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S. HRG. 110–394, PT. 7

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2009

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

ON

S. 3001

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2009 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR, AND FOR OTHER PURPOSES

PART 7
STRATEGIC FORCES

MARCH 4, 12; APRIL 1, 2008

Printed for the use of the Committee on Armed Services

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2009

TUESDAY, MARCH 4, 2008

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

MILITARY SPACE PROGRAMS

The subcommittee met, pursuant to notice, at 2:30 p.m. in room SR–232A, Russell Senate Office Building, Senator Bill Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Bill Nelson, E. Benjamin Nelson, Sessions, and Thune.

Majority staff member present: Madelyn R. Creedon, counsel.

Minority staff member present: Robert M. Soofer, professional staff member.

Staff assistants present: Kevin A. Cronin and Brian F. Sebold.

Committee members' assistants present: Christopher Caple, assistant to Senator Bill Nelson; Todd Stiefler, assistant to Senator Sessions; and Jason Van Beek, assistant to Senator Thune.

OPENING STATEMENT OF SENATOR BILL NELSON, CHAIRMAN

Senator BILL NELSON. Good afternoon. The hearing will come to order. After this open session, we will adjourn to S–407 of the Capitol, where we will continue this on the classified level.

I'm going to forgo a statement and put it in the record.

[The prepared statement of Senator Nelson follows:]

PREPARED STATEMENT BY SENATOR BILL NELSON

Welcome to all of our witnesses this afternoon for the Strategic Subcommittee's hearing on military space programs. General Kehler, it is a pleasure to welcome you to the committee in your capacity as the new Commander of the Air Force Space Command.

This afternoon we have, as I have mentioned, General Kehler, Commander Air Force Space Command; Lieutenant General Shelton, in his capacity as the Strategic Command Joint Functional Component Commander for Space; Rear Admiral Deutsch, Director, Warfare Integration Division, Office of the Chief of Naval Operations; Gary Peyton, the Deputy Under Secretary of the Air Force for Space Programs; and Ms. Cristina Chaplain, from the Government Accountability Office. Many years of space experience are represented on this panel and we look forward to a good discussion.

With the launch of the first Wideband Global Satellite last October, the first launch of the GPS–2F satellite scheduled for early next year, and the news that the first Space-based Infrared System HEO sensor is performing remarkably, the re-

capitalization of space systems is clearly underway. The extensive space recapitalization efforts come with many challenges, however, including the new problems with the Spaced-based Infrared System GEO satellite, the delay in the T-Sat program, and concerns about the scope of the GPS III program. In addition, we continue to be concerned about improving space situational awareness and making sure that space protection efforts are fully coordinated.

Last year, the National Defense Authorization Act contained a provision directing development of a joint space protection strategy, with the hope that this would be a first step toward ensuring that space protection is fully coordinated. Hopefully there is good progress on this strategy.

There is good news as well, the EELV program continues its string of successful launches with a significant number of launches scheduled in 2008 and 2009. Progress is also being made in the area of operationally responsive space and the standup in May of last year of the new ORS Joint Program Office.

We have a large number of witnesses this afternoon and you all have submitted prepared statements, which, without objection will be included for the record.

At the conclusion of the hearing, at about 4 p.m., we will move to room S–407 of the Capitol and receive some classified briefings at the SCI level. All members and appropriately cleared staff are invited.

As I mentioned, each witness has provided substantial statements that have been included in the record, so now I would like to hear, briefly, from each of you about your most important issue or the one about which you worry the most, and take the opportunity to discuss those issues in a conversational style. We have found that these sessions are much more useful approached as a conversation.

With that Mr. Peyton, will you begin, and then we will go to General Kehler, Lieutenant General Shelton, Admiral Deutsch, and Ms. Chaplain.

Senator BILL NELSON. When Senator Sessions gets here, we'll do whatever he wants. I am going to put into the record each of your opening statements, and we are not going to take the time for you to sit here and read to me your statement, it's in the record, we'll move directly to questions.

[The prepared statement of Senator Sessions follows:]

PREPARED STATEMENT BY SENATOR JEFF SESSIONS

Mr. Chairman, I join with you in welcoming today's Air Force, Navy, Strategic Command, and the Government Accountability Office (GAO) witnesses as we examine the state of U.S. military space programs, particularly with respect to the fiscal year 2009 budget request.

The past year has been a good one for our military space professionals. They should take great pride in providing daily space support to our forces operating abroad, and for continuing to provide the backbone for our Nation's strategic nuclear deterrent.

Air Force Space Command continues to add to its record of successful national security payload launches, with a total of 56 consecutive launches, including five successful launches of the Evolved Expendable Launch vehicle last year.

Air Force space acquisition programs, though heavily criticized in the past, appear to be moving in the right direction. Our GAO witness notes that recent actions taken by the Air Force and the Department of Defense (DOD) to address acquisition problems "are a good first step." That the back-to-basics policy and Operationally Responsive Space represent significant shifts in thinking about how space systems should be developed.

The fiscal year 2009 budget request for space programs—almost $9 billion—represents approximately 7 percent of the $117 billion Air Force budget, and 21 percent of the Air Force Modernization and Recapitalization budget request of $41 billion.

Despite these significant sums, the Air Force and the DOD still felt it necessary to reduce funding for critical military satellite communications programs over the Future Years Defense Program, and provided only a modest increase in funding for space protection programs.

The subcommittee will want to better understand how the Air Force and the Department rationalize these choices.

I thank the witnesses for their service to the country and look forward to hearing their testimony.

STATEMENT OF GARY E. PAYTON, DEPUTY UNDER SECRETARY OF THE AIR FORCE FOR SPACE PROGRAMS

[The prepared statement of Mr. Payton follows:]

PREPARED STATEMENT BY GARY E. PAYTON

INTRODUCTION

It is an honor to appear before this Committee as the Deputy Under Secretary of the Air Force for Space Programs, to discuss with you our National Security Space activities. I support the Secretary of the Air Force with his responsibilities as the Service Acquisition Executive for Space Programs and the Department of Defense (DOD) Executive Agent for Space, where his role is to "develop, coordinate, and integrate plans and programs for space systems and the acquisition of DOD space Major Defense Acquisition Programs to provide operational space force capabilities to ensure the United States has the space power to achieve its national security objectives."

The U.S. relies upon space capabilities not only to meet the needs of joint military operations worldwide, but to underpin our Nation's diplomatic, informational, and economic strengths as well. Because of this, it is important to ensure that our National Security Space (NSS) systems and our space professionals are integrated across our peacetime and wartime operations—providing robust and responsive space capabilities around the globe—particularly in Iraq and Afghanistan.

Americans also rely on the access and use of space capabilities in many areas of everyday life. Whether using satellites for navigation, communications, or the forecasting of severe weather, America increasingly depends on its space systems. To ensure the availability of these systems, the NSS community continues to program, and provide, for continuity in key mission areas, while simultaneously working to modernize and recapitalize our aging satellite constellations and supporting infrastructure.

At the same time, the global rate of change for technology and the number of nations directly engaged in space continues to increase. As a result, the ability of an adversary to contest our space capabilities is growing. In such an environment, we must improve our space situational awareness (SSA)—enabling a better understanding of objects and their activities in space.

We must ensure mission continuity in several key space capabilities, such as: Strategic Communications; Missile Warning; Launch; and Positioning, Navigation, and Timing (i.e., the Global Positioning System (GPS)), while pursuing increased Space Protection. Over approximately a 2-year period, beginning with the Wideband Global SATCOM (WGS) launch in October 2007, we will deliver five "first of" satellites. These include: WGS; Advanced Extremely High Frequency (AEHF); Space Based Space Surveillance (SBSS); GPS IIF; and Space Based Infrared System (SBIRS) geosynchronous earth orbit (GEO) satellites.

Always seeking ways to improve, we look forward to the recommendations of the congressionally-directed Independent Review and Assessment of DOD Organization and Management for National Security in Space. In the interim, I offer that the Secretary of the Air Force should remain the DOD Executive Agent for Space, and that this position has been critical in aligning space efforts across the DOD and other government agencies.

BACK TO BASICS IN SPACE ACQUISITION

We continue to institutionalize our "back-to-basics" acquisition philosophy, which emphasizes increased discipline in the development and stabilization of requirements, resources, engineering practices, and management. It also promotes a more deliberate acquisition planning strategy, firmly focused on mission success and delivering on our commitments.

Our acquisition philosophy can be viewed as a continuous process with five distinct but interdependent stages. The first stage is science and technology (S&T), where we conduct basic research and explore the possibilities of new technologies. In the second stage, technology development, we mature technologies into proven components and subsystems exploiting discoveries made in the S&T stage. The third stage is systems development. Here, we take the most promising technologies and mature them to higher technical and manufacturing readiness levels as part of integrated systems which can be produced in operational platforms in the fourth stage, system production. Thus, technology is matured through the first three stages. We are emphasizing early technology development to ensure mature component technology is available for our production systems. Entering the system production

phase with mature technology reduces cost, schedule, and performance risk. This allows confidence in predicting which new capabilities can be delivered when. The fifth stage is Sustainment, where the goal is increasing systems availability while reducing Operations and Support costs. Integration of acquisition and sustainment early in life-cycle development is key to achieving these goals.

A block approach acquisition strategy delivers systems through discrete, value-added increments which reduces production risk, delivers incremental capabilities to the warfighter sooner, and maintains continuity of service. This concept is consistent with current policy specifying "evolutionary acquisition as the preferred strategy" for DOD acquisitions. Specific capability increments are based on a balance of warfighter needs, delivery timeline, technology maturity, and budget. Well-defined increments help reduce many of the potential instabilities in requirements, budget, and workforce. An overarching goal is increased confidence, both in terms of cost and schedule, for our space acquisition programs. Therefore, I ask for your continued support, not only for the current generation of satellites and supporting technologies, but for the next generation technology development and the generation after next S&T, to ensure that we are able to continue this block approach strategy.

UPDATE ON SPACE

Today, I would like to briefly discuss some of the achievements we have had over the last year and some of our NSS initiatives.

Launch

Over the past year, we launched the last Defense Support Program satellite, our first Wideband Global SATCOM satellite, two additional GPS IIR–M satellites and extended our string of consecutive, successful NSS launches.

The December 10, 2007 launch of a National Reconnaissance Office (NRO) satellite marked the 56th consecutive, successful launch of a NSS Medium or Heavy payload—extending an incredible record. This unprecedented string of launch successes, which started in 1999, is a testament to the knowledge, skill, and commitment of our space professionals—particularly in the areas of Mission Assurance and attention to detail.

Missile Warning

Our Nation continues to rely on space-based missile warning—and for over 35 years, our legacy space-based sensors, in conjunction with ground-based radars, have done an excellent job of meeting the Nation's missile warning needs. On November 11, 2007, the 23rd, and final, Defense Support Program satellite (DSP–23) was successfully launched. This legacy constellation, however, continues to age, while threats such as the proliferation of theater ballistic missiles and advanced technologies continue to grow. These threats are driving the need for the increased coverage and resolution that will come with the SBIRS.

SBIRS supports four mission areas: missile warning, missile defense, technical intelligence, and battlespace awareness, and will be comprised of both GEO satellites and highly elliptical orbit (HEO) payloads. The first HEO payload was launched in 2006, and its on-orbit performance is exceeding expectations. Launches of the first SBIRS GEO satellite and the second HEO payload are both scheduled in fiscal year 2009.

Our funding request supports the procurement of three GEO spacecraft, two additional HEO payloads, plus the necessary ground elements. We continue to work with our industry partners to resolve challenges on the SBIRS GEO–1 spacecraft, specifically with respect to the Flight Software Subsystem, to ensure the successful launch of this critical capability. Our budget request also funds the Third Generation Infrared System program to develop wide field-of-view technologies. This is the technology development necessary reduce cost, schedule, and performance risks for the next generation of missile warning satellites.

Communications

Satellite Communications (SATCOM) is another critical space capability for which we must ensure mission continuity. The U.S. military is a highly mobile and dispersed force that relies heavily on wideband, protected, and narrowband SATCOM for command, control, and coordination of forces. SATCOM also enables forces to receive real-time images and video of battlefield and targets, thereby accelerating decision-making from the strategic to the tactical levels. These images and video often come from Unmanned Aerial Vehicles (UAVs) controlled via SATCOM links, allowing the UAVs to fly far beyond the line of sight and to collect information without endangering U.S. forces.

On October 11, 2007 we successfully launched the first WGS satellite as part of the Department's constellation of wideband satellites, significantly increasing the on-orbit capacity—a single WGS satellite has greater capacity than the entire legacy Defense Satellite Communications System (DSCS) III constellation. This success represents the first step in the Department's transition from its aging DSCS satellites to an increased capability for the effective command and control of U.S. forces around the globe. The Department also signed a Memorandum of Understanding with the Department of Defence of Australia on November 14, 2007, forming a partnership for the production, operation, and support of the WGS constellation. Our funding request supports the launch and on-orbit check out for two WGS satellites in fiscal year 2009.

In the protected SATCOM portfolio, this year we are scheduled to launch the first AEHF system—the follow-on to the Department's current Milstar satellites. This initial AEHF launch will complete the worldwide Medium Data Rate (MDR) ring, increasing the data-rate for these low probability of intercept/detection and anti-jam communications from tens-of-kilobytes per second to approximately a megabyte per second. Our funding request supports the procurement of four AEHF satellites.

The next generation of SATCOM satellites, the Transformational Satellite (TSAT) Communications System, will support both wideband and protected requirements. We are continuing with TSAT technology development and risk reduction efforts, and this past year we completed the Systems Design Review (SDR). In 2007, an independent Technology Readiness Assessment determined the program is prepared to enter the next phase of development. With the addition of the fourth AEHF satellite, the Department is currently conducting a MILSATCOM investment review to ensure the program's overall affordability and synchronization with user platforms.

Positioning, Navigation, and Timing

The U.S. GPS continues to be the world standard for positioning, navigation, and timing (PNT). As a result, GPS has been incorporated into military, commercial, and civilian applications, to include navigation, agriculture, banking, cartography, telecommunications, and transportation. Last year the GPS Program Office seamlessly implemented the Architecture Evolution Plan upgrade to the existing GPS Operational Control System. This upgrade increased sustainability and provided the ability to control the new GPS IIF satellites. Perhaps most notably, these upgrades were implemented with no impact to day-to-day operations and did not require any modifications to existing user equipment.

Later this year, there are three GPS IIR–M launches scheduled and we will begin to launch the next generation, GPS IIF, satellites in fiscal year 2009. These satellites, along with their ground control system and associated user equipment, continue to ensure constellation sustainment, increase the number of on-orbit M-code capable satellites, and introduce the "L5" civil signal. At the same time, the Air Force is developing the next generation of PNT satellites through the GPS III program.

GPS III will offer significant improvements in navigation capabilities by improving interoperability and jam resistance. The procurement of the GPS III system is planned for multiple blocks, with the GPS IIIA portion currently underway. GPS IIIA includes all of the GPS IIF capability plus up to a 10-fold increase in signal power, a new civil signal compatible with the European Union's Galileo system, and a new spacecraft bus that will allow a growth path to future blocks. As for the development of the ground infrastructure, we recently awarded two contracts for the System Definition and Risk Reduction phase for the associated ground segment, OCX. These two OCX contracts will each deliver prototypes and lead to a competitive selection of a single contractor in late fiscal year 2009.

Space Situational Awareness

Mission continuity is critical for persistent space based PNT, intelligence, surveillance and reconnaissance, strategic communications, and global environmental monitoring. As nations, and non-nation state actors, demonstrate both the capability and will to disrupt our space operations, we risk losing that continuity. Anti-jam SATCOM technologies, higher power GPS M-Code navigation signals, radiation hardened technology, on-orbit reconstitution, and dispersed ground segments are all part of our improved space survivability. We must also account for the possibility that new capabilities to deny, damage, or destroy our on-orbit assets will be arrayed against us. We are expanding our SSA to provide the ability to fully characterize and understand these new threats as they mature, as well as clearly discriminate between a hostile act and a naturally occurring event. In parallel, we are developing the organizational, operational, and technical enablers that will allow us to react swiftly and decisively when these threats materialize.

New systems that will contribute to SSA include the Rapid Attack Identification Detection and Reporting System (RAIDRS) program, the Space Fence, SBSS, and the Integrated Space Situational Awareness (ISSA) program.

RAIDRS develops ground based systems that rapidly detect, locate, characterize, identify, and report interference with DOD-owned and DOD-used space assets, and it is being developed via a block approach. In the next year, Block 10 will provide initial capabilities that detect and geo-locate SATCOM interference via fixed and mobile ground systems. Future development of the Block 20 system will provide automated data access/analysis, data fusion, and detection support capabilities.

The Space Fence is planned to replace the aging Air Force Space Surveillance System with a higher radio frequency system to detect and track smaller sized space objects, and provide worldwide coverage for the first time. It expands the terrestrial based detection and tracking capability, supporting SSA while working in concert with other networked sensors.

The SBSS program is planned to deliver optical sensing satellites to search, detect, and track objects in earth orbit—particularly those in geosynchronous orbit—building upon the success of the Space-Based Visible (SBV) technology demonstration. Surveillance from space will augment our ground sensors, and the initial SBSS Block 10 will replace the aging SBV sensor in 2009.

To combine all of the various inputs and provide a single picture for decision-makers, we are also pursuing the ISSA program. When delivered, ISSA will have the capability to acquire, process, integrate, and fuse SSA data to create the awareness we need, with an ability to attribute actions. Currently, our operators and warfighters must assemble an understanding of the global space picture from many disparate sources, including telephone calls, classified chat rooms, intelligence web sites, and imagery feeds. We have acknowledged this shortcoming and have initiated programs to bring data together, filter it for relevance, and aid the commander in making a timely decision that could attribute an attack or malfunction, preserve health of a constellation, or re-task sensors to track a new launch. The cornerstone program for this is the ISSA program, which will interact with the space command and control (C2) system to provide automated decision tools supporting decision-making on a timescale appropriate for today's and tomorrow's challenges in space. The space operating environment is becoming increasingly complex; we need to equip our Nation's space operators with the tools necessary to characterize space activities and accurately attribute actions.

Operationally Responsive Space

Another key initiative is Operationally Responsive Space (ORS), and I thank you for your continuing support for this program. On May 21, 2007, the Operationally Responsive Space Office was stood up at Kirtland AFB, NM, to develop, acquire, and deploy a tiered capability consisting of responsive spacecraft, launch vehicles, and ground equipment. The ORS Office is a jointly manned entity that reports to the DOD Executive Agent for Space, and will have representation from the defense, intelligence, civil, and international communities—to include Air Force, Army, Navy, and Marines, personnel from NASA, NSA, NRO, and Sandia National Laboratory—and we are pursuing allied partner representatives. Many other organizations, while not providing direct staff in the office, are planning to establish liaison relationships with the ORS Office to ensure synergy and close coordination.

Through a series of tactical satellite (TACSAT) operational experiments, we are exploring affordable and responsive launch, checkout, and theater integration of space systems to better support the needs of the combatant commanders. TACSAT experiments will test concepts such as common interfaces, subsystems, new payloads, and new concepts of operations. The 2009 request for the ORS program element funds the TACSAT–4 launch and development of TACSAT–5, a plug and play spacecraft bus. Additionally, responding to urgent warfighter requirements, vetted by U.S. Strategic Command, the ORS office is initiating communications and SSA programs in 2008 and 2009.

WORKFORCE

Our DOD space professional workforce includes our military Active, Reserve, and Guard components, and our civil service personnel. We are currently coordinating a new DOD Directive that will clearly outline responsibilities within the Office of the Secretary of Defense and the Services for the education, training, and management of these critical space professionals.

Looking beyond the DOD, a healthy space industrial base is one of our top priorities. The Space Industrial Base Council (SIBC) which is co-chaired by Secretary Wynne, as the DOD Executive Agent for Space, with the Director of the NRO, Scott Large, brings together stakeholders from across government and industry to coordi-

nate actions on critical space industrial base issues. The SIBC has taken a quantitative look at the health of U.S. companies and how they are balancing competitiveness and security concerns. We are all committed to protecting sensitive space technology while allowing our companies to compete internationally. We will continue to strengthen our understanding of the U.S. space industrial base to ensure that it remains viable in the future—we cannot afford to lose this national capability.

I would also like to thank the committee for its support of the National Defense Education Program (NDEP), which supports scholarships in Math, Science, Engineering, and Foreign Language, with a focus on critical skills for clearable people. The NDEP began in fiscal year 2006 with $10 million, and is funded at $44 million in fiscal year 2008. The Department is requesting $69 million for this program in fiscal year 2009, and I solicit your continued support to ensure we can continue to attract and retain these professionals.

CONCLUSION

We must ensure continuity of service for critical missions such as Missile Warning, Strategic Communications, Launch, and Positioning, Navigation and Timing; while improving our SSA. Our strategy over the recent years is showing promising results, as we continue toward securing the world's best space capabilities today and ensuring the same for our Nation's future generations.

Our Nation prefers to deter or dissuade potential adversaries, and space systems are critical to this strategy. When deterrence and dissuasion are not adequate, we too often must employ our military—and our space systems are even more critical then. Fortunately, our systems are the envy of the world. Our infrared surveillance satellites are able to detect missile launches anywhere in the world. Our strategic communications systems allow the President precise and assured control over our nuclear forces in any stage of conflict, and our wideband SATCOM systems rapidly transmit critical information between the continental U.S. to our front line forces. Our weather satellites allow us to accurately predict future conditions half a world away as well as in space, while our GPS constellation enables position knowledge down to centimeters and timing down to nanoseconds. These sophisticated systems make each deployed soldier, sailor, marine, and airman safer, and more capable.

The space constellations that deliver these capabilities are a critical asymmetric advantage. We must ensure the recapitalization and health of these constellations. While these systems are expensive, not having these space capabilities could be even more expensive, both in terms of lives lost and our national defense.

I look forward to continuing to work with this committee and thank you for your continued support of NSS.

STATEMENT OF GEN. C. ROBERT KEHLER, USAF, COMMANDER, AIR FORCE SPACE COMMAND

[The prepared statement of General Kehler follows:]

PREPARED STATEMENT BY GEN. C. ROBERT KEHLER, USAF

INTRODUCTION

Mr. Chairman, Senator Sessions, and distinguished members of the subcommittee, it is an honor to appear before you today as an Airman and, for the first time, as the Commander of Air Force Space Command (AFSPC).

I am proud and humble to lead and represent over 39,000 Active Duty, Guard, and Reserve airmen; government civilians; and contractors who deliver space and missile capabilities to America and its warfighting commands 24 hours a day, 7 days a week, 365 days a year. We do this as an integral part of the United States Air Force (USAF)—an Air Force which operates in and through air, space, and cyberspace in order to deliver Global Vigilance, Global Reach, and Global Power for America. Assuring the Nation's access to space, protecting our freedom to operate in space, and providing joint warfighting capabilities from space are core Air Force missions.

