelligence Agency's (DIA) Missile and Space Intelligence Center (MSIC), there are, aside from Russia, China, and our allies, between 5,780 and 6,310 ballistic missiles deployed worldwide.

Source: MSIC, e-mail, RE: Unclassified Force Level Numbers, 6 April 2012.

57. Senator INHOFE. General O'Reilly, was the number of ballistic missiles currently deployed around the world 4,000 only 4 years ago?

General O'REILLY. No, according to the DIA's MSIC, there were, aside from Russia and China, approximately 5,900 ballistic missiles deployed worldwide in 2008.

Source: DIA/MSIC Message 2009281441SS(U).

58. Senator INHOFE. General O'Reilly, has the number of countries making their own ballistic missiles tripled in the last 4 years from 4 to 12 countries?

General O'REILLY. Although the number of producing countries has remained constant at 10, the threat from ballistic missiles continues to increase.[1] Aside from Russia, China, and our allies, ballistic missile force levels have increased from 5,900 in 2008 to over 6,300 today. The percentage of missiles, medium-range or longer, has grown from 6 percent to 15 percent.[2,3] Potential adversaries are using technology sharing to accelerate the speed with which they deploy new, more capable ballistic missile systems.[4] These missiles are becoming more survivable, reliable, and longer-ranged. Countries are designing them to launch from multiple transporters against a broad array of targets, enhancing their mobility and effectiveness on the battlefield. Technology is also improving the accuracy of ballistic missiles.[5] As an example, Iran is developing and claims to have deployed short-range ballistic missiles with seekers that enable the missile to identify and maneuver toward ships during flight. This technology also may be capable of striking land-based targets.[6]

The problem of secondary proliferation continues to expand, as more countries that previously imported weapons and technologies, such as Iran and Syria, begin

---

[1] DIA, Response to MDA Requirement A128–12–0040, 28 June 2012 (Extract).

[2] MSIC, DIA/MSIC Message 2009281441SS(U).

[3] MSIC, Unclassified Force Levels, e-mail, 6 April 2012.

[4] Ronald L. Burgess, Jr., Lieutenant General, U.S. Army, Director, DIA, Worldwide Threat Assessment, Statement before the Committee on Armed Services, U.S. Senate, 10 March 2011.

[5] Ronald L. Burgess, Jr., Lieutenant General, U.S. Army, Director, DIA, Annual Threat Assessment, Statement before the Senate Armed Services Committee, U.S. Senate, 16 February 2012.

[6] Office of the Secretary of Defense, Annual Report on Military Power of Iran, Full Update, April 2012.

indigenous production and export those systems.[7] Countries that have not possessed ballistic missiles, such as Burma, have actively cooperated with North Korea to develop missile technology.[8] This proliferation has not been limited to states: in close cooperation with Syria, Iran has provided Lebanese Hizballah with increasingly sophisticated weapons, including a wide array of missiles and rockets.[9]

Countries that are developing ICBMs include India, which claims it is developing a nuclear-capable 6,000 kilometer-range missile that will carry multiple warheads,[10] and North Korea, which launched a Taepo Dong-2 in 2012 and is developing a road-mobile ICBM.[11] Since 2008, Iran has launched multistage space launch vehicles that could serve as a test bed for developing long-range ballistic missile technologies. It may be technically capable of flight-testing an ICBM by 2015.[12]

59. Senator INHOFE. General O'Reilly, is it true that the proliferation of ballistic missile technologies continues to increase?

General O'REILLY. Yes, the Director of the DIA stated in his Annual Threat Assessment that "Theater ballistic missiles already are a formidable threat in the Middle East and Asia, and proliferation is expanding their availability worldwide. Technology sharing will accelerate the speed with which potential adversaries deploy new, more capable ballistic missile systems over the next decade. Sophisticated missiles and the equipment to produce them are marketed openly."

Source: Ronald L. Burgess, Jr., Lieutenant General, USA, Director, DIA, (U) Annual Threat Assessment, Statement Before the Senate Armed Services Committee, United States Senate, February 16, 2012.