The men and women of AFSPC serve around the globe. From AFSPC Headquarters, Fourteenth Air Force (14 AF), Twentieth Air Force (20 AF), Space and Missile Systems Center (SMC), Space Innovation and Development Center (SIDC), and a host of deployed and forward locations, our space professionals are organizing, training, equipping, and providing the space capabilities needed to fight and win the global war on terror. Today, I can report confidently that the space and missile ca-

pabilities acquired with your help and support and delivered by the airmen of AFSPC to the Commander, United States Strategic Command (STRATCOM) are helping to maintain America's freedom, security and prosperity.

Last month, I visited a number of units and commanders in the United States Central Command (CENTCOM) area of responsibility (AOR). At one stop I received a mission briefing from a B–1B Lancer bomber pilot. He reflected that while preparing for the briefing, he came to realize that space capabilities were embedded throughout the planning, execution and debriefing phases of his mission. His bomber crew planned their missions using intelligence, surveillance, and reconnaissance (ISR) terrain mapping and weather data from space systems; the aircraft carried Global Positioning System (GPS)-aided Joint Direct Attack Munitions (JDAMs); when they were flying, real-time updates from a variety of space-based and other sources flowed to them over satellite communications (SATCOM) data links; the tanker and bomber crews coordinated air-refueling operations using GPS; and strike assessment was conducted. This pilot also knew that a combination of space, air, and terrestrial assets would immediately come to his assistance if his crew came down in hostile territory. In effect, space assets would take the search out of search and rescue. In the AOR, I saw first-hand how space plays a crucial role in virtually every mission and every operation. Every commander I visited confirmed this assessment.

Space power gives America's joint forces a decisive advantage and has shaped the "American way of warfare." Today, America's joint forces are interconnected, have global cognizance, and can produce swift and precise effects providing overwhelming and decisive results with minimum collateral damage. Our friends and adversaries alike have noted this decisive advantage. As a result, having witnessed or learned the cost of challenging the United States head-on, would-be adversaries are actively pursuing asymmetric strategies to challenge our advantages in air, space and cyberspace. The evidence is clear and convincing.

During Operation Iraqi Freedom, we experienced GPS jamming and since then we have witnessed a worldwide proliferation of technology that can be used against our space systems. Our space capabilities face a wide range of threats including radio frequency jamming, laser blinding and anti-satellite systems. The emergence of these threats requires a broad range of capabilities, from diplomatic to military, to protect our interest in space.

Our National Space Policy acknowledges that space is vital to our national security. We are not alone in our use of space. Today, 28 foreign militaries operate in space.

We can no longer take freedom of action in any of our warfighting domains for granted. From this point forward, we should expect to be challenged not only in the air, but in and through space and cyberspace as well. We clearly recognize that no future conflict will be won without the ability to achieve air, space, and cyberspace superiority when and where required and we face significant challenges as we look to the future. Therefore, it is crucial that we develop and resource a strategy that protects our space advantages and ensures we remain a world leader in space.

It is my distinct pleasure to define the strategic way forward for AFSPC and to describe for you our plan to conceive, acquire, employ and execute Air Force space and missile capabilities in an increasingly complex, dynamic and challenging global environment. I will present our mission and vision, affirm the guiding principles that characterize our approach, highlight some of our recent successes and describe how the fiscal year 2009 budget request supports our strategic way ahead.

As always, AFSPC undertakes our important mission with three USAF priorities in mind—win today's fight, take care of our people and prepare for tomorrow's challenges. We look forward to working with your committee and Congress to achieve our goals.

Mission

Deliver space and missile capabilities to America and its warfighting commands

Our mission is clear. For over 50 years, the Air Force has led the Nation's military space efforts and AFSPC continues that heritage as we deliver space power to STRATCOM, Joint Force Commanders around the globe, the Services, the Intelligence Community (IC), civil agencies, commercial entities and Allies.

Vision

America's space leaders . . . delivering responsive, assured, decisive space power

The USAF provides air, space and cyberspace power as part of a joint warfighting team. As we look to the future, the military space power element must become more responsive to the warfighter, it must remain assured under stressing conditions, it must contribute decisively as an integral piece of the larger whole, and it must be

developed and wielded by space professionals who are recognized leaders in both the space domain and in joint warfighting operations.

Guiding Principles

The following principles shape our approach and underpin our mission and vision.

- The USAF space mission serves joint forces, our Nation, and the world at large. The Nation has entrusted the Air Force and AFSPC with advocating, acquiring, and operating capabilities that are vital to our national security, economic growth, public safety, and welfare. The men and women of AFSPC help defend our homeland and our global interests abroad with space and ground-based missile early warning systems; connect national leaders and the military with secure global satellite communications; assure access to space for military, intelligence, civil and commercial purposes with medium and heavy space lift and range capabilities; keep watch over the space domain by tracking thousands of space objects; provide planners and commanders with critical environmental information; and deliver persistent position, navigation and timing signals to worldwide users from GPS, which provides multiple military benefits as well as a free, international utility. Many of these space systems are also called upon for help in disaster relief and search and rescue operations, at home and abroad. Additionally, our Nation places trust and confidence in AFSPC to secure, maintain, operate and support America's land based strategic deterrent, the Intercontinental Ballistic Missile (ICBM) force.
- Nuclear forces underwrite our Nation's security. Nuclear deterrence remains the ultimate backstop of our security by dissuading our opponents and assuring our Allies through extended deterrence. Our Nation's security relies heavily on the responsive and stabilizing attributes of AFSPC's ICBM force.
- Space is one of three interdependent USAF warfighting domains. Air Force operations extend across the mutually-supporting and reciprocally-enabling domains of air, space and cyberspace. Thus, airmen who are experts in the space domain play a key role in integrating capabilities to create a decisive joint military advantage. Cross-domain integration is the key.
- Space and ICBM forces are global in their effect. AFSPC delivers capabilities that transcend national and military boundaries and are intrinsically and simultaneously tactical and strategic, local and global. As a result, the men and women of AFSPC have a global perspective that influences the command and control of our forces and the way we provide and present them to STRATCOM. At the same time, we recognize the unique space requirements of U.S. Geographic Combatant Commanders around the world, and know that we must provide Joint Force Commanders with the space capabilities they need to see, know, and decisively act.
- Like air power, space power shapes the U.S. approach to warfare. Our increasingly net-centric Joint expeditionary force operates with smaller forward footprints and a greater dependence on reachback organizations. Space capabilities are inextricably embedded in an ever-more effective arsenal of modern weaponry and are threaded throughout the fabric of the Joint warfighting network. Without space, military operations would be far less precise, focused, timely, coordinated or efficient and much more costly in every respect.
- Space is a challenging, demanding, and contested domain. Space acquirers, developers, and operators must be technically astute and tactically competent to ensure mission success in the space domain. While necessary, technical competence alone is not sufficient to meet 21st century challenges. Today, AFSPC people must be adequately prepared to operate space assets and assure space capabilities in an increasingly contested environment.
- Airmen are the core of America's space team. The airmen and civilian space professionals of AFSPC serve a national mission and our skills and expertise are national assets. Since the beginning of the space age, airmen have contributed significantly to the national space enterprise. While airmen are serving the military space mission today in AFSPC, many other airmen are working elsewhere in the government within national security and civil space organizations. Commercial space companies and the space industry also abound with space professionals who gained training and experience while serving our Air Force.

While these principles shape our views, our sights are set directly on supporting the Air Force commitment to provide forces across the range of military operations

to protect U.S. interests and values; to assure Allies; to dissuade and deter potential adversaries; and if deterrence fails, to defeat those who choose to become our enemies. In answering this call, with congressional support, the space professionals of AFSPC last year delivered space and missile capabilities with great success.

A YEAR OF SUCCESSES

AFSPC activities in 2007 supported the Expeditionary Air Force, delivered and demonstrated space and missile capabilities, improved relationships across the space enterprise, and cared for our airmen and their families. We are also optimistic that we have made progress toward solving our systemic acquisition problems with our back-to-basics approach. Here are several of our key accomplishments.

- We forward-deployed nearly 4,000 airmen—further developing a strong bond between AFSPC and the airmen, soldiers, sailors, and marines who rely on our capabilities.
- The end of 2007 marked 5 consecutive years without premature failure of any AFSPC on-orbit system—many of our satellites are lasting years beyond their original predicted life spans and are exceeding expectations every day.
- AFSPC added to our all-time record which now stands at 56 successful national security payload launches in a row—we continued a string of excellence with 19 out of 19 successful operational launches using the Atlas V and Delta IV Evolved Expendable Launch Vehicles (EELVs).
- In November, AFSPC conducted the first operational launch of a Delta IV Heavy EELV which carried the last Defense Support Program (DSP) satellite into orbit.
- Without interruption of services, AFSPC completed the transition of the GPS ground control segment to the new Architecture Evolution Plan (AEP) system—replacing a 20-year-old command and control (C2) architecture with one that enables responsive Position, Navigation and Timing (PNT) services.
- Last year, AFSPC launched Glory Trip-193 to certify the use of the Mk 21 Safety Enhanced Reentry Vehicle (SERV) on the Minuteman III (MM III) ICBM. Additionally, this test demonstrated the capability of our ICBM force.
- AFSPC and the National Reconnaissance Office (NRO) further solidified our operational relationship.
- In addition, AFSPC sustained and expanded use of the Total Force. Last year, at Minot Air Force Base, ND, we stood-up the first-ever Air National Guard unit to support intercontinental ballistic missile field security forces. At Schriever Air Force Base, the AFSPC Reserve Forces are growing with the transition of the 310th Space Group to wing status.
- We privatized nearly 2,500 military family housing residences at Peterson, Schriever, Los Angeles and Vandenberg Air Force Bases. Additionally, 351 AFSPC families moved into newly-privatized units at Buckley Air Force Base.
- Finally, AFSPC experienced one of the safest years in its 25-year history—we lost no airmen in off-duty accidents. Moreover, AFSPC has had zero major weapons mishaps in over 4 years, zero major flight mishaps in 8 years and zero major space mishaps in over 2 years.

As proud as we are of our success, AFSPC's strategic way forward is to focus on delivering the space and missile capabilities needed today and tomorrow by balancing recapitalization and modernization investments, implementing organizational and cultural changes and maturing our space professionals.

THE WAY AHEAD

To defend America and provide needed capabilities to the joint team, AFSPC solidified over the last year a deliberate approach to confront the challenges of a dynamic strategic environment. The fiscal year 2009 budget request carefully balances a number of critical priorities.

Maintain perfection as the standard for nuclear operations, maintenance, security, and support.

In AFSPC, we are absolutely committed to providing a credible, safe and secure strategic deterrent. At any given moment, about 1,200 of the nearly 10,000 airmen in 20 AF are on duty in the Nation's MM III ICBM missile fields in Montana, North Dakota, Wyoming, Nebraska, and Colorado. These young professionals understand the awesome responsibilities entrusted to them and will never take those respon-

sibilities or the Nation's trust and confidence for granted. This year we will continue to sustain the Minuteman ICBM system as we selectively improve security measures and implement any necessary recommendations resulting from various nuclear reviews.

- Standards. We have defined perfection for ourselves through tough standards—which have been tested and proven for five decades. We follow these standards to the letter and focus on structured, intensive training for our maintenance, security, and operations personnel.
- Minuteman Life Extension. The fiscal year 2009 budget request continues the congressionally-approved $6.7 billion life extension programs that will sustain the MM III to 2020 as we work to identify further investments that may be required to sustain the MM III force to 2030. In January 2008, we completed deployment of the Guidance Replacement Program (GRP) which replaced some of the 1960s generation electronics in the guidance system. Currently the Propulsion Replacement Program (PRP), which replaces aging motors and propellant as well as environmentally unsafe materials and components, is 82 percent complete. The remaining MM III modification programs (the SERV and the Propulsion System Rocket Engine Life Extension Program (PSRE LEP) upgrade) are still on target for completion by 2012 and 2013 respectively. The SERV program enables the use of the Mk 21 reentry vehicle on MM III missiles, providing STRATCOM planners with increased targeting flexibility and enhanced safety. The PSRE LEP is extending the design life of this subsystem by replacing components originally produced in the 1970s.
- Security Modernization. AFSPC is also continuing to field robust capabilities funded under the ICBM Security Modernization Program (ISMP). Last year, we completed the installation of concrete headwork barriers at all operational launch facilities (LFs) to ensure the safety and security of our nuclear arsenal. In 2008, we are continuing to improve real-time situational awareness for our security forces through the Remote Visual Assessment (RVA) program. AFSPC is also replacing LF access doors with ones that enable our personnel to more quickly secure the silo hatch in case of a security threat during maintenance operations. In addition, we are also increasing the physical protection of our LFs with better technology and more effective tactics. AFSPC is also taking additional steps within our budget this year to add security surveillance cameras at our Missile Alert Facilities (MAFs) and to add GPS tracking capability to Payload Transporter (PT) vans.
- Prompt Global Strike (PGS). Looking to the future, the fiscal year 2009 budget request responds to STRATCOM's PGS needs by developing and demonstrating critical concepts and technologies for a conventional strike alternative. To increase our deterrence and conventional strike capabilities, AFSPC is investing in research and development of technology for guidance, reentry vehicle and propulsion systems with the ICBM Demonstration/Validation (ICBM DEM/VAL) program and are aligning these initiatives with the results of the recently completed PGS Analysis of Alternatives and with the congressionally-directed DOD-wide investment account.

Ensure mission success while delivering planned capability improvements.

Joint Force Commanders and the forces they lead rely on the capabilities provided by AFSPC and our operational commitment to deliver those capabilities to them every day can not falter. In addition to this operational commitment, we must also meet our aggressive program commitments to field and sustain leading-edge space capabilities on time and on cost. AFSPC is on final approach to deliver several major new Military SATCOM (MILSATCOM); PNT; and ISR capabilities over the next 18 to 24 months.

- MILSATCOM. The demand for satellite communications and bandwidth continues to grow. Aged in many cases beyond their design, Milstar and Defense Satellite Communications System-III (DSCS-III) continue to provide critical communications services for much of the Nation's daily secure and unsecure military and diplomatic activities as we deploy the next generation of advanced MILSATCOM capabilities.
    - The Wideband Global SATCOM (WGS) program provides communications capabilities greater than the entire constellation of DSCS-III satellites and increases coverage, capacity and connectivity for deployed tactical forces. In 2007, AFSPC launched WGS–1 and the Air Force negotiated a partnership with Australia to use the constellation and fund the procurement of a sixth WGS satellite. The fiscal year 2009 budget request funds continued oper-

ation of WGS–1, on-orbit checkout and operation of WGS–2, and launch technical support and on-orbit checkout of WGS–3. WGS–4 and WGS–5 are currently in fabrication.

• Our Advanced Extremely High Frequency (AEHF) program affords strategic and tactical users with secure, survivable anti-jamming and anti-scintillation communications. Each AEHF satellite has about ten times the capacity of Milstar II. The fiscal year 2009 budget request supports the launch and on-orbit checkout of AEHF–1; completion of integration and testing of AEHF–2 for launch in 2009; continued assembly, integration and testing of AEHF–3; contracting of AEHF–4; and work on the Mission Control Segment.

• Position, Navigation, and Timing (PNT). AFSPC is delivering PNT capabilities which are providing critical military benefits as well as a free international utility. Our GPS is the centerpiece of global PNT services and the GPS constellation enables an ever-increasing arsenal of precise munitions from the mainstay JDAM to the Air Force's new Small Diameter Bomb and from the Army's Guided Multiple Launch Rocket System to its Excalibur 155mm artillery round. Airmen in C–130 and C–17 aircraft are resupplying ground combat units in nearly impossible-to-reach places in Afghanistan by using the remarkable Joint Precision Air Drop Systems which have steerable parachutes with GPS guidance.

• Last year, AFSPC launched two modernized GPS IIR–M satellites configured with new signals for increased anti-spoofing and anti-jamming capabilities for military users and more robust capabilities for civil users. With five of eight GPS IIR–M satellites on-orbit, AFSPC is launching the remaining three in 2008.

• The follow-on block is GPS IIF which will have an extended design life of 11 years, include additional civil signals for improved accuracy and safety-of-life services and increased power to reduce vulnerability to signal jamming. The ground segment includes a master control station and a worldwide network of dedicated antennas and monitoring stations. The fiscal year 2009 budget request supports launch and support of two GPS IIF satellites and delivery of the final architecture evolution plan.

• In concert with upgrades in the GPS space segment, we are also improving the GPS ground segment. AFSPC launched the last two GPS IIR–Ms using the new Launch, Anomaly Resolution and Disposal Operations system; replacing an obsolete command and control system with a more modern and sustainable one.

• Intelligence, Surveillance, and Reconnaissance. Our Nation has relied on Air Force space-based missile warning systems since the early 1970s.

• AFSPC's Defense Support Program (DSP) provides missile warning, missile defense, battlespace awareness and technical intelligence collection capabilities.

• The SBIRS program provides missile warning, missile defense, intelligence and battlespace awareness capabilities and will replace DSP. The SBIRS constellation will consist of four Geosynchronous Earth Orbit (GEO) satellites and two Highly Elliptical Orbit (HEO) payloads.

• The first on-orbit SBIRS–HEO payload continues to exceed expectations in its checkout phase resulting in approval for early use in December 2007 and is on track to reach full operational acceptance in mid-2008. Additionally, HEO–2 has been built. On SBIRS GEO–1, AFSPC is correcting a safety issue in the flight software and is planning a launch in 2009. The fiscal year 2009 budget request for SBIRS funds development, integration and test of GEO–1 and GEO–2 satellites and ground system; funds initial HEO operations; fully funds HEO–3 and GEO–3 procurement; funds HEO–4 advanced procurement; and funds HEO ground system modifications and upgrades. The HEO–3 and HEO–4 payloads are designated as constellation replenishment assets.

• Launch, Ranges and Networks. Delivery of space capabilities begins with a successful launch. Our two space launch ranges at Patrick and Vandenberg Air Force Bases continue to be the lynchpin for America's assured access to space.

• At our Eastern and Western Ranges, AFSPC supported 23 successful military, civil and commercial launches in 2007. The fiscal year 2009 budget request supports sustainment and modernization of our launch ranges.

• This year, AFSPC is deploying a new Air Force Satellite Control Network (AFSCN) antenna at Vandenberg Air Force Base which will facilitate over

30 satellite contacts per day. The AFSCN continues to be the Nation's backbone for satellite operations. AFSPC is upgrading antennas with the Remote Tracking Station Block Change to ensure command and control of on-orbit capabilities is efficient and more accurate. The fiscal year 2009 budget request funds the operation and gradual modernization of the AFSCN.

Increase space protection capabilities.

The USAF and AFSPC play a key role in defending the Nation's military, intelligence, civil and commercial space capabilities. The Air Force is uniquely charged with mission responsibilities to provide forces to defend United States space capabilities. Our strategy and investment approach balances the need for space situational awareness, protection of space capabilities and protection of terrestrial forces from threats posed by adversary use of space against our interests.

- We must increase space situational awareness (SSA) while we address operational and physical vulnerabilities in our space, ground and link segments. The challenge is to find an affordable pathway to protect space capabilities that strikes the right balance among awareness, hardening, countermeasures, reconstitution and alternate means.
- The Integrated SSA (ISSA) program provides STRATCOM, Joint Functional Component Command for Space (JFCC–SPACE) and the joint community with an integrated source of current and predictive space events, threats and space activities. By employing a near real time, net centric construct, AFSPC is achieving higher accuracy space surveillance through fusion of other SSA elements. Funding from the fiscal year 2009 budget request increases our ability to characterize the space domain by focusing on space event processing and analysis to include high accuracy conjunction assessments and rapid maneuver processing.
- AFSPC is also planning to field ground and space based sensors to improve space surveillance capabilities. The Space Fence program provides the capability to find, fix and track small objects in Low and Medium Earth Orbits (LEO and MEO) using three ground sites. The fiscal year 2009 budget request for this program supports development awards to at least two contractors. Additionally, the Space-Based Space Surveillance (SBSS) program offers the ability to detect and track space objects; primarily those in GEO. With the fiscal year 2009 budget request, AFSPC is completing development of SBSS Block 10, launching the satellite in fiscal year 2009 and working towards development of SBSS Block 20.
- The Rapid Attack Identification Detection and Reporting System (RAIDRS) Block 10 program detects and geolocates satellite communications interference via fixed and transportable ground systems. In 2007, AFSPC activated the 16th Space Control Squadron at Peterson Air Force Base to operate RAIDRS and we deployed one system to the CENTCOM Theater to protect over 400 SATCOM links. The fiscal year 2009 budget request continues funding for the RAIDRS Block 20 update which is introducing an automated means to characterize anti-satellite (ASAT) and directed energy attacks on space systems and services.
- Building a comprehensive SSA picture includes a fully collaborative, net-centric space command and control architecture that links JFCC–SPACE to the joint fight. AFSPC improved our Nation's global space C2 infrastructure in 2007 when the 614th Air and Space Operations Center, the core of STRATCOM's Joint Space Operations Center (JSpOC) transitioned to an expanded facility at Vandenberg Air Force Base, CA. This effort modernized the JSpOC, streamlined operations, and more than doubled its physical size allowing for expanded missions and creating a platform for the future. With the fiscal year 2009 budget request, AFSPC is furthering development of a comprehensive SSA picture via the Space C2 program.
- AFSPC is committed to improving protection of ground, link and space segments. While some of our space capabilities are well protected, AFSPC is taking into account that we will likely face a wider range of threats in the space domain and on the ground through links that control these systems. As we move forward to modernize and recapitalize, the nature of these threats means we are going to engineer space protection into our new systems.
- To help us make informed decisions about how best to preserve space capabilities, AFSPC is establishing the Space Protection Program. This program will focus our efforts and provide decision makers with strategic recommendations on how to best protect our space systems and stay ahead of

the threat. We are already strengthening and unifying relationships across the defense and Intelligence Community.

Attract, develop, and retain space professionals.

While AFSPC is developing and wielding remarkable capabilities, the source of our tremendous accomplishments is our space professionals. Our challenge is to continue attracting, developing and retaining airmen with the skills necessary to maintain our competitive advantage. AFSPC is working with our partners in Air Education and Training Command (AETC), academia and elsewhere, to educate, train and cultivate experts in the space domain who are both technically and tactically competent, and who are skilled in integrating with other warfighting domains.

- Since 1996, the United States Air Force Weapons School (USAFWS) has graduated 180 space instructors from a pool of AFSPC's best and brightest. Last year, AFSPC and the USAFWS continued their partnership in developing and delivering world-class graduates to expertly employ space and missile capabilities and to instruct the next generation of space operators.
- The tactical mindset is also evolving on the nuclear side. AFSPC is operating a world-class center focused on training nuclear security professionals. To ensure we are providing the most secure nuclear deterrent, 20 AF operates the Nuclear Space Security Tactics Training Center at Camp Guernsey, WY. In 2007, this facility trained over 1,700 security forces on nuclear security and expeditionary tactics.
- AFSPC's National Security Space Institute (NSSI) is establishing itself as America's premier campus for superior space professional training and education. Last year, the NSSI taught 71 courses to 1,700 students—a 17 percent increase from 2006. Over 350 of those students were from other Services and for the first time, NSSI instructors taught our Allied partners. In 2008, AFSPC is partnering more closely with Air University (AU) as we look to transition more classes to AU in 2009.
- In 2007, AFSPC competitively selected twenty officer and enlisted space professionals for a fully-funded University of Colorado at Colorado Springs (UCCS) Space Certificate pilot program consisting of five courses focused on space and space systems, engineering management, information and communications systems and space policy. This year, AFSPC is selecting our second class and is using this pilot program as a catalyst for a master's degree.

Sustain AFSPC's enduring missions and mature emerging missions.

To better meet 21st century challenges, AFSPC will recapitalize its force to sustain enduring space force enhancement capabilities while designing a future force to ensure flexible, responsive capabilities in a contested domain. Fully recognizing we do not currently have a capability to perform maintenance or repairs on orbital assets, we are committed to protect and reinvigorate satellite constellations to provide the level of utility expected by users all over the globe. Additionally, AFSPC will work with appropriate government agencies to explore opportunities for enhanced commercial, Allied and international partnerships.

- Transformational Satellite (TSAT) Communications System. Since last year, the Joint Requirements Oversight Council (JROC) validated requirements for increased worldwide protected communications capabilities to extend the ground-based Global Information Grid (GIG) to deployed and mobile forces and to support Comm-on-The-Move, the Army's Future Force Initiatives, the Navy's ForceNet, and the Marine's X-Net warfighting visions. AFSPC is pursuing transformational communications capabilities and is studying a future MILSATCOM architecture investment strategy in response to congressional direction to procure a fourth Advanced Extremely High Frequency (AEHF) satellite. The fiscal year 2009 budget request continues technology maturation and design of TSAT.
- Global Positioning System III (GPS III). With GPS III, AFSPC is planning to further enhance military and civilian PNT capabilities by providing higher power, increased anti-jamming capability, and compatibility with European Galileo signals. By implementing a block approach, AFSPC will use the fiscal year 2009 budget request for GPS III Block A development and preliminary design review, capability insertion for Blocks B and C and risk reduction and concept development of the control segment.
- Third-Generation Infra-Red Surveillance (3GIRS). In addition, AFSPC is planning to continue the critical space-based infrared warning systems into its third generation. With the fiscal year 2009 budget request, we will con-

tinue wide field of view sensor testing and technology maturation activities along with development of an integrated test bed.

• Upgraded Early Warning Radar (UEWR). AFSPC is also embracing emerging missions such as missile defense. Last year, our UEWR program achieved several milestones when STRATCOM operationally accepted two UEWRs. As a key player in a recent Missile Defense Agency (MDA) flight test, the Beale UEWR and its crew acquired and tracked a flight-test target reentry vehicle launched from Alaska; enabling the successful destruction by an interceptor launched from Vandenberg Air Force Base. The fiscal year 2009 budget request supports sustainment and operation of the Beale and Fylingdales UEWRs.

• Operationally Responsive Space (ORS). Last May, AFSPC successfully teamed with our sister services and interagency partners to stand up the ORS Office. AFSPC is working closely with the ORS Office to develop innovative acquisition approaches and capabilities to prepare the United States to respond to a contested space domain, to better respond to urgent warfighter needs and to deploy small satellites and associated launch and control systems. AFSPC is continuing to work with the ORS Office to develop ORS as a national strategic capability and to export concepts to the broader Air Force space enterprise. The fiscal year 2009 budget request supports the launch of TACSAT–4 and continues the development of the first ORS spacecraft and enabling capabilities.

Improve the strategic acquisition, delivery, and sustainment of space capabilities.

In today's world of rapid technological advancement and proliferation, we cannot afford to do business as usual when it comes to delivering space capabilities. We require a new strategy for how we develop, deliver and sustain space systems that is more than an incremental progression of acquisition processes and management methods. Such a strategy requires a paradigm shift with an end-state that deploys needed space capabilities more quickly than in the past while still executing efficient, business-like acquisition practices.

• To effect organizational and cultural changes, AFSPC is reviewing and adjusting our organization construct and processes. At the beginning of 2008, we reorganized Headquarters AFSPC activities, functions and relationships to enhance our ability to act as a single, integrated organization.

• Our next step is fostering external relationships. AFSPC is clearly articulating our needs for science and technology, research and development, acquisition, sustainment and training to Air Force Materiel Command (AFMC) and AETC. We are also intensifying collaboration with Air Combat Command (ACC), including the USAF Warfare Center (USAFWC). Furthermore, AFSPC is supporting other major commands with space expertise and analysis.

• We are also working on proper alignment of development, acquisition and sustainment activities. We continue to build a more powerful and effective partnership with AFMC and SMC through better definition of roles, responsibilities and authorities.

• Finally, we have chartered a special study group to examine alternative acquisition strategies and recommend ways to shorten the time it takes to put space capabilities in the hands of the warfighter.

Improve integration across the air, space, and cyberspace domains.

Integration across air, space, and cyberspace is more than combining and disseminating data among interrelated architectures. If air, space and cyberspace power each have a value of one, the sum of these capabilities is far greater than three. AFSPC is working with the other Air Force major commands and domain experts to develop shared strategic plans, operational concepts and architectures, doctrine, as well as tactics, techniques and procedures for the next conflict—one where emerging technologies in air, space and cyberspace domains can be leveraged and mutually supported within a joint construct.

• AFSPC is teaming extensively with the USAFWC and STRATCOM to increase space scenarios across the full spectrum of exercises. In March 2007, AFSPC conducted the most comprehensive space wargame to date with 470 participants, including 74 flag officers or equivalents and 38 Allied partners. This wargame focused on the future and explored global space system architectures, technologies and C2 relationships; tackled concepts for integrating space with other warfighting domains; and examined potential policy trends and their implications. We look forward to the next game in 2009.

CONCLUSION

The Total Force AFSPC team plays an important role in delivering space and missile capabilities to America and its warfighting commands. These capabilities provide a decisive advantage for our national security and prosperity. With the continued support of Congress, AFSPC is postured to continue to maintain a crucial leadership role as we realize our vision of delivering responsive, assured and decisive space power.

STATEMENT OF LT. GEN. WILLIAM L. SHELTON, USAF, COMMANDER, JOINT FUNCTIONAL COMPONENT COMMAND FOR SPACE, UNITED STATES STRATEGIC COMMAND

[The prepared statement of General Shelton follows:]

PREPARED STATEMENT BY LT. GEN. WILLIAM L. SHELTON, USAF

Mr. Chairman, Senator Sessions, and distinguished members of the subcommittee, I am honored to be here today for my second opportunity to appear before you as United States Strategic Command's (STRATCOM) Commander of the Joint Functional Component Command for Space (CDR JFCC SPACE).

It's a distinct privilege to address you on our space posture, and to represent the men and women of JFCC SPACE who employ space capabilities around the globe every day. These soldiers, sailors, airmen, and marines are a dedicated and innovative joint force, working hard to conduct efficient and effective space operations. Their professionalism ensures our joint forces can exploit space-based capabilities to the maximum extent.

I know this subcommittee is fully aware of the growing importance of space capabilities to our national security, as well as to our national economic element of power. So rather than belabor those points, today I will focus on our efforts to improve employment of our vital space capabilities, and identify some of the challenges we face as we work to meet national and combatant commander objectives.

EMPLOYMENT OF SPACE CAPABILITIES

CDR JFCC SPACE is designated by Commander, STRATCOM, as the single point of contact for military space operations. As such, I am tasked to provide tailored, responsive, local and global space effects to the various combatant commanders. My STRATCOM-delegated authorities include Global Space Coordinating Authority, which makes me the primary interface with supported joint commanders for operational-level planning and execution to provide space effects in support of those Combatant Commanders' objectives. CDR JFCC SPACE also is assigned Operational Control and Tactical Control authorities for designated worldwide space forces. These authorities provide STRATCOM a single, globally focused component commander to enhance functional integration of space capabilities for the joint warfighter and for the Nation.

Over the last year, JFCC SPACE made huge strides in operational space employment by consolidating previously separated elements of the Joint Space Operations Center (JSpOC). The centerpiece was the move of the 1st Space Control Squadron (1 SPCS) and Unified Space Vault from Cheyenne Mountain to Vandenberg AFB. 1 SPCS, in particular, plays a key role in Space Situational Awareness (SSA) by planning, tasking, and directing the Space Surveillance Network as part of the JSpOC. This transition, coupled with the JSpOC's relocation to a new facility, created opportunities to integrate the total package of space command and control functions and lays the foundation for future modernization. The payoff from these moves was clearly demonstrated during the recent NRO satellite intercept as planning and direction of ground radars and space assets resulted in seamless integration to provide target vectors for the shooter, and enabled quick characterization and reporting of the success of the event. We continue to vigilantly track the debris generated by the intercept, which will allow us to predict its reentry and ensure safe launch and on-orbit operations.

CHALLENGES

Our number one operational need is for improved SSA capabilities. SSA is the understanding of the space medium to include tracking all manmade objects in space, discerning the intent of others who operate in space, knowing the status of our own forces in real-time, and understanding the natural environment and its effect upon space operations—simply stated, SSA is foundational for all space operations. By

fusing intelligence on potential adversaries, space surveillance information on all space systems in orbit, status of friendly systems, and space weather, we will be able to not only know what objects are in space and where, but we will also understand the purpose of these objects, their capabilities, and their owners' intent. This comprehensive knowledge enables decisionmakers to rapidly and effectively select courses of action to ensure our sustained freedom of action in space.

The January 2007 Chinese test of an anti-satellite (ASAT) capability continues to shape our future planning by tangibly demonstrating the potential vulnerability of our space assets. This irresponsible space operation by the Chinese left over 2,300 pieces of orbital debris that we're still tracking, and tens of thousands of likely smaller pieces our sensors can't track. Only 25 items have reentered so far, with the remainder expected to be in orbit for decades. This debris will slowly decay due to natural forces and will remain a hazard to manned and unmanned spaceflight in low earth orbit, or transiting low earth orbit on the way to higher orbits. In contrast, over 99 percent of the debris from the recent intercept of the NRO satellite will reenter the atmosphere within approximately 3 months.

We've derived many lessons from the Chinese ASAT event, chief among them being the tremendous wealth of SSA data available, albeit in many disparate systems and security channels. It took the heroic efforts of many to manually assemble this information ad hoc, then pass it to senior decisionmakers. While we were very successful in this case due to the outstanding cooperation between the intelligence and operations communities, we clearly need improved processing and analytic systems that continually compile and automatically fuse SSA information in real-time to keep us abreast of space events. Our lessons learned from the Chinese test will continue to guide our future improvements and developmental efforts for the JSpOC.

Every significant military operation uses space capabilities in some way—these ubiquitous capabilities are truly integral to military operations in the 21st century. Also, there is a tremendous national economic impact from commercial space systems that provide many crucial services to the American public—services the public relies on and has come to expect. However, it is clear our operating environment is changing.

Access to space and space products becomes cheaper and more widely available every year. The commercialization of space has allowed many developing nations and non-state actors to acquire space-based capabilities such as imagery and satellite communications that were previously the exclusive purview of superpowers. With more space players, space is more crowded than ever—we currently track over 18,000 manmade objects, to include everything from active satellites to debris. The potential for a catastrophic collision in space increases as the number of objects increase. Finally, the kinetic ASAT threat is not the only threat to our space assets. The capacity to jam satellite communications links is within the capability of many nations, as well as non-state actors. Space-related ground sites can be damaged by direct attack. Several nations are working on high-energy lasers that could damage or destroy our satellites. The potential proliferation of nuclear weapons is also a threat to space systems. Such a device could cripple our space assets with the persistent effects of an exo-atmospheric electromagnetic pulse. With the exception of the high-energy laser, all of these threats to our satellites exist today. Clearly, we can no longer view space as a sanctuary.

Our Nation's growing dependence on space-based capabilities, coupled with the increasing risks we face, creates corresponding potential economic and military vulnerabilities. Therefore, we must protect our space assets against intentional and unintentional acts in order to preserve our essential space capabilities. Solid protection also requires us to have the ability for rapid recognition and attribution of space events—the prerequisite that enables full consideration of response options. Thus, the basis for an adequate protection capability is robust SSA. In the future a decisionmaker's ability to quickly answer the ″who, what, when, where, how, and why″ questions will not only help determine the proper course of action, but is the necessary foundation for deterring potential adversaries from hostile acts against our space assets.

Other needed improvements to our SSA capabilities include networked sensors and information systems that seamlessly share information to more effectively use our current resources, and allow future sensors to "plug and play." Our array of radar and optical space surveillance sensors around the world provide acceptable coverage in the northern hemisphere, but we have an exploitable lack of coverage in the southern hemisphere. This gap greatly increases the time required to characterize new payloads and maintain awareness, or "custody," of maneuvering spacecraft. Finally, we need the ability to track and assess smaller objects if we are to keep pace with the potential threats that stem from the emergence of small satellite

technologies, and to gain better awareness of the hazards posed by small space debris. For the reasons cited above, SSA improvements are a top priority within Air Force Space Command.

The increasingly threatened, highly dynamic environment of space requires us to build more automated, net-centric capabilities to command and control space forces. Along with essential SSA, we will need the ability to act rapidly. Events in the space domain unfold quickly, often at the speed of light. Our playbook must be ready to go, with modeling and simulation tools, decision aids, and operator alerts forming the automated solutions. Rather than the labor-intensive command and control processes we currently use, machine-to-machine interfaces must enable decisionmakers to quickly and accurately assess the situation, and promptly direct actions.

CONCLUSION

The nature of space operations is rapidly evolving. The United States' absolute dependence on space across our military, civil, and commercial sectors, coupled with the increased and diverse threats to our space assets, requires improved SSA and command and control capabilities to ensure our ability to effectively operate in an increasingly dynamic environment. This is an exciting time in the evolution of Joint Space Operations and I am truly honored to be leading such a talented group of men and women as they expertly tackle the challenges we face every day. I thank the subcommittee for your continued strong support as we work to preserve our vital space capabilities for the Nation.

STATEMENT OF RADM KENNETH W. DEUTSCH, USN, DIRECTOR, WARFARE INTEGRATION, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

[The prepared statement of Admiral Deutsch follows:]

PREPARED STATEMENT BY RADM KENNETH W. DEUTSCH, USN

Mr. Chairman, distinguished members of the subcommittee, as the Director of Warfare Integration on the Office of the Chief of Naval Operations (OPNAV) staff, I am honored to appear before you today to address Navy space activities. I am the Navy's resource and requirements sponsor for Space. This sponsorship includes the Mobile User Objective System (MUOS), the new Joint Narrowband Military Satellite Communication System. I am also the Navy's Subject Matter Expert for Space, responsible for reviewing and approving navy space systems being reviewed by the Joint Requirements Oversight Committee (JROC) as part of the Joint Capabilities Integration Development System (JCIDS). The committee has asked several specific questions which I would like to address, one of which is a request for Navy's thoughts on the organization and management of space, including Navy's role therein.

SPACE ORGANIZATION AND MANAGEMENT, AND NAVY'S ROLE IN SPACE

Space systems are a critical enabler for maritime operations. The Navy has a long and proud history in space, having developed a number of technological breakthroughs. The list of Navy advances in space is expansive and includes: the first space communications used for operations; the first controllable space launch vehicle; the first satellite tracking system; the first successful electronic intelligence reconnaissance satellite; the first space object tracking system; the first demonstration of on-orbit atomic clocks; the first military broadcast satellite; and the first astronauts to orbit the earth, orbit the moon and crew the Space Shuttle. The 20 February interception of a nonfunctioning National Reconnaissance Office (NRO) satellite illustrates Navy's continued critical role in Space and Space Control. The Navy AEGIS warship, U.S.S. *Lake Erie* (CG–70), fired a single modified tactical Standard Missile-3, hitting the satellite approximately 133 nautical miles over the Pacific Ocean as it traveled in space at more than 17,000 miles per hour.

Today, the Air Force, as the Department of Defense (DOD) Executive Agent (EA) for Space has DOD-wide responsibilities for planning and acquisition of most DOD major Defense space acquisitions. In addition, the NRO is responsible to both the Secretary of Defense and the Director of National Intelligence for national space reconnaissance activities. While the Navy continues to serve as the Program Manager for DOD narrowband ultra-high frequency (UHF) satellite communications systems, which includes the new MUOS and the UHF Follow-on system, and conducts smaller space-based experiments, most large-scale national security satellite programs

will be developed through the Space EA and NRO. With limited funding and more narrowly defined scope, Navy has focused energy on leveraging existing space capabilities and aggressive engagement within the requirements and acquisition processes to ensure maritime operational needs are met.

Satellites provide global access and enable the Navy to establish global presence. The process for designing, building, launching and operating modern satellite systems has increasingly become both a lengthy and an expensive proposition lasting decades, meaning a new satellite program that is currently in the concept phase could remain in service well into the 2020–2030 timeframe. Unlike other major DOD programs, however, satellites cannot be modified or repaired once they are placed into orbit. Due to the long lead times involved, it is therefore critical that naval requirements and maritime missions be factored into the pre-launch design and planned in-orbit operation of all future satellite systems being considered for acquisition through the DOD EA for Space, the NRO and the National Oceanographic and Atmospheric Administration (NOAA). Without active Navy involvement today in ongoing deliberations over future satellite programs, the Navy risks operating in future scenarios with multi-billion dollar National Security Space systems sub-optimized for the maritime environment, which is increasingly important as Maritime Domain Awareness requirements are developed.

The Navy remains heavily reliant on space systems to conduct its wartime and humanitarian missions. A wide array of national, joint and commercial satellites currently provide Navy commanders with essential communication capabilities, position, navigation and timing support, missile warning, meteorological data, and over-the-horizon surveillance and reconnaissance capabilities on a worldwide basis. Future U.S. satellite programs are now being developed that could provide additional benefit and capabilities to Navy warfighters. Many of these programs, however, face technological and budgetary hurdles which could force future capability trade-offs affecting the maritime environment and could ultimately impact their utility to the Navy. For these reasons, the Navy will actively engage with key national and joint space-related entities at the appropriate levels to ensure current and future Navy needs in space are identified, understood, resourced and protected. This requires close cooperation between the Navy and various space-related entities within the DOD, the National Intelligence Community (IC), the NOAA, as well as those commercial partners who develop and manage satellite systems.

The various U.S. satellites and space support systems that constitute National Security Space generally fall under six distinct mission areas, all of which directly or indirectly support Navy operations. Furthermore, virtually each of these mission areas involves one or more future satellite systems currently in the design or development phase. The six mission areas are Intelligence/Surveillance/Reconnaissance, Communications, Position/Navigation/Timing, Space Control, Ballistic Missile Warning/Defense and Metrological and Oceanographic. One of the primary goals contained within the Department of Navy Space Policy is to shape the outcome of joint deliberations on future space capabilities these mission areas to maximize combat effectiveness and to ensure supremacy of the naval force. Within the Navy, various space-related functions and responsibilities are distributed among different commands, but jointly constitute a functional "Navy Space Team" which works collaboratively to advance Navy's many goals in space. The Navy Space Team is composed of several Navy organizations that span the full spectrum of Navy warfighting and have key roles to play in advancing the Navy's role in space:

a. The Deputy Chief of Naval Operations (CNO) for Communication Networks (CNO N6) is responsible for leading the overall Navy Space Team, developing Navy space requirements, making resource recommendations, funding designated space acquisition programs, and coordinating with the National Security Space Office;

b. The Deputy CNO for Manpower, Personnel, Training and Education (CNO N1) is responsible for managing and developing a core group of Active Duty and Reserve enlisted, officer, and civilian personnel with specialized space expertise known as "Navy Space Cadre;"

c. The Director of Naval Intelligence (CNO N2) is responsible for incorporating space capabilities into the larger Navy-wide ISR strategy, advocating Navy's space-related requirements within IC and joint ISR programs, and representing the OPNAV staff within key IC and joint space-related forums;

d. The Deputy CNO for Integration of Capabilities and Resources (CNO N8) is responsible for making resource decisions on relevant Navy space assets, and incorporating space capabilities into Navy campaign/mission modeling and simulation efforts;

e. The Oceanographer of the Navy (CNO N84) is responsible for coordinating space-related portions of the Navy's Oceanography and Navigation programs with appropriate commands, agencies and commands outside the Navy;

f. The Office of Naval Research is designated as the Navy Space Scientific and Technical Executive; and

g. The Program Executive Office Space Systems (PEO Space) is responsible for acquiring space systems for the Navy, and for working with PEO Command, Control, Communications, Computers, and Intelligence (C^4I) and Space for acquiring Navy space-related terminals.

A number of other space-related Navy organizations and offices play key roles in supporting the primary Navy Space Team. These key organizations include:

a. Navy-NRO Coordination Group: Responsible for coordinating Navy space-related issues between the OPNAV Staff and key Navy personnel working within the NRO, and linking ongoing Navy-related activities at the NRO with the Deputy Assistant Secretary of the Navy for C^4I/Space;

b. Navy Tactical Exploitation of National Capabilities Office: Responsible for conducting rapid prototyping involving national reconnaissance satellites and related systems in support of Navy operations; and

c. Naval Research Laboratory's Naval Center for Space Technology: Exploits and develops space-related technologies in support of DOD, Navy, and other agencies.

Additionally, the Navy maintains a key flag-level joint billet at the NRO. This senior officer oversees a team of Navy Space Cadre members, who collectively provide invaluable support to the Navy Space Team on a number of space-related issues.

MOBILE USER OBJECTIVE SYSTEM

The committee has requested a clearer understanding of the MUOS. The Navy's major space segment responsibility to the joint community is the narrowband satellite communications constellation. Today it consists of UHF Follow-on (UFO) and two residual Fleet Satellites (FLTSATs) and one Leased Satellite (LEASAT) which will begin to be replaced by MUOS in 2010. MUOS will provide communications-on-the-move at high data rates (up to 64 kbs per access) to disadvantaged users such as handheld terminals, aircraft, missiles, UAVs, and remote sensors. Additionally, MUOS will provide these capabilities in such challenging environments as double canopy foliage, urban environment, and high sea state. MUOS will bring a 4-fold increase in the number of accesses (1997 vice 500) and a 20-fold increase in throughput (39.2 Mbps, total system capacity vice 2 Mbps) in comparison to the legacy UFO constellation. MUOS is the common denominator for command and control providing the capability to communicate from tactical to theater levels and between defense and non-defense agencies. MUOS will allow a more comprehensive and coordinated approach to regional engagement, providing the capability to synchronize efforts with other Services, agencies, and allied nations.