60. Senator INHOFE. General O'Reilly, has the capability and range of ballistic missiles continued to increase, making them more accurate with longer ranges?

General O'REILLY. Yes. The Director of the DIA, in his Annual Threat Assessment, stated "Ballistic missiles continue to pose a threat as they become more survivable, reliable, and accurate at greater range."

Source: Ronald L. Burgess, Jr., Lieutenant General, USA, Director, DIA, (U) Annual Threat Assessment, Statement Before the Senate Armed Services Committee, United States Senate, February 16, 2012.

61. Senator INHOFE. General O'Reilly, do you agree with the statement made by Secretary Panetta to the House Armed Services Committee on April 19 that "there is no question that North Korea's capabilities with regards to ICBMs and their developing nuclear capability represent a threat to the United States"?

General O'REILLY. Yes. Any questions on North Korean nuclear weapons and ICBMs should be referred to the DIA for a thorough assessment.

62. Senator INHOFE. General O'Reilly, do you agree with the statement made by Secretary Panetta last month that Iran could have a nuclear weapon and a delivery vehicle within 3 to 4 years?

General O'REILLY. Questions regarding the projected threat, and specifically for an assessment on Iranian nuclear weapons and delivery systems should be referred to the Intelligence Community.

63. Senator INHOFE. General O'Reilly, are there enough Aegis ships and missiles programmed in the budget to support the President's PAA while meeting other combatant commanders' requirements, such as PACOM?

General O'REILLY. Aegis BMD ships and SM–3 missiles are managed within the Global Forces Management Process and this question is best answered by the Joint Staff.

---

[7] Director of National Intelligence, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, Covering 1 January to 31 December 2011.

[8] State Department, Administration Eases Financial and Investment Sanctions on Burma, Fact Sheet, July 11, 2012.

[9] Office of the Secretary of Defense, Annual Report on Military Power of Iran, Full Update, April 2012.

[10] Ronald L. Burgess, Jr., Lieutenant General, U.S. Army, Director, DIA, Annual Threat Assessment, Statement before the Senate Armed Services Committee, U.S. Senate, 16 February 2012.

[11] Tal Inbar, Controlling the Axis, Defense News, 1 May 2012 (Secretary of Defense Gates quote).

[12] Office of the Secretary of Defense, Annual Report on Military Power of Iran, Full Update, April 2012.

The MDA provides the combatant commanders and Navy capabilities to conduct BMD operations. Assessment of the adequacy of number of ships and missiles programmed in the budget to support the Phased Adaptive Approach and other combatant command requirements is managed within the MDEB process, with input from the Office of the Secretary of Defense Staff, Joint Chiefs, combatant commanders, and the Services.

64. Senator INHOFE. General O'Reilly, if Iran is able to develop a nuclear weapon and marry that weapon to a ballistic missile by 2015 or 2016, as estimated by Secretary Panetta, will we have the capability to provide all our deployed forces and our allies in Europe protection against that missile?

General O'REILLY. By the 2015 or 2016 timeframe, Phase II of the EPAA will have been deployed. The EPAA Phase II architecture will have the capability to provide protection against an Iranian missile attack against our deployed forces and NATO allies in Europe.

The current planned stationing of Aegis BMD ships, along with the Aegis Ashore battery in Romania, will provide a layer of defense for all NATO European allies within range of the projected Middle East short- and medium-range ballistic missile threat.

65. Senator INHOFE. General O'Reilly, would a GMD site in Europe or on the east coast of the United States provide a greater capability to defend against an Iranian ICBM threat?

General O'REILLY. [Deleted.]

66. Senator INHOFE. General O'Reilly, the administration has failed to provide Congress a hedge strategy in the event North Korea or Iran continue to develop their ICBM capabilities to target the United States. Is this due to the administration's ambivalence towards missile defense and the growing threat?

General O'REILLY. DOD is continuing to develop the strategy and options for defense of the U.S. Homeland against an unexpected long-range ballistic missile threat. The Office of the Secretary of Defense for Policy is the lead in DOD for developing this strategy. MDA has provided technical analysis in support of this effort.

[Whereupon, at 2:00 p.m., the subcommittee adjourned.]