MUOS is critical to satisfying the demand for tactical satellite communications. During Operations Enduring freedom and Iraqi Freedom, UFO, FLTSAT, and LEASAT 5 were only able to support 80 percent of the narrowband tactical UHF satellite communication requirements. Additionally, in the 2010 timeframe, LEASAT 5 will reach its end of service life, and the UFO constellation is expected to reach an unacceptable level of availability in May 2009. We have a mitigation plan to minimize the operational impact of a potential gap in capability (seven operational satellites vice the required eight) before MUOS is operational and MUOS-capable terminals are available. It includes the use of commercial bandwidth and the dynamic management of existing bandwidth as mentioned previously. A "Sources Sought for Additional UHF Capabilities" was released on 09 August 2007 with the objective of supplementing the current UHF SATCOM resources with additional commercial services. Of the six options presented by four vendors in response to this RFI, Navy chose Intelsat's Skynet leased services and is initiating a competition for a hosted payload option. Navy has identified funding in PB09 to fund both of these mitigation plans. Intelsat's Skynet services will supplement UHF resources in fiscal years 2009–2010 while the hosted payload option will tentatively be available beginning in 2010. Today, UFO supports approximately 500 simultaneous accesses worldwide. Based on evolving future war fighting concepts in support of the Guidance for Development of Forces, UHF SATCOM access requirements are expected to grow by at least a factor of four and MUOS, as designed, will be able to support that requirement.

The MUOS program is currently preparing for the October 2009 Follow-On Buy Decision. MUOS' advanced capabilities can only be realized with the fielding of MUOS-capable Joint Tactical Radio System terminals or by upgrading existing UHF legacy software programmable terminals to MUOS capability.

Lastly, the committee asked for Navy's thoughts on Space Protection Strategies. The Navy continues to work with U.S. Strategic Command, the Joint Staff and other Services to ensure appropriate means of Space Control Protection are addressed systematically as space systems are being developed. Navy supports Space Control Protection becoming a mandatory JCIDS Key Performance Parameter. This will ensure the warfighter and the JROC understand and approve the trade offs between advance performance and enduring protection. Navy also advocates the National Security Space Office standing up a Space Control Functional Integration Office (FIO) using the current Communications FIO as the model.

SUMMARY

Navy's mission of keeping the air and sea lanes open and ensuring the security of our citizens at home and abroad requires a global reach and persistent presence. We must be constantly ready, whether it is to deliver on a mission of mercy or more lethal measures to respond to a specific threat. Our ability to respond, as well as work with our coalition and other maritime partners, will depend on space capabilities for the necessary flexibility and speed to support our worldwide responsibilities. Navy's ability to leverage DOD and IC space capabilities, and to have an impact on future space developments is critical in ensuring its ability to successfully conduct maritime operations and in fulfilling Navy missions.

We look forward to delivering MUOS for the joint warfighter. Finally, we intend to be an important contributor toward the development and implementation of space protection strategies.

Thank you for the opportunity to share our efforts with you today.

STATEMENT OF CRISTINA T. CHAPLAIN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

[The prepared statement of Ms. Chaplain follows:]

PREPARED STATEMENT BY CRISTINA T. CHAPLAIN

Mr. Chairman and members of the subcommittee:

I am pleased to be here today to discuss the Department of Defense's (DOD) space acquisitions. Each year, DOD spends billions of dollars to acquire space-based capabilities to support current military and other government operations as well as to enable DOD to transform the way it collects and disseminates information, gathers data on adversaries, and attacks targets. In fiscal year 2009 alone, DOD expects to spend over $10 billion to strengthen space-based capabilities and $7.6 billion of this amount is targeted for selected major space acquisition efforts. At the same time, however, DOD's space system acquisitions have experienced problems over the past several decades that have driven up costs by hundreds of millions, even billions, of dollars; stretched schedules by years; and increased performance risks. In some cases, capabilities have not been delivered to the warfighter after decades of development. Today, we are here to comment on what problems affecting space acquisitions still persist, what actions DOD has been taking to address these problems and what remains to be done. In general, we found this year that space programs that have been troubled in recent years still face problems that are driving up costs and schedule. At the same time, senior leadership has remained committed to reducing technology risks and ensuring newer programs are more affordable. Investment prioritizing, realistic cost estimating, policy changes, and other actions we identify can help this commitment take further hold.

SPACE ACQUISITION PROBLEMS PERSIST

The majority of major acquisition programs in DOD's space portfolio have experienced problems during the past 2 decades that have driven up cost and schedules and increased technical risks. Several programs have been restructured by DOD in the face of delays and cost growth. At times, cost growth has come close to or exceeded 100 percent, causing DOD to nearly double its investment in the face of technical and other problems without realizing a better return on investment. Along with the increases, many programs are experiencing significant schedule delays—as much as 7 years—postponing delivery of promised capabilities to the warfighter.

Outcomes have been so disappointing in some cases that DOD has had to go back to the drawing board to consider new ways to achieve the same, or less, capability. As figures 1 and 2 below indicate, five programs that were begun in the late 1990s/early 2000s to replenish aging constellations of satellites have incurred substantial cost growth and schedule delays, including the:

(1) the Advanced Extremely High Frequency (AEHF) communications satellite program,

(2) the National Polar-orbiting Operational Environmental Satellite System (NPOESS), which DOD is jointly developing with the National Oceanic and Atmospheric Administration,

(3) the Space Based Infrared System (SBIRS), which detects missile launches,

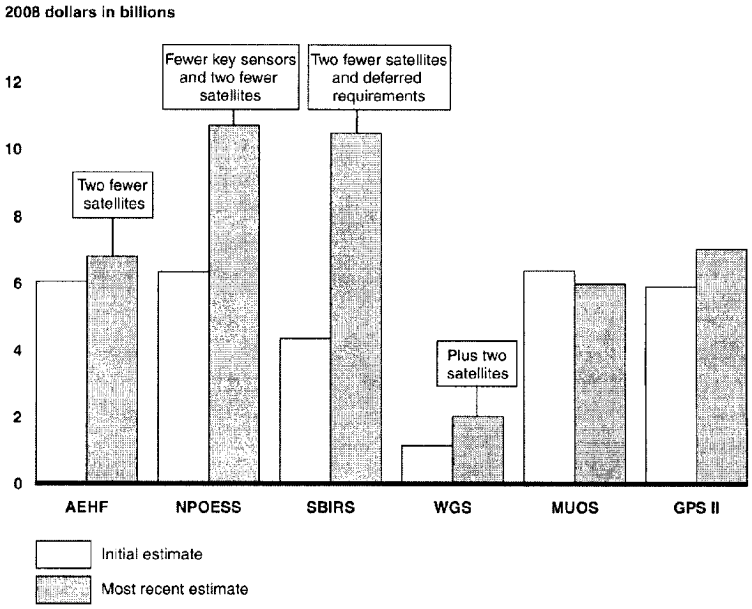
(4) the Wideband Global Satellite Communications (SATCOM) (WGS), another communications satellite, and

(5) the Global Positioning System (GPS) IIF program. Last year we reported that AEHF and WGS had worked through the bulk of their technical problems.

Since our testimony, the first WGS satellite was launched, but the AEHF program experienced technical problems with hardware components that have pushed back its first launch date by 6 months. Also, this year, as described below, we found that NPOESS and SBIRS still face very high risks, even after recent replanning efforts. Further, GPS IIF has experienced additional technical problems.

- SBIRS continues to face cost and schedule setbacks. Software problems have recently delayed the first satellite launch by about a year, which will likely increase the program's overall delay to roughly 7 years. Correcting the problems may necessitate hardware and software changes that could, according to the Air Force, also drive cost increases up to $1 billion, which would be in addition to the $6 billion cost growth already incurred. Management-reserves expenditure continues at an unsustainable rate. Program officials acknowledge that management Reserves set aside to fix unexpected problems will likely be depleted in early 2009, even though the Reserves were intended to last through 2012. Given the complexity of the SBIRS satellites, it is possible that further design flaws may be discovered, leading to more cost and schedule increases. If management Reserves are depleted and not replenished, the program will likely experience further cost and schedule problems.
- In July 2007, the NPOESS program finalized its restructure in response to a Nunn-McCurdy (10 U.S.C. § 2433) program acquisition unit breach of the critical cost growth threshold. The restructure included about an additional $4.1 billion, or about a 49 percent, life-cycle cost increase for fewer satellites to be acquired, delays in satellite launches, and deletions or replacements of satellite sensors. The restructure also included removing 7 of the original 14 critical technologies from the program. Furthermore, three of the remaining technologies remain immature and the program continues to experience development problems, increasing risks of further problems. At this point, the program has seen a 153 percent unit cost increase.
- The GPS IIF program has faced technical challenges in completing development and production, causing another schedule delay in the launch of the first IIF satellite—over a 2-year slip from the original launch date of December 2006 to February 2009. Moreover, the program continues to face cost increases due to these technical problems. Specifically, the program has requested over $100 million for fiscal years 2008 and 2009 to cover the estimated cost overruns to complete production of the first three space vehicles. In addition, program officials are concerned that additional funds may be needed to complete this program if additional delays are incurred—the program has already spent $1.2 billion to date, which represents about 77-percent of the total cost originally estimated for the program. (Note: The chart below reflects a larger cost because it includes estimates for the GPS IIR, IIR–M, and IIF blocks of the GPS program.)

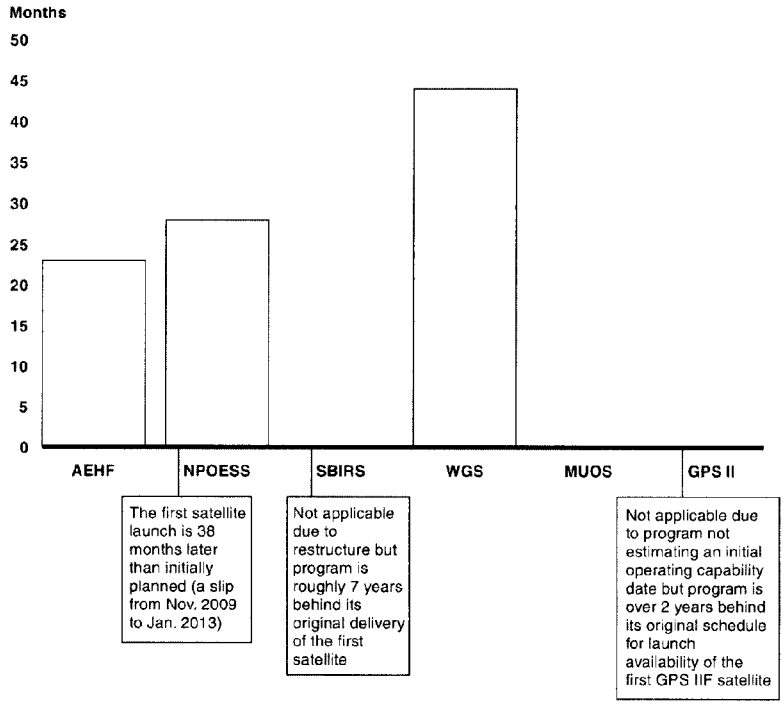
Figure 1: Differences in Total Program Costs from Program Start and Most Recent Estimates



Source: GAO analysis of DOD data.

Note: MUOS is the Mobile User Objective System.

Figure 2: Additional Months Needed since Program Start



Source: GAO analysis of DOD data.

Not all of DOD's space programs are facing the problems being experienced by GPS, NPOESS, and SBIRS. For example, the Navy's Mobile User Objective System (MUOS), another communications satellite program, is meeting cost and schedule goals. Further, as discussed later in this testimony, newer Air Force acquisition efforts such as the Transformational Satellite (TSAT) Communications System and Space Radar have been taking actions to ensure they can meet their cost and schedule goals, though their funding has been reduced in light of overall affordability of space acquisitions. These two efforts were highly complex and ambitious and were predicted to be the most expensive military satellite developments ever.

In addition, in December 2005, the Air Force was directed to begin efforts to develop competing capability in parallel with the SBIRS program; this effort was previously known as the Alternative Infrared Satellite System (AIRSS). We reported in September 2007 that DOD had not positioned the AIRSS effort for success. DOD agreed, and revised the effort's development strategy to reflect best practices. The effort has a new name, the Third Generation Infrared Surveillance (Third Gen), and is now a follow on to the SBIRS program. The first sensor prototypes are expected later this month.

Lastly, our annual weapons system assessment this year will be reporting on challenges faced by the Evolved Expendable Launch Vehicle (EELV) program, as the two providers—Boeing and Lockheed Martin—undertake a joint venture that will provide U.S. government launches of medium- to heavy-lift rockets. The consolidation of production, engineering, test, and launch operations under the joint venture, called the United Launch Alliance or ULA, is expected to yield cost savings in the future, but when and how much remains unknown. ULA expects the consolidation to be nearly complete by the end of 2010, but there are preliminary indications that some elements of the consolidation are falling behind schedule.

Furthermore, the Air Force revised its acquisition and contracting strategy for EELV in 2005, which among other things increased program office oversight responsibilities. The change in contracting strategy created new data analysis activities for

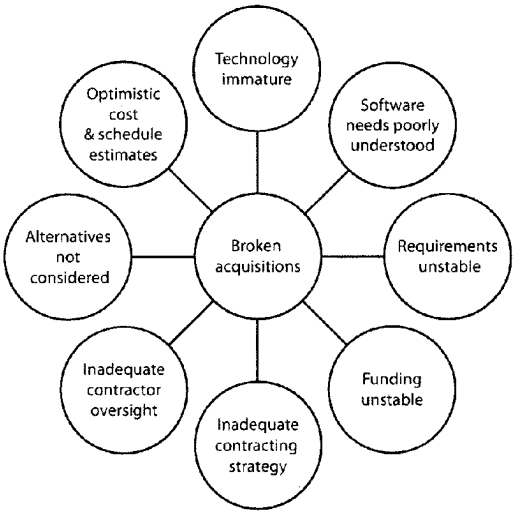
the program and expanded the types of expertise needed by the program office to utilize the new information provided by contractors. Despite its increased responsibilities, the program office is experiencing staff reductions and expects staffing vacancies to continue in the near term. The current military staff lacks some of the technical expertise needed to fully analyze contractor performance data now being collected under the new contracting strategy.

CAUSES OF ACQUISITION PROBLEMS IN SPACE PROGRAMS

Our work has identified a variety of reasons for this cost growth, most notably that weapons programs are incentivized to produce and use optimistic cost and schedule estimates in order to successfully compete for funding. We have also found that DOD starts its space programs too early, that is, before it has assurance that the capabilities it is pursuing can be achieved within available resources and time constraints.

We have also tied acquisition problems in space to inadequate contracting strategies; contract and program management weaknesses; the loss of technical expertise; capability gaps in the industrial base; tensions between labs that develop technologies for the future and current acquisition programs; divergent needs in users of space systems; diffuse leadership; and other issues that have been well documented in DOD and Government Accountability Office (GAO) studies.

Figure 3: Key Underlying Problems



Source: GAO.

Many of these underlying issues affect the broader weapons portfolio as well, though we have reported that space programs are particularly affected by the wide disparity of users, who include DOD, the intelligence community, other Federal agencies, and in some cases, other countries and U.S. business and citizens. Moreover, problematic implementation of an acquisition strategy in the 1990s, known as Total System Performance Responsibility, for space systems resulted in losses of technical expertise and weaknesses in contracting strategies that space programs are still dealing with the effects of.

ACTIONS NEEDED TO ADDRESS SPACE AND WEAPON ACQUISITION PROBLEMS

Over the past decade, we have identified best practices that DOD space programs can benefit from. DOD has taken a number of actions to address the problems that we have reported on. These include initiatives at the department level that will affect its major weapons programs, as well as changes in course within specific Air

Force programs. Although these actions are a step in the right direction, additional leadership and support are still needed to ensure that reforms that DOD has begun will take hold.

Our work—which is largely based on best practices in the commercial sector—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 space programs could benefit from. Table 1 highlights these practices; appendix II provides more detail.

Table 1: Highlights of Practices Identified in GAO Reports That Space Programs Can Benefit From

Before Undertaking New Programs
• Prioritize investments so that projects can be fully funded and it is clear where projects stand in relation to the overall portfolio.
• Follow an evolutionary path toward meeting market needs rather than attempting to satisfy all needs in a single step.
• Match requirements to resources—that is time, money, technology, and people—before undertaking a new development effort.
• Research and define requirements before programs are started and limit changes after they are started.
• Ensure cost estimates are complete, accurate, and updated regularly.
• Commit to fully fund projects before they begin.
• Ensure critical technologies are proven to work as intended before programs are started.
• Assign more ambitious technology development efforts to research departments until they are ready to be added to future generations (increments) of a product.
• Use systems engineering to close gaps between resources and requirements before launching the development process.
During Program Development
• Use quantifiable data and demonstrable knowledge to make go/no-go decisions, covering critical facets of the program such as cost, schedule, technology readiness, design readiness, production readiness, and relationships with suppliers.
• Do not allow development to proceed until certain thresholds are met—for example, a high proportion of engineering drawings completed or production processes under statistical control.
• Empower program managers to make decisions on the direction of the program and to resolve problems and implement solutions.
• Hold program managers accountable for their choices.
• Require program managers to stay with a project to its end.
• Hold suppliers accountable to deliver high-quality parts for their product through such activities as regular supplier audits and performance evaluations of quality and delivery, among other things.
• Encourage program managers to share bad news, and encourage collaboration and communication.

Source: GAO.

CONSTRUCTIVE ACTIONS ARE BEING TAKEN

DOD is attempting to implement some of these practices for its major weapons programs. For example, we recently reported that DOD released a strategy to enhance the role of program managers in carrying out its major weapon system acqui-

sitions. As part of this strategy, DOD established a policy that requires formal agreements among program managers, their acquisition executives, and the user community intended to set forth common program goals. In addition, DOD plans a variety of actions to enhance development opportunities, provide more incentives, and arrange knowledge-sharing opportunities for its program managers. Within this strategy, the department also acknowledged that any actions taken to improve accountability must be based on a foundation from which program managers can launch and manage programs toward greater performance, and must include an overarching strategy and decisionmaking processes that prioritize programs based on a match between customer needs and available resources. DOD highlighted several initiatives that, if adopted and implemented properly, could provide such a foundation. Some of these include establishing an early decision gate to review proposed programs at the concept stage, testing portfolio management approaches in selected capability areas and using capital budgeting accounts for programs in development.

Additionally, as we reported previously, the Air Force adopted a "back-to-basics" policy for space designed to reduce technology risk and ensure programs were more executable. Specifically, for its TSAT and Space Radar acquisition efforts, the Air Force committed to delaying product development until critical technologies could be demonstrated to work in a relevant environment. This stood in sharp contrast to previous programs, started with immature technologies, such as NPOESS and SBIRS.

The Air Force also committed to deferring more ambitious technology efforts associated with these efforts to science and technology organizations until they are ready to be added to future increments. TSAT, for example, deferred the wide-field of view multi-access laser communication technology, and contributed about $16.7 million for "off-line" maturation of this technology that could be inserted into future increments. It laid out incremental advances in other capabilities over two increments. Space Radar has deferred lithium-ion batteries, more efficient solar cells, and onboard processing for its first increment, and like TSAT, contributed toward their development by space and technology organizations. Further, both efforts have used systems engineers to help determine achievability of requirements.

In our experience, the Navy has tended to follow good acquisition practices for its space programs, especially in relation to keeping technology risks out of programs. The Navy's MUOS is an example. Specifically, the MUOS acquisition effort began development with almost all of its critical technologies mature. Additionally, about 95 percent of design drawings had been completed at the critical design review milestone in March 2007. Since MUOS's development start in September 2004, the program has been meeting its overall cost and schedule goals, with the first satellite expected to become operational in March 2010.

Furthermore, the Air Force, U.S. Strategic Command, and other key organizations have made progress in implementing the Operationally Responsive Space (ORS) initiative. This initiative encompasses several separate endeavors with a goal to provide short-term tactical capabilities as well as identifying and implementing long-term technology and design solutions to reduce the cost and time of developing and delivering simpler satellites in greater numbers. ORS provides DOD with an opportunity to work outside the typical acquisition channels to more quickly and less expensively deliver these capabilities. In performing a review of ORS for this committee, we found that DOD has made progress in putting a program management structure in place for ORS as well as executing ORS-related research and development efforts, which include development of low-cost small satellites, common design techniques, and common interfaces.

Other parts of DOD are also moving towards space programs with less risk and that have a greater chance of being more successful. The Missile Defense Agency's Space Tracking and Surveillance System (STSS) program office is seeking an operational constellation that would be easier to produce than originally envisioned for the constellation. The new development approach for the constellation would involve no technology breakthroughs or scientific discovery, and the program office wants to scale the system design so that it will only require only a 5- to 6-year build cycle.

DOD has also pushed back the decisions to start the TSAT and Space Radar acquisitions so it could reformulate their acquisition schedules and approaches to make them more affordable within DOD's overall space portfolio. For example, TSAT is currently being assessed by the Office of the Secretary of Defense (OSD) to better ensure that proposed future funding levels for TSAT are affordable in the near term. In the meantime, the program office is continuing to fund risk-reduction efforts between two separate contractors to further reduce overall risk in TSAT. Similarly, the Space Radar program office told us that it is adjusting its acquisition approach to better balance affordability through incremental evolution of the Space

Radar capability. In both of these cases, DOD will likely be better positioned with acquisition programs that are more affordable and executable in terms of meeting cost, schedule, and performance goals.

ADDITIONAL ACTIONS NEEDED

The actions that the Air Force and OSD have been taking to address acquisition problems are good first steps. The back-to-basics policy and ORS, in particular, represent significant shifts in thinking about how space systems should be developed as well as commitment from senior leadership. But, there are still more, significant changes to processes, policies, and support needed to ensure reforms can take hold.

First, while DOD pilot initiatives related to portfolio management are targeted at addressing funding pressures, there has not been a real commitment to prioritizing investments across DOD. For the past several years, we have emphasized that DOD starts more space and weapon programs than it can afford, creating a competition for funding that encourages low cost estimating, optimistic scheduling, overpromising, suppressing of bad news, and, for space programs, forsaking the opportunity to identify and assess potentially better alternatives. Programs focus on advocacy at the expense of realism and sound management. Invariably, with too many programs in its portfolio, DOD is forced to continually shift funds to and from programs—particularly as programs experience problems that require additional time and money to address. Such shifts, in turn, have had costly, reverberating effects. This year, significant cuts were made to several major space programs including TSAT, Space Radar, and STSS largely in light of the realization that new, expensive programs were not affordable at a time when DOD was attempting to upgrade other capabilities and still contending with problematic programs like SBIRS. In the case of TSAT, resulting delays in capability could have a dramatic effect on other new programs, such as the Army's Future Combat System, which were counting on TSAT-like capabilities to enhance their performance.

Second, as we have testified before, space programs are facing capacity shortfalls. These include shortages of staff with science and engineering backgrounds as well as staff with program-management and cost-estimating experience. Several of our reviews of major space programs have cited shortages of personnel as a key challenge that increases risk for the program, specifically in technical areas. In addition, during our review of DOD's space cost estimating function, Air Force space cost-estimating organizations and program offices said that they believed their cost-estimating resources were inadequate to do a good job of accurately predicting costs. Because of the decline in in-house cost-estimating resources, space program offices and Air Force cost-estimating organizations are now more dependent on support contractors. We recognize that there are actions being taken to strengthen the space acquisition workforce, but we have not yet seen the condition get much better at the individual program office level.

Our past work has also pointed to capacity shortfalls that go beyond workforce. For example, in 2006, we reported that cost-estimation data and databases are incomplete, insufficient, and outdated. In previous testimonies, we pointed to limited opportunities and funding for space technologies, and the lack of low-cost launch vehicles. The ORS initiative is designed to help alleviate shortfalls in launch and testing resources, but one concern raised in interviews with launch providers was that there was still not enough investment being directed toward low-cost launch.

Furthermore, policies that surround space acquisition need to be further revised to ensure best practices are instilled and sustained. For example, DOD's space acquisition policy does not require that acquisition efforts such as TSAT and Space Radar achieve a technology readiness level (TRL) 6 (that is, testing in a relevant environment) or higher for key technologies before being formally started—key decision point B (KDP B). Instead, the policy suggests that TRL 6 be achieved later—at preliminary decision review (KDP C) or soon after. In fact, the back-to-basics policy that was adopted by the Air Force has not been incorporated into the space acquisition policy. Given that there are many pressures and incentives that are driving space and other weapon programs to begin too early and to drive for dramatic rather than incremental leaps in capability, DOD needs acquisition policies that ensure programs have the knowledge they need to make investment decisions and that DOD and Congress have a more accurate picture of how long and how much it will take to get the capability that is being promised. In addition, although the policy requires that independent cost estimates be prepared by bodies outside the acquisition chain of command, it does not require that they be relied upon to develop program budgets. Officials within the space cost-estimating community also believed that the policy was unclear in defining roles and responsibilities for cost estimators. We continue to recommend changes be made to the policy—not only to further in-

grain the shift in thinking about how space systems should be developed, but to ensure that the changes current leaders are trying to make can be extended beyond their tenure.

Last, while DOD is planning many new practices that will provide program managers with more incentives, support and stability, the overall environment within which program managers perform their work is very difficult to change simply with policy initiatives. Policies similar to the one DOD issued in 2007 to increase accountability of program managers have existed for some time, but according to DOD and Air Force officials, they have not always been practiced. For example, while DOD policy provides for program managers of major defense acquisition programs to serve as close to 4-year tenures as practicable,[1] many serve for only 2 years. One example is the SBIRS program, which has had six program managers in 12 years. In fact, our work has shown that rather than lengthy assignment periods between key milestones as suggested by best practices, many of the programs we have reviewed had multiple program managers within the same milestone.

CONCLUSIONS

In conclusion, senior leaders managing DOD's space portfolio are clearly working in a challenging environment. There are pressures to deliver new, transformational capabilities, but problematic older satellite programs continue to cost more than expected, constrain investment dollars, pose risks of capability caps, and thus require more time and attention from senior leaders than well-performing efforts. To best mitigate these circumstances and put future programs on a better path, DOD needs to continue with the actions it has begun undertaken. However, these measures should be complemented by realistic estimating of what it will take to complete space programs, prioritizing programs for investment, and strengthening DOD acquisition policy for space. At the same time, DOD should ensure its ORS program is well-supported and focused on alleviating capability gaps as well as developing longer-term solutions for space programs. Taken together, such actions, with the support of Congress, should help senior leaders negotiate acquisitions in a challenging environment and ensure their commitments to reform can be sustained into the next administration.

Mr. Chairman, this concludes my statement. I will be happy to answer any questions that you have.

Senator BILL NELSON. Let us just get right on into the questions.

We constantly hear about the spiraling need for communications. Let's talk about the transformational satellite (TSAT). It's supposed to address some of the growing communications requirements and has been described by the Air Force as the linchpin for the 21st century net-centric warfare. TSAT was, at one point, supposed to launch in 2012. Congress removed $130 million from the program and then in the next year $150 million, mostly to allow technologies to mature so that the program wouldn't be high risk.

When the fiscal year 2008 budget was submitted, the first launch was supposed to be in the first quarter of 2016. The fiscal year 2009 budget request completely undermines the program. The Department of Defense (DOD) and the Air Force have pulled $3.6 billion out of the program through fiscal year 2013 and have delayed the first launch until 2018 at the earliest, and the requirements for TSAT haven't changed. So what's going on?

Mr. PAYTON. Mr. Chairman, perhaps I could address that. The TSAT spacecraft will be an immensely capable vehicle. It will serve a large number of users, first and foremost perhaps is protected strategic communications for our nuclear command and control systems. Additionally, it will serve relay for airborne intelligence, surveillance, and reconaissance (ISR) assets like Global Hawk, and also space-borne ISR assets. It will serve fleets on the high seas.

[1] DOD policy provides for the tenure of program managers of major defense acquisition programs to last until the completion of the major milestone that occurs closest in time to the date on which the person has served in the position for 4 years.

It will serve communications on the move for our land forces, and of course, it is closely related with the Army's Future Combat System (FCS).

As we move to Advanced Extremely High Frequency (AEHF)–4, the fourth AEHF spacecraft, that vehicle completes a global ring of geosynchronous satellites for protected strategic communications. With the fourth AEHF spacecraft, we now have no longer that first immediate schedule driver for the first TSAT spacecraft. With that as a fact, we are now looking at that first block of TSAT spacecraft and how we can best marry its capabilities to the schedules of its users.

Again, with AEHF–4 filling the ring for protected strategic communications, we can now rephase the TSAT capabilities so that it can service the most important users first, again, amongst all the large number of different users it will have.

We are taking this time from December until this spring to rephase the first block of TSAT capabilities and redefine that. We are not necessarily married to a 2018 launch. Again, that is part of the trade space to link up TSAT capabilities with its users.

Senator BILL NELSON. What you have said is that part of the cut in TSAT is justified by the Air Force as a payment for the fourth AEHF, and I guess there were other higher DOD priorities. So I go back to the initial question. If TSAT is still the linchpin for the 21st century net-centric warfare, what is the higher DOD priority?

Mr. PAYTON. Sir, again, it is a program-management, program-risk perspective of properly marrying and fielding the TSAT capabilities with its next immediate users.

Senator BILL NELSON. Did you say that you were on a 2018 launch date instead of a 2016 launch date?

Mr. PAYTON. No, sir. We do not know yet what the first spacecraft launch schedule is like until we define the content of that first block of spacecraft.

Senator BILL NELSON. So you don't even know that you are on a 2016 launch date?

Mr. PAYTON. Any schedule prediction right now is premature, sir.

Senator BILL NELSON. That is some new information.

Mr. PAYTON. We are currently in work with both the user communities, the Marines, the Army, the Navy, the Joint Chiefs of Staff to identify the schedules for their top users. We are working with the technology folks, obviously. We have spent several years proving the technology readiness at the subsystem level. So, we are again in the process of re-architecting that first block of TSAT capabilities.

Senator BILL NELSON. Tell me, if we are going to have this kind of delay, is there also going to be a requirement to buy more wideband global satellite communications (SATCOM) systems?

Mr. PAYTON. That is part of the analysis that is in work this spring. Yes, sir.

General KEHLER. Mr. Chairman, if I could also add something to what Mr. Payton is saying? Sir, you said it exactly right when you said the requirement for warfighting capabilities that are promised through TSAT have not gone away.

We know that the objective here is to get protected communications farther and farther and farther down into the forward eche-

lons, which allows them to communicate in a protected way on the move, and that really is one of the key drivers to go beyond where we are right now with the Wideband Global Satellite (WGS) and AEHF.

But we should not lose, sir, sight of the facts, sir, that we have just launched the first of what will now be six WGS satellites, which are a quantum leap in wideband communications.

We are about to launch within the next year, we believe, the first of now four AEHF satellites, which again are in a quantum sense far more capable than the systems that they replace.

Military satellite communications remain a top priority for the combatant commanders. We understand that it does. We think that the steps that we are taking right now are giving them vastly improved communications. What this does allow us to do with the insertion of the fourth AEHF is to take the investment that we have had in TSAT so far, particularly in the ground system, which we will have to continue regardless, and it allows us now to take the next couple of months to assess what the pace and scope of TSAT needs to look like.

That is the pathway that we are on. There is a study underway. It is not a brand-new study. We have looked at this a lot of different ways, and we owe you some answers on this.

Senator BILL NELSON. Admiral, what does the Navy think about the delay on TSAT?

Admiral DEUTSCH. Sir, obviously, we have stated our requirements for protected communications a number of times, and how those protected communications are delivered to our sea base and our fleets at sea is certainly important. But as long as they are delivered, that is the most important thing.

We are very concerned that the protected communications remain available and that they are in sufficient capacity to allow us to have the reach-back that we need based upon the way we intend to fight the future conflicts.

Senator BILL NELSON. You said as long as they deliver it, but the question is "when?"

Admiral DEUTSCH. Yes, sir.

Senator BILL NELSON. So what do you think about that?

Admiral DEUTSCH. Sir, we certainly are interested in more protected communications available as soon as possible. With the current schedule, we believe that the sea base will remain viable. We would like to see more.

Senator BILL NELSON. Ms. Chaplain, GAO has been critical of this acquisition path for TSAT. What is your assessment of this progress, and what is your assessment of this new information that we just got today?

Ms. CHAPLAIN. I think everything that has been described today is actually good in that some actions are being taken to make the TSAT program more executable, more affordable, and also to ensure that there are no capability gaps in the upcoming years.

But I have always said that this investment needs to be looked at in the context of the DOD-wide systems portfolio, not just space because, as you said, it is the linchpin for the future global information grid. There are a lot of huge systems depending on this to achieve their kinds of capabilities. I think it is not just FCS. So I

think when we talk about priorities, they need to be discussed in the context of the whole portfolio of weapon systems and just not the space portfolio.

In terms of dates being in question, I think it is important to go back to all of these major systems and really get a good sense of what are their schedule delays. They are also facing delays themselves. So is any TSAT revised schedule still in synch with schedules like the FCS program, and what are their backup plans if TSAT is not available?

I don't think just saying we can rely on other assets may be totally an answer for them. They probably need certain capabilities in the TSAT program to do what they are supposed to do.

Mr. PAYTON. Mr. Chairman, I may have left an improper impression. The 2018 date is based on the classic analysis if you take so much money out of the program in these years, it will then slip the program so many years in the future. We are looking at something a little more granular than that or something a little more than just dollars out and schedule slipped. We are looking at the actual content. Clearly, protected communications is the top priority for the TSAT program.

I am just not accepting 2018 and the analysis that led to the 2018 as being thorough enough. It could be earlier than 2018. Again, depending on the needs of the warfighters and the TSAT's many, many different customers.

Senator SESSIONS. I am sorry, Mr. Chairman. I went to the other room, and I had been told you were here. I should have remembered that.

Senator BILL NELSON. I went to the wrong room also.

Senator SESSIONS. General Shelton, what is your take, Strategic Command's (STRATCOM) view of the TSAT delay?

General SHELTON. Senator, STRATCOM has polled—as General Kehler has said, all the other combatant commanders (COCOMs), and the other COCOMs have military SATCOM very high on their priority lists. So STRATCOM is awaiting this analysis that is being conducted right now, anxious to see what the output of that analysis will be.

Clearly, AEHF–4 is a priority now because of the slip to TSAT, but we are anxious to see what this analysis in the spring will yield.

Senator SESSIONS. General Shelton, again, can you tell us what role the U.S. space assets and space personnel played in the recent successful intercept of our out-of-control National Reconaissance Office (NRO) satellite? Was that a joint operation? What lessons are we learning from this operation about command and control and integration of space assets?

General SHELTON. Yes, sir. It was very much a joint operation. In fact, STRATCOM was lead for planning for this event, not only for the intercept itself, but also the consequence management and dealing with the aftermath of the intercept.

So assets included, of course, the——

Senator SESSIONS. Did you decide that the Navy's SM–3 was the right vehicle to utilize to take out that satellite?

General SHELTON. Sir, that was General Chilton, in consultation with the Joint Staff and, ultimately, the national leadership that decided that that was the proper weapon. Yes, sir.

Senator SESSIONS. Did I cut you off there? I'll let you finish?

General SHELTON. Let me just say that between Navy assets, Missile Defense Agency (MDA) assets, Air Force assets, a tremendous joint effort, probably a national effort pulled off in a very short period of time. It is almost unprecedented.

Senator SESSIONS. I felt it was a good surprise test for the entire effort. It tested a lot of different things, including your ability to coordinate. I understand the Air Force had a role. What was their role in the process?

General SHELTON. Air Force assets were used to track the target satellite.

Senator SESSIONS. To track the satellite?

General SHELTON. Track the satellite and produce a very precise vector on where that satellite would be, because when it broke the horizon for the Aegis shooter, it needed to be in a certain size box. We were well inside that box. So it gave a very good target for the shooter. The shooter was able to lock on, and the results speak for themselves.

Senator SESSIONS. Mr. Payton, maybe you can comment on that, and did the Air Force incur costs in the course of what they were doing? Have they had to defer any other work as a result of that?

Mr. PAYTON. The tracking sensors that General Shelton referred to are something that the Air Force has going on 24–7, 365. So there's perhaps some overtime for analysts, I honestly don't know. But there were no extra immediate costs for the Air Force to participate in this exercise.

Senator SESSIONS. Are you satisfied with the coordination and cooperation of so many entities that were involved in this? Did we learn anything that we could do better?

Mr. PAYTON. I came from MDA before my current job, and this was executed as in a similar fashion as many MDA operations, where they do rely on several different assets from the Air Force, from the Army, from the Navy, to execute their mission. So this was just another routine exercise from the perspective of the coordination that was conducted.

General SHELTON. Senator, let me make one other comment on that in terms of lessons learned, if I could? The Chinese Anti-Satellite (ASAT) test as well applies here. But there is a tremendous amount of data that is available, but because of the way we are architected right now, you have to pull all of that data together ad hoc. It is different networks. It is different levels of security. There are many different problems in pulling that data together.

Yet again, we did it this time. But what we need is a system that pulls this together on a routine basis, and that is exactly what we are working for: integrated space situation awareness.

Senator SESSIONS. I will ask whoever, I am not sure who the appropriate person is. But one of the things that I know we were concerned about is that the Chinese attack on the satellite was 450 miles up above the International Space Station, and it was going to create space debris that could endanger space activity for years to come.

This was about 100 miles up, I believe, and we thought that the debris would re-enter the atmosphere. That is below the Space Station, of course. Did those facts bear out, and how are we doing with the debris situation? Were you accurate in your projections that the debris would not threaten the Space Station?

General SHELTON. Sir, for both the Chinese ASAT test as well as the intercept, the models that predicted the debris field did a pretty good job. Chinese ASAT test produced debris up at 850 kilometers, the engagement altitude, and that debris will literally rain down, naturally decay over decades.

The test that was done occurred at 247 kilometers. That debris will probably, 90-plus percent of it, will be down within the next 2 months. What we can track right now is 10 centimeters, roughly. We are tracking about 193 pieces left on orbit right now, and that will rapidly decay.

So very different not only in terms of motivation for the event, but very different in terms of debris fallout.

Senator BILL NELSON. Admiral, let us go to another program, the Multiple User Objective System (MUOS), ultra-high frequency (UHF)-band communication satellite. It is scheduled to launch around March 2010. What is the current status on this? Is its launch still on?

Admiral DEUTSCH. Senator, I would like to say that it is doing fairly well on schedule. As a matter of fact, I think the schedule performance index is at about .97 right now. So we are still doing very well on schedule.

Sir, I think the actual launch will be in December 2009, with initial on-orbit capability of March 2010. There is pressure on the schedule. I won't sit here and promise you that that will definitely be the date that it will launch. We are now in single-line flow, and with your experience, you are well aware of what happens at that time.

That is where you get into the situations where, if you have a problem, you may have to stop and redesign a component. We have had a couple of components that have had some issues and have eaten up some of the margin. Having said that, we have successfully solved those component issues, and we believe that we are still on track for the initial launch in the winter of 2009.

Senator BILL NELSON. There have been technical issues with the ultra-high frequency follow-on (UFO) satellite, so that there is likely to be a gap in UHF capability. What is your analysis of this gap?

Admiral DEUTSCH. Senator, the gap that you referred to is the gap between the likelihood or the probability of eight functioning satellites on orbit, eight UFOs, if you will. That has been established by STRATCOM, in consultation with the COCOMs, to be a 70 percent figure is what is desired.

As of this month, the likelihood that there will be 70 percent of the satellites still on orbit, that date is now within 9 months of the on-orbit capability of the first MUOS. So we have about a 9-month gap between the 70 percent availability and then a replacement satellite capability, which each MUOS not only carries a MUOS package, but also a UHF legacy package as well. So about a 9-month gap right now, sir.

Senator BILL NELSON. Now that capacity, is that the commercial UHF capability?

Admiral DEUTSCH. No, sir. The commercial capability not only the leased satellite (LEASAT) that is currently up and its fuel is expected to remain through about 2010, that is not factored into the 70 percent availability, nor is the commercial UHF capability that we are working on providing as part of the President's submit to Congress.

Senator BILL NELSON. Has the Navy started the process to acquire commercial UHF?

Admiral DEUTSCH. Yes, sir. Not only leasing, but also a hosted payload option. The leasing is besides what we have right now on LEASAT, as I just mentioned, we also are working on with Intelsat's Skynet. We have money programmed in the 2009 submittal for fiscal year 2009 and fiscal year 2010 leases. We are also in the pre-solicitation synopsis release phase for the hosted payload.

We have an industry day this month, as a matter of fact, to talk to industry about potentially hosting a payload. In our submittal to you, sir, we have money dedicated towards that.

Senator BILL NELSON. Senator Sessions.

Senator SESSIONS. The Chinese counterspace program by all accounts represents a significant commitment on their part. Yesterday, DOD released its 2008 report: "The Military Power of the People's Republic of China." It highlighted their growing counterspace capability, which includes nuclear-tipped missiles; direct ascent ASATs, which we have seen; jammers; ASAT lasers; and radio frequency weapons. They are also building a domestic capability for the production of micro satellites, which could be used as space mines or space parasites.

I will just ask this to you, and I am not sure who should be in priority to answer it. What value does China see in these counterspace weapons? How would they use them in a conflict? What do you think their ultimate objective is in terms of size and scope of the program? General Kehler?

General KEHLER. Sir, let me try this on. As a force provider for STRATCOM, which is what Air Force Space Command is, we wind up having to provide the STRATCOM space capabilities that can operate during times of conflict, and so this is a big issue for us.

Let me start by saying, though, that as we look at the space domain today, the evidence that we see looks to be pretty clear. We have to expect that the space domain will be contested in any future conflict. We see evidence that potential adversaries and others are preparing to deny us the advantages that we have in space in lots of different places. The Chinese are one of those.

As we look at them, the answer to the questions that you posed, though, is probably the most puzzling to us, and that is we don't know. It isn't clear to us what their intent really is. In terms of their acquisition, in terms of the ASAT test that they conducted a little over a year ago, and what those implications are for us for the future.

What we believe we have to do, though, is be prudent. Therefore, we are preparing to have to continue to provide our space capabilities in a contested environment. We are working very hard on that,

and so, sir, I can't answer for you directly—I am not sure anyone can answer directly where we think the Chinese are going here.

I did read the report from yesterday. Fundamentally, it is information that we have been reporting to Congress in various venues. The key question, I think, and the report poses this question is "why?" What is it that they are doing, and what is their intent behind the visible activity that we can see?

I can tell you that it is concerning to us, and those of us that are forced to prepare to provide military capability in conflict have to take account of the fact that we see the kinds of things that were shown in the report that was issued again yesterday. I believe that we are on a good pathway to address those. I also want to suggest to you that the Chinese are not the only folks that we watch with concern.

Senator SESSIONS. I am sure that is true. What about Operationally Responsive Space (ORS)? It seems to me that throughout our DOD procurement, we need to be looking for capabilities that are less expensive and have substantial volume and a quick response time and ability to deploy promptly.

I had a professor in college that talked about before it became, I guess, so common to think about the Russian tanks and the German tanks. The German tanks had leather interior and cost a fortune. But, as he argued, all it was was a piece of metal with a gun that could hit his target. You get more of them, you are better off. So it could be less attractive and superb in a lot of ways, but still to be able to do the job that we need to be doing.

So let me ask this, General Kehler first. What are we starting to learn from the TSAT–2 experiment that we had in terms of, one, developing small technology satellite technology; two, improving our acquisition approach to satellites and launch vehicles; and, three, operational concepts related to warfighter? Would you start off with that, and I will ask anybody else to contribute?

General KEHLER. Yes, sir. First of all, I believe you are referring to Tactical Satellite (TACSAT)–2, and let me say at the outset that improving our responsiveness across the board is something that we think is critically important.

Senator SESSIONS. What do you mean by "responsiveness," for someone who might be listening in and not know what you are talking about?

General KEHLER. It covers a range of things for us, as a matter of fact. We have chunked this up, if you will, into three tiers' worth of what we think about responsiveness. The first is how do you make your existing capabilities more responsive? My colleagues and I believe that helping ourselves on the ground—which may sound a little odd here—is the first step to being more responsive. That is, how do we make more responsive the things that are on orbit today?

In many cases, the way we have to go about that is by making the ground systems more responsive, using those platforms that are on orbit in better and more efficient ways and handing information, in many cases, directly from the platforms to the warfighters, which is something that the warfighters have always demanded.

So the first step for us is to make sure the existing systems are more responsive, and largely, that is something——

Senator SESSIONS. More responsive basically to the warfighter?

General KEHLER. More responsive to the warfighter in terms of being more timely and handing product over to them, whether that is imagery or whether that is communications product, whatever. Getting that farther down into the warfighting echelon sometimes is helpful as well.

Then the second step for us is how do we make in big terms acquisition more responsive to the warfighter needs. As the GAO points out, it takes us too long to put things on orbit, and we have been addressing those issues. Part of our back-to-basics approach, for example, in acquisition, part of acquisition corrections that were made as a result of decisions we made in the 1990s, et cetera, all apply here. I believe that we can even do more in terms of coming up with a strategy that helps us to deploy capability sooner.

In fact, we have people off looking at that and maybe we can come back and have a discussion with you at some point about the strategy that we have been on, the relatively small number of large platforms versus a large number of small platforms. Your tank analogy, if you will. I think that is a great question for us to ask ourselves.

Of course, ORS. Then how can we position ourselves to have the ability as a national strategic capability to put platforms on orbit maybe within months as opposed to years? That is what ORS is all about. How do we make that affordable? How do we make that achievable? How do we make all of that feasible?

To come full circle to your question, I think what TACSAT–2 showed us, which was really the first of the experiments that we put on orbit that tries to follow a more rapid, smaller way of conducting our business, what that showed us more than anything else, more than the technical capability of the platform was it validated the concept.

It validated for us that this makes sense for us to have in our toolkit as we try to improve our responsiveness across the board that at the one end of our ability to deploy capability, we want to have something that can put a smaller platform up there, maybe has a single purpose, doesn't last more than a couple of years, applies its output directly to the warfighter, is controlled by the warfighter, and is something that we could have as a replenishment, for example, capability if, in fact, we take losses on orbit or augmentation to supplement some capability that is up there.

It is very, very promising to us, and I believe that the output of TACSAT–2 was a validation of the concept, not as much about the technology, that, we will get better at as time goes on. There were technologically good things about TACSAT as well, but I think, more importantly, it was a validation of the concept. It also helped us understand better where the gaps were in the concept. So, it helped us come back and address where those are and get those closed.

Senator SESSIONS. I guess we know that there is a threat to any satellites we put up, that a lot of nations have the capability, if they put their mind to it, to threaten those capabilities. One re-

sponse to it would be to be able to put another one back up on a very short notice, would it not? Would you agree with that?

General KEHLER. Yes, sir.

Senator SESSIONS. So I guess my question is, are we moving? We talk about it, but my question is, are we moving to have a low-cost launch system? Are we going to have a low-cost satellite that would meet just those qualities and capabilities you mentioned for the warfighter and make sure that at least the people we have in harm's way are able to maintain the capabilities of our FCSs that all require satellite capability?

General KEHLER. The answer, Senator, is, yes, sir, we are.

Senator SESSIONS. Secretary Payton, do you want to comment?

Mr. PAYTON. One of the critical elements of shortening that timeframe to be more responsive to the COCOM is to shorten the amount of time it takes to assemble the spacecraft and put the requisite payload sensors on that spacecraft. That is called plug-and-play spacecraft.

We currently have four TACSATs that have been defined. One has been launched. The other three are in different stages of preparation for launch. The fifth TACSAT will fly that conceptual plug-and-play spacecraft, a demonstration where we can plug together a spacecraft similar to the way laptop computers are plugged together after you phone the company and say, "I need this kind of hard drive and this kind of memory and this kind of display." They plug-and-play a laptop for you. That is the same construct that we will demonstrate on TACSAT–5.

Senator SESSIONS. It seems to me we would want to have in inventory some satellites that, I don't mean weeks, I mean within days, could replace one that fails or is damaged in some fashion. Is that part of your vision?

General KEHLER. Yes, sir. Again, we are headed in that direction. I would describe the current ORS effort, though, in crawl, walk, and run terms. We are crawling. I believe we are about to start walking.

When we cross those thresholds, what we are doing with the ORS program right now is we are essentially developing the piece parts that allow you to get to a more and more and more responsive solution. When you get there, I believe you are then to the point where if you decide, some things may go on the shelf for immediate use, some things may be assembled and purchased within months, which may be sufficient to respond to warning. We will have the capability——

Senator SESSIONS. I see the fiscal year 2009 through the fiscal year 2013 budget calls for $550 million for ORS. It appears to me to be modest. Who wants to comment on that? You are required to answer. What do you think?

Mr. PAYTON. I will give that a shot, Senator. Again, we have to crawl, walk, run. Our first investments are into what we call enablers, like the plug-and-play spacecraft, like a spacecraft control center that can handle more than one kind of satellite constellation at a time, a multi-mission spacecraft operations center, where one person flies a certain kind of satellite in the morning and that same person is trained and qualified to fly a different kind of satellite in the afternoon.

Additionally, we have to improve some of our ground support equipment. Right now, there is a launch vehicle called the Minotaur. We can only process one Minotaur at a time. Now we may need to be in the business of processing a Minotaur up in Kodiak, AK, for a launch and at the same time, one out of Wallops Island here in Virginia.

So we have to invest in some of the fundamental enablers that sometimes are exotic, but typically are not. Those are where we are putting our money right now. Equally important, we are working with STRATCOM, who represents the combatant warfighters—the geographical combatant warfighters in this case—and quantifying what sort of capabilities, what sort of needs do those theater COCOMs have for systems like ORS. So, we are in the business operations side of it, quantifying what the theater commanders need, while additionally in parallel, we are working on those enablers that allow us to migrate from crawl to walk to run.

Senator BILL NELSON. Admiral, with regard to this ORS, are you satisfied you are part of this? You have at least one senior scientist in the office.

Admiral DEUTSCH. Yes, sir, we are satisfied. We would like to play a larger role. We certainly would like the Naval Research Laboratory, which has a pretty distinguished history in space and has a lot of talent, to also play a larger role. We are working it through the requirements process.

Of note, like the fellow Services, we are strongly in favor of making the ORS office a joint office with a rotating director. This year, we will nominate an individual to perform as the director of the ORS office. So if we are lucky, we would certainly like to have that individual serve, and we look forward to, as General Kehler and Secretary Payton mentioned, advances in ORS.

We think there is a need for it within Navy's requirements. There will be a growing need, as recent events have shown, in the future to be able to rapidly replenish and to put capability on orbit.

Senator BILL NELSON. Do any of you all need any new authority to make the office more efficient, more effective?

Mr. PAYTON. We looked at that closely. Initially, we thought there were all sorts of inhibitions to an organization like we have in Albuquerque. Come to find out the single largest benefit would be if their money were all research and development (R&D) money, instead of being divided up into procurement or operation and maintenance or science and technology (S&T) money. If all of their budget were single color money, R&D money, that adds a lot of flexibility to how rapidly they can respond to warfighter needs.

Senator BILL NELSON. There was an issue about the electronic intelligence payload on TACSAT–2. What was the issue, and what was the resolution, and what was the lesson learned?

General SHELTON. Senator, the problem was signal intelligence operational tasking authority, and that is the purview of the National Security Agency (NSA). So getting that authority had not been worked out ahead of time. That is one of the key lessons learned from TACSAT–2. That, I am confident, will never happen again. We will work that well ahead of time and get the NSA's permission to have that operational tasking authority that is needed.

Senator BILL NELSON. TACSAT–1 is supposed to launch this June or July. Are you ready to go? Are all of the issues resolved?

General SHELTON. To my knowledge, Senator, we are ready to go. I think it is more of a booster problem than anything.

Senator BILL NELSON. Ms. Chaplain, GAO has been looking at the standup of the ORS office. What do you say?

Ms. CHAPLAIN. As you can hear the talk about ORS today, you realize that there are a lot of efforts involved with this program. Many on the short-term side, which involve developing these TACSATs and launching them, and also addressing potential capability gaps in some of the acquisition programs.

There is also a very long-term effort to ORS to get to this vision of having satellites on the shelf ready to go at any moment. In addition to plug-and-play, that includes having common interfaces, having well-understood common design practices, and also having low-cost launch. Our concern, while we thought the ORS effort is doing a pretty good job of standing up the program office and getting staff and progressing with these S&T efforts, our concern is that over the long run, there is a chance that some of these short-term demands may end up overwhelming the long-term effort.

So we have to keep our eye on things like getting low-cost launch and keeping up with the design effort and things like interfaces. So, in our review, we are going to be recommending that there be an investment strategy to help guide this program office. It is a small office. It doesn't have longstanding clout, like a huge acquisition program has. So it may have trouble negotiating a lot of the demands being placed on it if it doesn't have strategy and good support from above.

General KEHLER. Sir, if I could add something to that? Inside Air Force Space Command, we now have the Space and Missile Systems Center, the large acquisition house. A key issue for us all along here for ORS has been how do we attach the ORS office so that it can leverage the capabilities that are brought in, the money that is brought by the Space and Missile Systems Center.

We are still working our way through that. The way we have done it today is that we have dual-hatted the director of the ORS office. So not only is he the director of the ORS office, but he also has a role in the Space and Missile Systems Center.

That has been very helpful to us. It is a joint office. So, regardless of where we go with the leadership, we intend to make sure that relationship remains in whatever way we can make that happen because GAO is exactly right, that there has to be some attachment here for a smaller organization that will have to leverage the larger organization. We are committed to making that happen.

Mr. PAYTON. Speaking on organizations, again, the ORS office has Air Force, Army, and Navy people onsite in Albuquerque. Additionally, there is a NASA representative onsite in Albuquerque from NASA Johnson Space Center, and even an NSA person is assigned there now, again to help us with the lessons that we learned from the first TACSAT–2.

Senator BILL NELSON. Back on the issue of debris, General Shelton, what is your modeling and simulation roadmap?

General SHELTON. Right now, Senator, we have an Aerospace Corporation effort that provides that modeling and simulation ca-

pability for debris. That is also peer reviewed by some NASA work, and I think there are very consistent results between NASA's modeling efforts and aerospace's modeling efforts. So I think we have the best of all worlds here, where we have experts in DOD, experts in NASA whose results agree very closely.

Of course, NASA is focused on the manned spaceflight side of things, and DOD is focused on the broader issues of spaceflight. But to have that agreement, I think we are doing very well on debris modeling.

Senator BILL NELSON. On this same issue, we had to move some satellites to avoid debris from the Chinese. Has there been any satellite that has been damaged by the debris?

General SHELTON. Not to our knowledge, Senator. We have moved a couple, as you are aware. But neither of those resulted in damage, nor anything that we have seen to date that we can track that back to debris from the Chinese ASAT test.

Senator BILL NELSON. All right, and what have your models shown that the Chinese debris is no longer going to pose a risk?

General SHELTON. It will be decades before all of that debris is down. Now, having said that, the models put the overall spaceflight risks on the order of 10 to the minus 6, which is 1 in 1 million. But that is if you take great solace in probabilities.

Senator BILL NELSON. Okay, I am going to go to the Space-Based Infrared System next. Senator Ben Nelson, did you want to get in on any of these issues we have discussed thus far?

Senator BEN NELSON. I am not sure I know all of the ones that have been discussed so far, but I do have a couple of questions.

Senator BILL NELSON. Go ahead, and then you finish and we will let you take off.

Senator BEN NELSON. Okay. Thank you, Mr. Chairman.

First, I want to welcome all of you here today. Thanks for your service, and much of what you are involved with today is clearly going to assist us in this global war of terrorism.

My first question relates to the recapitalization and modernization. General Moseley has already said that the Air Force needs to recapitalize and modernize its fleet of both air-breathing and space systems. Of course, we are familiar with the new fighters, new bombers and tankers, and everything that is on the drawing board as well as those that have not been financed so far.

But as we look at the Space Command, what space systems might be old and failing? I am thinking in part about all of the assets that are in the ground out in Nebraska and other areas, the missile systems that are there. Consequently, would that be part of the recapitalization to try to extend the life 20 to 30 years of some of those assets that are already in the ground there?

I guess I would ask you, Secretary Payton?

Mr. PAYTON. Yes, sir. We have a plan to go to 2020 with our Minuteman fleet, and we have just finished a series of significant upgrades to that fleet. As we conduct aging tests with the technology in that fleet, we will be able to judge more accurately, but we think the technology improvements we have made recently can probably go to 2030.

So we do know certain areas of the missile system that will need upgrading—avionics in the guidance package, for instance—but we

are confident that we can get at least to 2020 and high likelihood to 2030 with the upgrades that we have just finished for the Minuteman.

Senator BEN NELSON. Do the generals agree with that?

General KEHLER. Sir, let me put a little bit finer point on what Mr. Payton has said. The Air Force Space Command does, in fact, have responsibility for the Nation's land-based intercontinental ballistic missile force. Congress has approved, over the last 5 or more years now, almost $7 billion in service life extension, if you will, to Minuteman. We are getting to the end of that time.

We are very confident that we can take Minuteman to 2020. This has been service life extension of the boosters, the guidance system, the bus that carries the payloads if the need should arise, et cetera. We have also made some substantial investment in security improvements with additional concrete on the launch facilities, remote cameras, and other things. So we are very confident we can go to 2020.

You in Congress have asked us about going from 2020 to 2030, and quite honestly, we are still looking at that very hard. There is one school of thought that says that we can go to 2030, and I tend to think that is possible. But what I don't know is what additional investment will be required to do that, and so, we owe you some answers on that.

We owe ourselves some answers on that as well. I am not ready to stand up and say that system definitely can go to 2030. It looks like the work that has been done and the congressional support that has gone on so far puts us in a good position for that, but I think it is fair for us to take a harder look.

We have never gone there before, sir, and much like some of our aging aircraft that we had some issues with, we don't know what Minuteman as a system behaves like when it gets over the age of 50 or 60 or approaches 70. So, that is something that we are going to have to come back and tell you.

Senator BEN NELSON. In that regard, 5 years ago, the Deputy Secretary of Defense signed out a policy letter designating the Air Force as the executive agent for space. That seems to have been successful for us because at least the back-to-basics approach seems to generate what we would hope in the way of expertise as well as a plan.

But the position of the Under Secretary of the Air Force is vacant, and I guess, Mr. Secretary, what is the Air Force's view regarding that position, if you know? Will it remain vacant until the end of the administration's time, and is the Air Force's view of the executive agent still operative today?

Mr. PAYTON. Yes, sir. The DOD instruction, the DOD document that empowers the executive agent for space says that the Secretary of the Air Force is the executive agent for space. That individual can delegate that to the Under Secretary of the Air Force. The Under Secretary position is vacant right now. I cannot predict if it will be filled. It is a nominative, confirmed position.

But we are fortunate in that Secretary Michael W. Wynne, the Secretary of the Air Force, is extremely knowledgeable in the space business, both launch vehicles and ground control segments and satellites, due to his background.

Senator BEN NELSON. I certainly wouldn't suggest that he is not knowledgeable. I guess my concern is that without that position being filled, that he already has enough to do without taking on the Under Secretary's position. Or if he could do it, maybe we don't need the position of the Under Secretary?

I am just hopeful that we won't saddle the Secretary with more than we should.

Mr. PAYTON. Yes, sir.

Senator BEN NELSON. Based on the fact that position is there.

Mr. PAYTON. Sir, again, I cannot project into the future if there will be any nominees or anyone that——

Senator BEN NELSON. Maybe I should call him and ask him, huh? I won't tell him you suggested that. It was my idea.

One final thing, with the end of the Cold War, there seems to have been a pause in our investment in the U.S. nuclear community. So, in a February 10th LA Times article, the U.N.'s chief watchdog, Dr. Mohammed El Baradei, warned that the most imminent threat is not a new nation joining the nuclear club, but rather deadly material falling into the hands of extremists.

With the risk of extremists pursuing dirty bombs, as we know, and also concern about anti-proliferation, are we in a position where we need to reinvest in new personnel and in new technology and new assets in this area? I guess I would ask you, General Kehler.

General KEHLER. Sir, first of all, proliferation concerns us very much. Attempts at counterproliferation, of course, are ongoing at all levels. In terms of our own nuclear forces, I can speak for, again, land-based strategic deterrent inside Air Force Space Command. When I took my job in October, the first question that I had was are we being good stewards of the Nation's land-based strategic deterrent? The answer that I came to was, yes, we are.

I did that in a combination of visits to our field commanders, some assessments that our field commanders had done. The fact that we went back and reviewed the standards that we have for our nuclear activities, which, by the way, have been in existence for over 50 years now and, in some cases, since the end of the Cold War, have gotten more stringent.

But what has changed since the end of the Cold War, there are some things out there that concern me. One is security. The good news is that the number of weapons since the end of the Cold War have declined drastically, and that is good. That is the way all of us wanted—

Senator BEN NELSON. That is assuming that we know where the decline, where those that have declined are resident right now. Is that right?

General KEHLER. Yes, sir. We certainly do. We know where ours are.

Senator BEN NELSON. Yes, but I am obviously concerned about where ours are.

General KEHLER. Yes, sir.

Senator BEN NELSON. But I am less concerned about that than perhaps where the others are.

General KEHLER. That is the proliferation issue. What we have seen, again, in our own house is certainly with the decline in num-

bers came the decline in number of people associated with the nuclear mission, which inherently in that decline in the number of people, we have a decline in experience, and that is what concerns me.

So we have done a number of studies in the Air Force, and those outside the Air Force have helped us look at this, in the last 6 months or so. There have been a number of recommendations made that we are now in the process of implementing to try to make sure that our experience base is firm, that we have made the investments that we need to make, that we are complying with our standards, that we have not taken our eye off of this most important, in my view, of all the balls that we have.

So, we are addressing some recommendations at this point in our command that get to, for example, even increased security beyond where we find ourselves today. It gets to some changing in operating concepts and the way we do our business in the missile complexes to put security and surety first. So, I am very comfortable that we are on the right paths.

I will remain concerned about our experience level. We have gone back to basics on that as well. We are going to make sure that we have done everything we can do to grow people with the appropriate experience, and we will pay attention to that and are already paying attention to that in many different ways.

So the long answer to your question is I believe that we can have high confidence in the way we are operating our land-based deterrent force today. I am concerned about proliferation. Of course, that is a concern across the board with us, and we do have some issues to go address in light of some of the reviews that we have done recently, and we will go address those.

Senator BEN NELSON. Will the authorization request that we have, and are looking at, adequately handle the staffing requirements that you are talking about with developing the new expertise or the expertise in light of where we are today, and is at all adversely affected by the reduction in end strength within the Air Force?

General KEHLER. Again, speaking from within my command, I do believe we are adequately addressing this. This is largely the use of the people that we have, and it is making sure that we are fostering the development of certain folks who, from second lieutenant all the way up, are going to be developed as nuclear experts. I think we have a commensurate concern with the laboratories and elsewhere across the nuclear enterprise of whether we have the appropriate experience, whether we have the appropriate industrial capacity here to do what we need to do, and I think those are all good questions that are being addressed.

Senator BEN NELSON. Okay, as long as the budget request is adequate for that. Because what I don't want to find is that, for example, the Air Force budget for planes and so forth is inadequate to the tune of $20 billion per year for each of the next 5 years, which is outside the budget and not part of the authorization request at all, but we are going to be presented with trying to deal with that.

I hope there are no surprises of that kind dealing with the nuclear arsenal and the space issues.

General KEHLER. Sir, again, I can't speak outside my command. I can tell you that inside the command, I believe that we are adequately resourced.

Senator BEN NELSON. Okay, all you can do.

General KEHLER. I will also add, though, if I may? One of my concerns in extending Minuteman from 2020 to 2030 is beyond the boosters, et cetera, it also goes to the weapons and whether we will have the appropriate industrial capacity to do everything we need to do for the weapons.

Senator BEN NELSON. When will you know what would be required?

General KEHLER. Those assessments go on all the time. In terms of the stockpile, the warhead stockpile, those assessments are going on constantly. What we don't know yet is what we don't know about how some of these things age.

Again, there are other efforts underway to make sure that we don't find ourselves in a very awkward position, and there are other folks besides me working with other committees here on the Hill to take a hard look at the weapons complex itself. I can't speak for that here other than as a consumer, as a customer of that, making sure that we are addressing it.

Senator BEN NELSON. I understand.

Thank you, Mr. Chairman. You have been very tolerant. Thank you.

Senator BILL NELSON. Senator Thune?

Senator THUNE. Thank you, Mr. Chairman. I thank you all very much for your service and for being here today.

I know the Chairman is anxious to move into closed session, but I wanted to find out and maybe these are questions that could be asked in that setting if they can't be answered in open session. But I wanted to get to this issue of the shootdown of the malfunctioning spy satellite a few weeks ago. I applaud the Navy's successful shootdown, but I also, at the same time, want to touch a little bit on the cost of a malfunctioning satellite because, obviously, whenever we shoot down something like that, we are blowing up a large amount of money on that particular item.

So, I guess to the extent that you can discuss this in open session, I am curious to know, do we know what the malfunction was? What caused it? What is the cost of losing that satellite? Perhaps then maybe the question about how do we hold the contractor accountable? Do they reimburse the Government? Those sorts of questions, if anybody, Mr. Secretary, can answer that?

Mr. PAYTON. I believe what we can say at this juncture is that it is an NRO satellite that was the target, and that is the limit of what we can say in this forum.

Senator THUNE. Okay, so those are all questions for another time.

Senator BILL NELSON. If you can go with us to S–407?

Senator THUNE. That is where we are going to go next?

Senator BILL NELSON. Yes. Ask that same question there.

Senator THUNE. Okay.

General KEHLER. Yes, sir. However, I would just add one other thing here. None of us sitting here represent the National Reconnaissance Organization (NRO) today.

Senator THUNE. Right.

General KEHLER. So I know I can't answer the specifics of your question. So I don't want to create an impression that we can go somewhere else and answer. I can't, and I don't think anybody else at the table can either.

Senator THUNE. Okay, let me ask, Mr. Secretary, last month the Chinese and Russians put forward a treaty proposal that would ban space programs. I am wondering if you could comment on that proposal and what the administration's position is on the general principle of a space weapons ban?

Mr. PAYTON. Yes, sir. The presidential policy from August 2006 on space says that arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, or operations in space. That is founded on a couple of principles. As a military acquisition group, we respond to what the President would say, clearly. But some of the difficulties of a space treaty of some sort would revolve around definitions and verification.

Some of the best strategic treaties in recent memory have been founded on trust, but verify. So the verification regime would be very difficult for space weapons. For instance, a routine satellite that is up there doing a normal job could, toward the end of its life, as its last act, run into another satellite and, therefore, become an ASAT.

So it is how do you verify that it won't do that? How do you define an ASAT in the first place? Early in the Shuttle era, the Soviet Union was concerned that the Space Shuttle was an ASAT, which, of course, it could not be. So the basic fundamentals of trust, but verify would be fundamentally impossible to do in space.

Senator THUNE. I know you have exhausted the Chinese ASAT test last year, and you talked, I think before I got here, maybe a little bit about the whole issue of proliferation. But I am curious to know if the panel could discuss how the notion of prompt global strike fits into countering those types of ASAT attacks. General?

General KEHLER. Yes, sir. I will take a stab at this, again, as a force provider for STRATCOM. The commander of STRATCOM has asked us to participate with both the Navy and the Army in investigating technologies and how we might give to him a capability to do prompt global strike. The objective is deterrence.

At least from our perspective, as we would be looking to provide such capability to STRATCOM, the objective would be to enhance our deterrent posture. In any ways that we can enhance our deterrent posture, we think that we are preventing, hopefully, a conflict to begin with. If we can prevent a conflict, then we are into this discussion of a contested space domain as part of a conflict.

So our view is that this has potential to contribute to our deterrent posture and in that way gives the commander of STRATCOM another arrow, if you will, in the quiver to use potentially in a conflict and, therefore, could hold some very important things around the world at risk. Whether that is a proliferating weapon that we discover somewhere or whether those are other kinds of targets, the commander of STRATCOM has seen the need to be able to hold those risks.

Senator THUNE. Okay.

General SHELTON. Senator, as we think through the threats to our space systems, some of them are ground based, some of them are space based. But in dealing with the ones that are ground based, our only option right now seems to be a kinetic strike against that ground-based asset that is engaging our space assets.

That leads you down that road of prompt global strike. You also could consider a non-kinetic computer network attack or something like that, if you could get into the network, if they were even reliant upon a network, which is a huge intelligence challenge to start with. But as we think about either reconstituting or augmenting, you have to consider that that threat is still extant and deal with that threat on the ground before you put something into space and put it at risk just like the thing that was just taken out.

So it is a complex problem, and as General Kehler said, dealing with that threat on the ground with some sort of weapon has to be a priority for us if we are going to consider contested domain as part of a conflict.

Senator THUNE. Thank you, all. Thank you, Mr. Chairman.

Senator BILL NELSON. Secretary Payton, are you going to be able to answer his question in classified session?

Mr. PAYTON. I am not knowledgeable on the details of the NRO spacecraft.

Senator BILL NELSON. Now, your boss would be the Assistant Secretary, would he not?

Mr. PAYTON. I work for Secretary Wynne.

Senator BILL NELSON. Right. The Assistant Secretary position is vacant, isn't it?

Mr. PAYTON. Under Secretary is vacant, yes, sir.

Senator BILL NELSON. Under Secretary. That is the one that is dual-hatted?

Mr. PAYTON. When the Under Secretary job is vacant, Mr. Wynne is dual-hatted.

Senator BILL NELSON. He is also the Secretary of the Air Force and the Executive Agent for Space?

General KEHLER. I think he is talking about NRO.

Mr. PAYTON. NRO. No, the dual-hatted position for both military space and NRO, that dual-hatted position evaporated in 2005.

Senator BILL NELSON. Okay. So to get Senator Thune's question answered, are you saying that there is nobody in your bailiwick, including the Secretary of the Air Force, that can answer that question, that we would have to go to the head of the NRO?

Mr. PAYTON. That is accurate. Yes, sir.

Senator BILL NELSON. Would the Director of National Intelligence be able to answer the question?

Mr. PAYTON. If he could not answer it immediately, he could get it for you, to be sure.

Senator BILL NELSON. Okay, and is there anybody in DOD that could get it? Could the Secretary of Defense get it?

Mr. PAYTON. I could ask the question and run down the answer for you. But again, the spacecraft was an NRO responsibility.

General KEHLER. Senator, it isn't about us being able to get the answer. I just wanted to point out to you that those of us sitting at the table don't have the answer.

Senator BILL NELSON. The head of NRO jointly reports to the DNI and the Secretary of Defense.

Mr. PAYTON. Yes, sir.

Senator BILL NELSON. So we could get it from either one of them. All right. What we need to do is to move quickly to S–407, and we will resume in classified session. We will submit written questions for the record that we haven't had time to ask here. We are adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

EVOLVED EXPENDABLE LAUNCH VEHICLE

1. Senator BILL NELSON. Mr. Payton and General Kehler, I recognize that this has to be a rough ballpark estimate as each launch will carry different satellites and booster configurations, but we need some rough estimate to determine if there are really savings to be achieved from the creation of United Launch Alliance (ULA). What is your best estimate as to what an average evolved expendable launch vehicle (EELV) launch costs?

Mr. PAYTON and General KEHLER. There are five classes of launch vehicles with a corresponding cost for each class used in the budget. The fiscal year 2009 EELV Launch Services costs follow:

[In millions of dollars]

Class	Fiscal Year 2009
Medium	85.614
Intermediate	
Small	102.405
Medium	124.792
Large	146.060
Heavy	207.624

Costs associated with EELV missions are distributed between two contract structures: EELV Launch Capability (ELC) provides the minimum capability required for the United States to maintain assured access to space and EELV Launch Services provides for booster production, materials and touch labor.

ELC is a "must-pay" bill and provides a minimum national capability for space launch. This allows the Air Force to comply with the direction of the National Space Transportation Policy. The ELC contract funds both families of launch vehicles to a basic minimum capability (support four launches, surge to five launches, per family each year).

2. Senator BILL NELSON. Mr. Payton and General Kehler, when do you expect to see the beginning of savings from the creation of ULA, and is the advertised 25 percent cost savings realistic?

Mr. PAYTON and General KEHLER. The formation of ULA will result in cost savings to the Government. The fiscal year 2008 President's budget reflected savings beginning in fiscal year 2011 as the ELC contract budget line was reduced by $105 million (the Air Force share of $105 million annual savings to the total program based on a 70/30 cost ratio between the Air Force and the National Reconnaissance Organization (NRO)) as shown in the table below. As far as projected ULA cost savings being realistic, the proposed savings are currently being evaluated by Defense Contract Management Agency and Defense Contracting Audit Agency.

EELV Launch Capability ($M, FY09 - FY13)

	FY09	FY10	FY11	FY12	FY13
Changes for each year			*Apply ULA Savings*		
ELC Funding ($M)	747.7	759.3	669.5	682.9	696.6

ULA savings of $105M per year beginning in FY11

Historically, the 25 percent savings, as defined in the EELV Operational Requirements Document (ORD), was used to measure savings for EELV over heritage launch costs. The program is currently exceeding the 25 percent savings. The program has always met this objective with the current savings at ~45 percent.

USING THE ESPA RING

3. Senator BILL NELSON. Mr. Payton and General Kehler, the March 2007 Air Force Space Test Program (STP) launch was the first time the EELV secondary payload adapter (ESPA) ring was used and with remarkable success, launching seven satellites from the adapter ring. This seems to be a ready option for more space test launches or for operationally responsive space (ORS) launches that should be used whenever possible. What are the plans to use the ESPA ring on future EELV launches?

Mr. PAYTON and General KEHLER. The Air Force has a goal to launch at least one ESPA ring mission per year beginning in fiscal year 2012. Implementation of the ESPA ring program is an important milestone in our efforts to provide affordable access to space for scientific, research, and development efforts. This secondary mission is contingent on missions with excess margin and appropriate launch profiles, spacecraft availability, funding availability, and acceptable operational mission risk.

4. Senator BILL NELSON. General Shelton, do you think the ESPA ring could be used for more ORS launches?

General SHELTON. ESPA rings could enable more ORS launches. ESPA rings on all EELVs would reverse the downturn in the size of the Secondary Test Program (STP) launch manifest that has declined mostly as a result of fewer space shuttle opportunities. For example, the percentage of Navy STP experiments lifted into space declined from 2000 when 23 percent were launched, to 2005 when only 5 percent launched.

ORS could use the ESPA for S&T/R&D development in the same manner as STP does. ORS could also use ESPA for other activities provided the schedule and orbit are flexible, and the capability can be achieved with less than 200kg.

5. Senator BILL NELSON. Admiral Deutsch, would the Navy be able to utilize or have an interest in using the ESPA ring for small satellite launches?

Admiral DEUTSCH. Yes, increased use of EELVs equipped with EELV ESPA rings would help reverse the downturn in STP launch manifest slots resulting primarily due to declining space shuttle opportunities.

Navy STP experiments reaching space declined from 2000 when 23 percent were launched, to 2005 when 5 percent were launched. The EELV program will have thousands of pounds of excess throw weight. The smart use of this excess EELV capability would help to reinvigorate Navy space S&T. At least nine Navy current payloads have weight and orbital parameters that are compatible as a secondary payload for an ESPA-class launch.

OPERATIONALLY RESPONSIVE SPACE

6. Senator BILL NELSON. General Shelton, a lot has happened with ORS since last year. The ORS office was stood up in May and the Strategic Command (STRATCOM) issued an initial concept of operations. From a STRATCOM perspective, what are the goals and requirements for ORS?

General SHELTON. STRATCOM's intent is to assure and enhance the space contribution to joint warfare by enabling timely support to emergent needs of Joint Force Commanders (JFCs) and other users. STRATCOM has expressed three desires with regard to ORS: first, to rapidly exploit and infuse space technological or operational innovations; second, to rapidly adapt or augment existing space capabilities and when needed to expand operational capability; and third, to rapidly reconstitute or replenish critical space capabilities to preserve operational capability.

7. Senator BILL NELSON. General Shelton, is there anything—capabilities, experiments, or analysis, etc.—that you want to see the office do that is not planned now, either in the future or in addition to what the office is doing now?

General SHELTON. I believe the ORS office is on track with their approach to pursuing responsive capabilities. We work closely with the ORS office, and provide

them operational needs and operational perspective as they pursue initiatives. Clearly this is still a work in progress, but the vector is certainly positive.

8. Senator BILL NELSON. General Kehler, what is your organizational vision for the ORS office?

General KEHLER. The ORS office currently operates under the authority, direction, and control of the Department of Defense (DOD) Executive Agent (EA) for Space. The Director of the ORS office reports directly to the DOD EA for Space for program execution. Air Force Space Command (AFSPC) is posturing itself to meet ORS expectations of executing projects under highly accelerated timelines. DOD understands the benefits and limitations of the current organizational structure and is prepared to reanalyze the organization of ORS after an appropriate amount of time has passed to observe ORS execution.

The ORS concept is maturing and will continue to develop throughout the first few years of execution. The current focus of ORS is developing architectural concepts and enabling technology for responsive space. A joint office with an abbreviated chain of command provides a great opportunity to maximize the contributions of the Services and agencies.

At some point in the future, the responsive space concept will need to shift from the technology demonstration phase into fielding operational systems. The Services, and in particular the Air Force, are charged with the responsibility for organizing, training, and equipping joint military forces for space operations. AFSPC takes this Service responsibility seriously and intends to work closely with the ORS office to plan for the transition of the concepts they develop into the Air Force organizational structure. We believe that the right place for a jointly staffed responsive space program office is as part of AFSPC. We look forward to fully integrating responsive space concepts into our portfolio of space programs.

9. Senator BILL NELSON. General Kehler, are you getting cooperation from other entities?

General KEHLER. Yes, we are getting cooperation on ORS. Each of the Services and several government agencies have provided representatives to the ORS office. The two recent examinations of urgent STRATCOM requirements in communications and space situational awareness (SSA) involved the joint participation of all the different defense space organizations. We achieved superior responses to these needs by capitalizing on the different institutional capabilities.

10. Senator BILL NELSON. Admiral Deutsch, I understand that the Navy has at least one senior scientist in the ORS office. What else can ORS bring to the Navy and can the Navy bring to ORS?

Admiral DEUTSCH. What can Navy bring to ORS? Navy recently transferred an 0–5 Space Engineering billet to the ORS office and Navy is working to find the best qualified individual to fill the position given constraints on the force due to other commitments such as global war on terror and sea duty demands. The ORS office should avail itself of the work performed by the U.S. Naval Research Laboratory (NRL) and continue to use NRL's proven ability to develop and transition operationally-relevant capabilities as they have done over the last 50 years using integrated government and industry teams. NRL also has exceptional assets, such as Blossom Point Ground Station, which have capacity and many of the characteristics needed to support ORS.

What can ORS bring to Navy? Being forward deployed, naval forces are often the first responders in a crisis and are heavily dependent on space capabilities to support planning and operations. The ability to augment and reconstitute space capabilities, especially in denied areas, is critical to winning in maritime-dominated major conflict operations. ORS can help meet warfighter end-to-end needs for intelligence, surveillance, and reconnaissance (ISR) programs, communications, battlespace management, command and control, position, navigation and timing (PNT), and meteorological support. ORS resources could provide Navy with flexible options to protect and extend space capabilities in denied and restricted environments, reducing the impact of satellite vulnerability and reducing risk in strategic and tactical warning.

11. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, are there any new authorities that the ORS office needs to operate more efficiently or effectively?

Mr. PAYTON and General KEHLER. The ORS office does not currently require any additional authorities to achieve the desired results. However, the greatest benefit to the program would be to receive all funding as research and development (R&D)

funding instead of being divided into procurement or science and technology (S&T) funding. Having the ORS budget as R&D would add flexibility and speed in responding to warfighter needs.

General SHELTON. From a STRATCOM perspective, the ORS office has the authorities required for success. As the staffing levels mature in the ORS office, we expect their efforts and effectiveness will increase commensurately.

Admiral DEUTSCH. Navy believes the ORS office has the appropriate level of authority at this time.

Ms. CHAPLAIN. The ORS initiative is just getting underway so it is premature at this point to definitively answer whether new authorities are needed. The joint ORS office intends to leverage off existing contracting and acquisition authorities of other organizations, as well as their resources, in meeting unmet space requirements. The office expects these leveraging efforts to streamline the overall process for delivering capabilities as soon as possible.

12. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, TACSAT–1 is scheduled to be launched in the June-July timeframe and also has an electronic intelligence payload. Are the issues all resolved with TACSAT–1 so that there are not similar problems?

Mr. PAYTON and General KEHLER. The DOD will ensure needed authorities are in place prior to future TACSAT and ORS launches. TACSAT–1 was scheduled for launch in 2004 on a SpaceX Falcon-1 launch vehicle. Since the Falcon-1 launch capability is still not available, the ORS office is evaluating options for how to best use the existing TACSAT–1 space vehicle hardware.

General SHELTON. TACSAT–1A has been developed in response to a STRATCOM and ORS office request to upgrade the payload, utilizing lessons learned from TACSAT–2. One of the lessons learned was that SIGINT Operational Tasking Authority (SOTA) needed to be fully justified and approved for all appropriate future ORS projects. This will ensure authority for tasking, as well as allowing data to be released for processing. All parties involved in TACSAT–1A understand the importance of SOTA approval as a precursor to operations.

Admiral DEUTSCH. Navy defers to STRATCOM.

Ms. CHAPLAIN. The joint ORS office expects to have a decision by July 2008 regarding the sensors that are to be incorporated on TACSAT–1. Two issues surrounded the operation of TACSAT–2. First, the encryption device that was to be used in conjunction with the electronic intelligence payload on TACSAT–2 failed after launch. This caused concern regarding how to securely transmit information between platforms, for example, from satellite to aircraft. The second TACSAT–2 issue pertained to the potential for misuse of the automatic identification system (AIS). While AIS is used to identify and locate ships, there was some concern that this sensor could be used to collect space intelligence information. Regarding TACSAT–1, it will not host an encryption device like TACSAT–2, so these satellites could not share this same problem. As for AIS, currently there is no sponsor willing to pay to add the AIS sensor to TACSAT–1. Without a funding source for AIS and commensurate operations and maintenance activities, AIS will not pose an issue to ORS.

JOINT SPACE OPERATIONS CENTER

13. Senator BILL NELSON. General Shelton, the Joint Space Operations Center (J–SPOC) stood up at Vandenberg Air Force Base (AFB) in 2005 and is currently completing a move into its permanent space at Vandenberg. Based on a J–SPOC fact sheet, the center "provides a focal point for the operational employment for worldwide space forces" and that it "creates a single integrated space picture." Part of this responsibility, as I understand it, is to track all objects in space, including debris and understanding what the objects are doing. Modeling and simulation capabilities are key to presenting this space picture and to have the necessary SSA. My assumption is that your capability to do this is limited. What is your modeling and simulation roadmap?

General SHELTON. AFSPC's Space and Missile Systems Center (SMC), as well as Air Force Materiel Command's Electronic Systems Center (ESC), has the responsibility for developing the tools we need to modernize the J–SPOC. This modernization effort will enable command and control of space forces, and provide the SSA necessary to underpin all space operations. We need tools that combine vast amounts of data into decision-quality information, that help us analyze trends, and that provide decision aids for our operators. SMC and ESC are currently working with the Air Force Research Laboratory to accelerate work on prototype tools that

will improve our capabilities while reducing the risk for the Integrated SSA and Space C2 acquisition programs. Additionally, AFSPC and AFRL have engaged with Department of Energy (DOE) modeling and simulation experts via technical interchange meetings to leverage DOE's considerable expertise in this area.

SPACED-BASED INFRARED SYSTEM

14. Senator BILL NELSON. Ms. Chaplain, with the recent delay in the Space-Based Infrared System (SBIRS) program it appears that management reserves for SBIRS will likely be depleted in early 2009, several years earlier than intended when the program was restructured in 2006. If this is true, what, in your view, are the Air Force and the DOD going to have to do to address the problem?

Ms. CHAPLAIN. To keep the SBIRS program on track to meet schedule milestones, DOD will likely have to provide additional funds to address unanticipated problems, given the high complexity of the integration that remains on the first satellite, and the recently identified design flaw on the flight software. If DOD decides not to replenish management reserves once they deplete, unanticipated problems will consume these resources much earlier than planned, causing SBIRS to suffer additional schedule slips.

15. Senator BILL NELSON. Ms. Chaplain, is the Government Accountability Office (GAO) planning to assess the efforts to resolve the software problems on the first SBIRS Geostationary (GEO) satellite?

Ms. CHAPLAIN. Yes, we have recently initiated an effort to determine the events and circumstances that contributed to the SBIRS flight software problem as a follow up to this committee's earlier request to review SBIRS. Through this effort, we intend to determine what software plans and alternatives DOD is considering, and the commensurate risks of each, as well as an approach for resolving the software problems. In addition, we will determine whether DOD has identified the cost and schedule implications to the SBIRS program as a result of the problems encountered with the flight software.

SCHEDULE AND NEED FOR FOLLOW-ON PROGRAM

16. Senator BILL NELSON. Ms. Chaplain, in the fiscal year 2008 budget request, the Air Force submitted a request for a program called the Alternative Infrared Satellite System (AIRSS) which was an alternative infrared program to SBIRS. By the time the budget request was submitted, the reason for the program was largely overtaken by events and Congress directed that the program be restructured. In the fiscal year 2009 budget request, the AIRSS program is gone and a new program called Third Generation Infrared Surveillance (3GIRS) is in the budget. This is supposed to be the follow-on to SBIRS. Have you had a chance to review the request for this third generation follow-on to SBIRS to determine if the program is appropriately timed and structured to address technology risk and readiness, and to meet the requirement for missile warning systems?

Ms. CHAPLAIN. We have not been requested to conduct an in-depth review of the 3GIRS, but we plan to continue to work informally with the program office to keep apprised of its overall plans and progress.

17. Senator BILL NELSON. Mr. Payton, General Kehler, and General Shelton, what is the need date for a follow-on program and in this instance, is there an advantage to continue with the SBIRS program?

Mr. PAYTON and General KEHLER. Continuing to procure the SBIRS through GEO–4 is the lowest risk approach for continuity of service to meet critical national defense needs of missile warning, missile defense, battlespace awareness, and technical intelligence. SBIRS is the successor to the Defense Support Program (DSP) with increased capabilities to meet the four mission needs. The first SBIRS Highly Elliptical Orbit (HEO) payload is on orbit and test results are exceeding performance specifications. SBIRS GEO–1 satellite is making integration and test progress and the program is resolving flight software issues. GEO–1 is baselined for a December 2009 delivery. The infrared (IR) sensors for GEO–2 are proceeding well in thermal vacuum testing, and the GEO–2 satellite delivery is baselined for December 2010. The fiscal year 2009 budget has procurement funding for GEO–3 in fiscal year 2009, and funding GEO–4 beginning with advanced procurement in fiscal year 2010. We will still require space-based infrared surveillance continuity of mission after SBIRS GEO–4. The 3GIRS program, which is currently focused on full-earth staring IR technology maturation and system definition, is also in our fiscal year 2009 budg-

et. There is adequate funding in the fiscal year 2009 budget request for 3GIRS to complete technology maturation and system definition activities. These efforts will inform the DOD to make a system design decision in late fiscal year 2010 and proceed with system design and development of 3GIRS.

General SHELTON. The missile warning, technical intelligence, and battlespace characterization missions that DSP and SBIRS perform are critical to the United States. The sensor sensitivity that SBIRS will provide will greatly improve our battlespace characterization, thereby increasing the value of this infrared data to our warfighters. As we consider a future that will see further proliferation of ballistic missiles with shorter burn times and lower heat signatures, our sensor capabilities need to keep pace. STRATCOM will continue to advocate for robust, capable IR sensors in space.

18. Senator BILL NELSON. Mr. Payton, General Kehler, and General Shelton, what are the disadvantages?

Mr. PAYTON and General KEHLER. The key disadvantages of continuing to build SBIRS GEO satellites are parts obsolescence, older technology, and complex designs resulting in high recurring costs. The evolution to 3GIRS would result in smaller, lighter, and mechanically simpler IR payloads to maintain the continuity of critical mission areas (missile warning, missile defense, technical intelligence, and battlespace awareness).

General SHELTON. From STRATCOM's operational perspective, a continuing strong IR sensor development program is needed. Whether that is accomplished under the rubric of the SBIRS program or some other avenue, it's clear that we must continue the research to constantly improve our space-based IR capability. Missile defense, missile warning, battlefield characterization, and technical intelligence are all enhanced by improved IR sensors in space.

SYNCHRONIZATION OF EQUIPMENT

19. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, user equipment to allow troops to use the special new military signal on Global Positioning System (GPS) satellites—the M code—is not yet available and may not be available until after all M code satellites are on orbit. Is the equipment to utilize the capabilities of other new satellites as they become available, such as the Wideband Global Satellite (WGS), Advanced Extremely High Frequency (AEHF) satellite, and the Multiple User Objective System (MUOS), on track to utilize the new satellites as soon as they become available?

Mr. PAYTON and General KEHLER. Terminal and satellite deployments, which for the Air Force include WGS and AEHF, are programmed to enable users to operate on the new systems as follows:

(1) With the submission of the fiscal year 2009 FYDP, the Air Force has synchronized the development of M-Code receiver technology with the on-orbit availability of M-Code service.

(2) At first WGS launch, over 885 currently fielded, joint terminals, will be able to use the system's legacy X-band capability. At the time of the sixth and final WGS launch, 4,586 joint terminals are programmed to be fielded to take advantage of the new WGS Ka-band capability.

(3) At first AEHF launch, over 1,290 currently fielded, joint terminals, will be able to use the system's legacy MILSTAR-like capabilities. At the time of the fourth and final AEHF launch, 83 percent of the joint terminals planned to take advantage of the new AEHF waveform are programmed to have been fielded.

General SHELTON. The WGS Ground Multi-band Terminal started fielding last year before the launch of the first WGS. The initial fielding of these terminals will be complete by the end of fiscal year 2011 (FOC by fiscal year 2014). There are currently a significant number of terminals already in the field which have already been passing communications over the satellite.

The first AEHF satellite will be launched in January 2009 with only the Low Data Rate and Medium Data Rate capability, so AEHF is backward compatible with existing Milstar terminals. Once the second AEHF satellite is launched in fiscal year 2010, the Extended Data Rate capability will be made available to users; however, there will be limited terminals available initially (approximately 80), but increasing as the Services field the new terminals through fiscal year 2016.

The first MUOS satellite will be launched in December 2009, and it is backward compatible with the legacy UHF terminals. The legacy terminals, however, cannot

fully utilize the increased channel capacity until the new terminals are fielded beginning in fiscal year 2011.

STRATCOM emphasized terminal synchronization via our Integrated Priority List for fiscal years 2010–2015.

Admiral DEUTSCH. Navy terminals for WGS and MUOS advanced waveforms are lagging behind the current satellite launches. WGS Ka capability is also being incorporated into the NMT terminal, and therefore, lags behind the WGS constellation IOC, however, the WSC 6 SHF SATCOM terminals are being upgraded to access the WGS Ka capability and finding for this has been programmed for procurement and installation beginning in fiscal year 2009. The Joint Tactical Radio System (JTRS) Airborne, Maritime/Fixed Station (AMF) terminal, required to access the MUOS constellation, has experienced delays and will lag the satellite by approximately 4 years.

Ms. CHAPLAIN. We have expressed concerns about synchronization of ground assets for these systems in previous reports and believe those concerns are still valid. We plan to provide your staff with more detailed concerns in briefings later this spring.

20. Senator BILL NELSON. Ms. Chaplain, has GAO looked at the issues and problems associated with matching up user equipment and satellites, and if so, what are your recommendations for fixing this problem?

Ms. CHAPLAIN. As stated above, we are aware of sonic of the potential synchronization problems that may be occurring in the area of matching user equipment with satellite development. While we are currently studying this issue as part of an ongoing review of the GPS program, we have not been requested to perform other in-depth reviews matching user equipment development with space segment development for other space programs. Consequently, we are not ready at this point to make any recommendations on this issue.

21. Senator BILL NELSON. General Kehler and General Shelton, it appears the backup ground station will control SBIRS rather than the main mission control station. The main control station for SBIRS, which also operates the DSP satellite, was supposed to begin operating SBIRS as soon as the HEO sensor was certified. Now it appears that the backup station will control SBIRS. We need an explanation of the schedules and funding for the mission control stations. Can you explain the schedule for the mission control station for SBIRS?

General KEHLER. The Mission Control Station (MCS) has command and control of the DSP satellite constellation under Increment 1 of the SBIRS program. The plan is for the SBRS MCS to control and report on all of the SBIRS assets, DSP, SBIRS HEO, and SBIRS GEO except for the period when the MCS is upgraded for SBIRS Increment 2.

The Mission Control Station Backup (MCSB) is planned to be the primary peacetime backup to the MCS. To meet 1996 SBIRS ORD and CJCSV National Security Space Policy directives, the MCSB must have the same global and theater missile warning, missile defense, and battlespace awareness mission processing; ground station control; communications; satellite and payload command and control; and mission planning capabilities as the MCS.

Since June 2004, the SBIRS ground baseline has included the MCSB HEO (MCSB–H) as the prime facility to operate and process data from the SBIRS HEO payloads. The MCSB–H will process HEO mission data and create HEO-only track data for the SBIRS MCS to fuse with DSP event data. The MCS will then report the consolidated event messages to the combatant commanders worldwide. A NORAD-STRATCOM operational acceptance decision and certification for HEO is currently scheduled for October 2008.

The primary MCS is scheduled to be upgraded (hardware/software/communications) for Increment 2 mission operations (consolidated DSP, HEO, and GEO) in fiscal year 2013. The Command will address potential MCSB–H upgrades in future budget submissions.

General SHELTON. The MCS at Buckley AFB is scheduled to be upgraded to perform the SBIRS HEO mission by first quarter fiscal year 2012. During the upgrade, residual DSP and SBIRS GEO mission processing will be done at the training facility at Buckley, and SBIRS HEO processing will remain at the MCSB at Schriever AFB. Following that upgrade the DSP, SBIRS GEO, and SBIRS HEO mission processing all will be performed at the MCS. The MCSB will be upgraded to provide a backup capability by third quarter fiscal year 2012.

SPACE WEATHER

22. Senator BILL NELSON. General Kehler, General Shelton, and Admiral Deutsch, a February 11, 2008, article in Space News discusses the NASA Advanced Composition Explorer (ACE) Satellite. This satellite, which transmits information about space weather and solar wind, is now 10 years old. According to the article, it could fail any day and there are no plans to replace it. What are your concerns if this satellite should stop functioning?

General KEHLER. The DOD has a long history of partnering with other U.S. agencies such as NOAA and NASA to meet the Nation's space environmental support needs. To avoid duplication of effort and to achieve least-cost solutions, these partnerships have routinely involved the sharing of data obtained by one agency, but used by all agencies. The data obtained by the NASA ACE satellite falls into this category. The ACE spacecraft is a key national asset providing data exploited by both the DOD, civil, and international operational and research communities. This data is essential to providing DOD SSA.

As a Nation, theses partnerships between the DOD, NOAA, and NASA are essential to the success of our space environment support infrastructure. No single agency has the manpower or fiscal resources to complete this task alone. By better institutionalizing strong partnerships to leveraging one another's resources, we look to develop near-term mitigation strategies for ACE, while building a comprehensive long-term strategy to obtain environmental capabilities to meet evolving SSA requirements.

General SHELTON. We view space weather information as an essential piece of SSA. The ACE provides important information that offers a timely warning on approaching solar activity and gives our satellite operators 30–180 minutes lead time before our satellites experience the impacts of space environmental events. The loss of ACE would result in decreased forecast accuracy and reduced warning time of solar events for our satellite, ground radar, and communications system operators. Currently, there is no near-term program to replace ACE. STRATCOM will continue to advocate to replace this vital capability as we continue to utilize the remaining space and ground space weather sensors.

Admiral DEUTSCH. If the ACE satellite stops functioning, the resulting degraded ability to predict the onset of geomagnetic storms will prevent operational space weather forecasters from providing accurate predictions, alerts, and warnings of harmful environmental conditions. The resulting reduced time available for operators and engineers to safeguard assets, invoke protective measures, engage backup network systems, and retain SSA during solar storms would severely compromise military operations for missile defense radars and GPS-guided munitions.

23. Senator BILL NELSON. General Kehler, General Shelton, and Admiral Deutsch, the National Polar-orbiting Operational Environmental Satellite (N–POES), a joint Department of Commerce-DOD satellite program, was supposed to carry a sensor that would help GPS satellites maintain accuracy in the face of solar activity that can disrupt GPS accuracy. This satellite is no longer on the N–POES manifest. What are the plans to get this capability in the future?

General KEHLER. The sensors you are referring to are part of the NPOESS Space Environmental Sensor Suite (SESS). These sensors are designed to sense conditions in the near-Earth space environment that can impact space services such as GPS and UHF SATCOM. These same capabilities have contributed to our space environmental situational awareness for the past 2 decades with similar sensors on our Defense Meteorological Satellite Program weather satellites and were expected to continue on NPOESS. SESS was demanifested during the NPOESS Nunn-McCurdy process. To address potential sensing gap shortfalls, AFSPC is working with Air Force Weather Agency, Air Force Research Agency, and our national partners to examine alternative options such as purchasing sensors to fly on other agency platforms. Other alternative concepts include examining small satellite sensor packages that can take advantage of room on ESPA and commercial satellites. This analysis effort is focused on examining the entire space environmental architecture supporting SSA operations and is expected to be completed in time for input into the 2012 POM.

General SHELTON. STRATCOM is working with AFSPC to advocate for a replacement program for those sensors canceled from the NPOESS program.

Admiral DEUTSCH. Navy defers to Air Force's response.

ACQUISITION

24. Senator BILL NELSON. Ms. Chaplain, could you please give a brief summary of where progress has been made on improving acquisition programs for space systems and where you think there is still improvement needed?

Ms. CHAPLAIN. Progress has been forthcoming on improving acquisition programs for space systems, particularly in approaches to technology development for programs such as TSAT. However, progress has been somewhat slow due in large part to the fact that DOD is still suffering the consequences of historical problems in its space portfolio and is not prioritizing investments in a concerted fashion. As I commented in my statement, there are also critical shortages in technical and program management skills. It is also not clear to what extent improvements have been made in cost estimating for space. We previously reported that program assumptions were optimistic in areas such as technology readiness, industrial base capabilities, reliance on heritage systems, complexity of software, etc.

INTERNATIONAL COOPERATION OPPORTUNITIES

25. Senator BILL NELSON. Mr. Payton, recently the United States and Australian governments announced that Australia would participate in the WGS communication satellite system and that an additional sixth satellite would be purchased. This is really a win-win situation. Are there other opportunities to partner with allies and friends in satellite communications?

Mr. PAYTON. The Air Force, in partnership with the National Security Space community, actively explores opportunities to build and expand partnerships on current and future satellite communications programs. As we continue to assess future satellite communications requirements and capabilities, we will explore opportunities for building and expanding our partnerships with friends and allies.

SCIENCE AND TECHNOLOGY

26. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, the Services, the Defense Advanced Research Projects Agency (DARPA), and other agencies invest in basic research for space and related technologies. How do program requirements shape S&T expenditures?

Mr. PAYTON and General KEHLER. The Air Force S&T community works closely with system developers and operational users to identify those technologies that could enable future warfighting capabilities, thus shaping S&T investment and expenditures. AFSPC prepares the "AFSPC Science and Technology Guidance for the Air Force Research Lab" each year to provide recommendations in the context of programmatic guidance and Air Force priorities. The latest guidance, dated April 2007, includes the integrated space technology needs of STRATCOM and other Combatant Commands in support of their operational requirements from the Future Years Defense Program through fiscal year 2030. The Air Force then balances these needs with other Air Force needs to pursue integrated technology capabilities that support our warfighters' highest priorities.

General SHELTON. STRATCOM works with DARPA and the Services' S&T organizations to ensure they understand our longer term operational needs. The Services' acquisition agencies determine actual program requirements and drive the priorities for S&T expenditures. STRATCOM provides general advocacy for needed space technologies by hosting Senior Warfighter Forums and creating an Integrated Priority List, which informs both the S&T and acquisition processes. Additionally STRATCOM participates in prototyping and rapid development processes, such as sponsoring Advanced Concept Technology Demonstrations.

Admiral DEUTSCH. Basic and applied research goals tend to focus on enabling fundamentally new capabilities and are usually not tied to existing program requirements. As investments move into more advanced technology areas, they are rooted more and more closely to programs of record. These investments are often in capabilities "within reach" of being proven in the near-term and transitioned to the operational community. NRL is Navy's corporate laboratory for basic and applied research. NRL leadership rigorously reviews proposals every year with the Office of Naval Research (ONR) and the resulting investments make up the NRL "Base Program". These investments are made typically made based on the potential for enabling new foundational understanding and/or breakthrough capabilities; they are not tied to program of record requirements. Navy's decades-long investment in developing clocks for precision time which enabled the GPS is a space-based example of this process.

ONR invests broadly in S&T for the Navy. ONR divides S&T investments into categories described as Discovery and Invention, Innovative Naval Prototypes, and Future Naval Capabilities. The Future Naval Capability (FNC) program focuses on providing Enabling Capabilities (ECs) to close warfighting gaps. A three-star Navy and Marine Corps Board of Directors, the Technical Oversight Group, approves the FNCs based on their contribution to closing a warfighting capability gap. The FNCs must provide measurable operational improvement within 5 years and are inherently the S&T investments most closely tied to existing programs of record. ONR's recent and current space S&T investments were made within the Innovative Naval Prototype category; this investment is often called the "Space INP". While the Space INP did not require an operational program sponsor prior to investment, the Space INP prototypes selected for development (i.e. TACSAT–4) were directly traceable to either naval analysis of needs (such as data exfiltration from buoys) or to jointly-validated requirements known to be only partially met.

Ms. CHAPLAIN. We have previously reported that there are mechanisms within the space community and DOD designed to ensure S&T efforts are coordinated and are focused on achieving broader goals and that redundancy is minimized. For example, within the space community, a forum called the Space Technology Alliance was established in 1997 to coordinate the development of space technologies with an eye toward achieving the greatest return on investment. At the DOD-wide level, there was also a Joint Warfighting S&T Plan, which ties S&T projects to priority future joint warfighting capabilities identified by higher-level documents. These overall plans, in turn, are used by DOD laboratories to direct investments in S&T. Further, in 2004, DOD was directed to develop a strategic plan for space S&T investments to further tie S&T efforts to program requirements. However, while there are processes in place to link program requirements to S&T expenditures, our work has generally found that large space acquisition programs tend to conduct the technology development needed to achieve desired capabilities.

27. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, several years ago, at congressional direction, a space S&T roadmap was prepared. Has this roadmap ever been used to guide investments? Is there a need for an updated roadmap?

Mr. PAYTON and General KEHLER. The 2004 DOD Space S&T Strategy was prepared in response to congressional direction for a space S&T roadmap. Supporting this strategy are four S&T Vector Roadmaps used to guide investments. The Vector 1 Roadmap identified and estimated costs for technologies to enable next generation launch capability and continues to guide technology investments. The Vector 2 Roadmap established the initial technical guidance for the ORS office, while the Vector 3 Roadmap has been used to guide investments in space control technologies focused on SSA and defensive counterspace capabilities. Finally, the Vector 4 Roadmap identified and estimated costs for enabling technologies for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C^4ISR) capabilities. From an Air Force perspective, updated roadmaps would be beneficial and the Air Force is currently developing a Research and Development Strategic Plan that will provide a space S&T roadmap to guide investments in this area.

General SHELTON. I would defer to the Air Force to answer this question.

Admiral DEUTSCH. The space S&T roadmap was developed in 2003/2004 and did help guide S&T investments. The roadmap also helped validate existing investments. Two of the four roadmap vectors were related to ORS. The jointly-developed Plan for ORS, submitted to Congress in April 2007, intended for the management of these two vectors to be tasks for the Joint ORS Office. These vectors are specific to the most recent roadmap. Updating the roadmap has inherent value due to the increased communication that occurs within the S&T community as each organization explains their priorities and current investments.

Ms. CHAPLAIN. If done effectively, roadmaps can lay out an incremental path toward achieving significant advances in capabilities, and help ensure overall investments in technology development are affordable. The space S&T roadmap was an outgrowth of the DOD space S&T strategy, which DOD was directed to develop in 2004. We found that the strategy provided a foundation for enhancing coordination among space S&T efforts since it specified overall goals and established several mechanisms to help senior leaders gauge whether investments were focused on those goals. Moreover, the development of the strategy itself helped spur collaboration within the DOD space S&T community since it required diverse organizations to come together, share knowledge, and establish agreement on basic goals. Since the strategy had only recently been issued, it was too early to assess whether the direction and processes outlined in the strategy would be effective in supporting and

guiding future space S&T efforts. Additionally, DOD officials were still working out the details of some implementation mechanisms, including the roadmap. Since our January 2005 report, we have not conducted any subsequent reviews of DOD's utilization of the space S&T strategy or efforts to update it.

28. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, transitioning successful S&T efforts is always difficult. What in your view leads to better transition?

Mr. PAYTON and General KEHLER. The Air Force's "back-to-basics" concept and Block Approach, work to deliver systems through discrete, clearly defined increments, based on sound systems engineering principles. This approach reduces development and production risk by maturing technologies prior to system development, deferring some capabilities to later increments when their technologies are mature. The Air Force has also increased its emphasis on technology transition and is using knowledge management tools and databases to track promising technologies and determine how they might impact current programs. Additionally, the Air Force is exploring ways to better achieve advanced technology/manufacturing readiness levels through prototyping to demonstrate capabilities in an operational environment.

General SHELTON. Successfully transitioning technology requires significant interaction among the operational, acquisition, and S&T communities. A regular, ongoing dialogue helps focus the efforts on compelling, future operational needs. In the space arena, designing experiments with residual operational capability in mind certainly eases the transition.

Admiral DEUTSCH. Transition is always a delicate process because managers of formal programs have not budgeted to assume responsibility for capabilities that evolve from S&T efforts of an outside office. Navy experience with transition suggests two steps are crucial for this process: (1) as soon as a S&T project shows serious potential to satisfy an operational need, make candidate long-term sponsors aware of it and attempt to get them involved in the development process, and (2) obtain strong support, in writing, from operational commands that want the capability.

Ms. CHAPLAIN. We have found through our acquisition best practices work that leading commercial companies use three key techniques for successfully developing and transitioning technologies, with the basic premise being that technologies must be mature before transitioning to the product line side.

- Strategic planning at the corporate level: Strategic planning precedes technology development so managers can gauge market needs, identify the most desirable technologies, and prioritize resources.
- Gated management reviews: A rigorous process is used to ensure a technology's relevancy and feasibility and enlist product line commitment to use the technologies once the labs are finished maturing them.
- Corroborating tools: To secure commitment, technology transition agreements solidify and document specific cost, schedule, and performance metrics labs need to meet for transition to occur.

We found that DOD had taken steps to improve its technology transition processes, but it lacked many of the techniques that are hallmarks of leading companies' ability to transition technology smoothly onto new products. From a strategic perspective, we found that the Department lacked strong influence at the corporate level to guide the Department's technology investments. In addition. DOD was not using a gated process with criteria that would allow lab and program managers to know when a technology was ready to transition. Consequently, technologies were often not ready when needed and acquisition programs pulled the technologies into their programs too early, leading to inefficiency during product development, and cost and schedule increases. Furthermore, we found that while the military Services were using technology transition agreements, use of these agreements was low.

29. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, DARPA launched and successfully demonstrated Orbital Express to show that a satellite could be refueled on orbit. Does this demonstration play a role in future acquisition decisions?

Mr. PAYTON and General KEHLER. The lessons learned and capabilities demonstrated by Orbital Express (OE), particularly the ability to service a satellite on-orbit, will help inform future plans for the development and fielding of responsive space systems. In the near-term, DARPA is developing the Front-end Robotics Enabling Near-term Demonstration (FREND) program. FREND is a follow-on project to OE that allows for interaction with military and commercial spacecraft in a GEO with the potential to extend spacecraft service life.

General SHELTON. OE helped demonstrate the art of the possible. The remaining questions center on the operational utility of the concept. On the surface, on-orbit refueling and/or servicing is appealing. But the cost-benefit trades must consider satellite components that either age or are outdated (e.g., computers, solar panels reaction wheels), calling into question life extension by refueling. Designing component replaceability into the satellite also is questionable, given the current nature and design of satellites. In fact, it may prove more cost-effective to launch a new satellite rather than design in repair on orbit capability. An exception may be satellites that would be highly maneuverable by design, for any number of reasons. In this case, on-orbit refueling might be desirable. Much more trade study is required to fully explore these concepts.

Admiral DEUTSCH. We believe the capabilities demonstrated by OE will inform space acquisition programs to consider employing them in future space vehicles.

Ms. CHAPLAIN. Though the concept behind OE is one that is believed to be a key enabler for more responsive, self-maintaining space systems, we do not know yet whether or how this particular DARPA project will enable future acquisition efforts. It is not currently a key enabling capability for the ORS initiative's conceptual construct.

30. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, much of the work of the S&T community is focused on high risk concepts, where as much is learned from failure as from success. Are the space capabilities being looked at in the high risk programs generally the sort of capabilities in which the acquisition community is interested?

Mr. PAYTON and General KEHLER. Yes, space capabilities are reviewed by the Space S&T Council, which meets twice a year to assess investments and provide for a coordinated space S&T program. The Air Force S&T community works closely with system developers and operational users to identify those technologies—whether high risk or lower risk—that could enable future warfighting capabilities and in which the acquisition community is interested. The S&T program strives to reach a Technology Readiness Level that supports Product Center prototyping, productization, and tech insertion into systems development. The Air Force continues to rebalance and focus its core S&T competencies to aggressively pursue high payoff technologies directed towards countering the new threats of today, while modernizing weapon systems for tomorrow.

General SHELTON. I would defer to the Air Force to answer this question.

Admiral DEUTSCH. Naval space S&T investment, while often using some aggressive Technology Readiness Level items, tends to focus on operational prototyping to prove system level performance and demonstrate operational capability. S&T investments of lower risk are generally targeted toward moderate enhancements to current capabilities and are part of ONR's FNC investments. FNCs are expected to transition in the near-term and therefore involve the acquisition community from the start. In general, the higher the risk of the S&T investment, the further from transition to the acquisition community the capability is.

Ms. CHAPLAIN. It is appropriate that the acquisition community be focused on technologies that can be matured in the near-term rather than technologies that are still in their nascent stages. Including such high-risk development in an acquisition program would likely render cost, schedule, and performance estimates unreliable.

COORDINATION ACROSS SERVICES

31. Senator BILL NELSON. Admiral Deutsch, do you see any areas where the Services and other agencies could improve cooperation in providing space capabilities, including coordination in planning for terminals and user equipment?

Admiral DEUTSCH. The Services look for every opportunity to develop satellite capabilities based upon validated requirements. The Joint Capabilities Integration and Development System process provides a means to coordinate requirements between Services.

SPACE INDUSTRIAL BASE STUDY

32. Senator BILL NELSON. Mr. Payton, General Kehler, General Shelton, Admiral Deutsch, and Ms. Chaplain, the DOD recently completed a space industrial base study that looked at, among other things, the space workforce. This study identified some alarming gaps in the space technical design, integration, and systems engineering disciplines. Are you familiar with the study and what can be done, or are you doing, to address some of these problems?

Mr. PAYTON and General KEHLER. A DOD Space Industrial Base study to include the space workforce was recently finalized. The study identified gaps in the space technical design, integration, and systems engineering disciplines. DOD and AFSPC concerns are in the following specific disciplines: science, technology, engineering, and mathematics (STEM). Excellence in STEM disciplines provides an asymmetric advantage to DOD, AFSPC, and all warfighters.

DOD, with AFSPC support, is taking steps to address workforce issues through the National Defense Education Program (NDEP). NDEP is striving to meet the challenge of educating, training, recruiting, and retaining workers in the STEM disciplines. NDEP encourages K–12 students' interest in science and math and funds scholarships and fellowships in critical DOD research areas.

The scholarships and fellowships are provided through a program within NDEP called Science, Math, and Research for Transformation (SMART). This program provides graduate education in science and engineering areas. In turn, the graduates incur a DOD service commitment.

The NDEP also funds scholarships and fellowships in research areas critical to DOD. The SMART is the largest program in the NDEP portfolio. In place since fiscal year 2005, SMART provides graduate level schooling in 15 different science and engineering disciplines in return for a DOD service commitment. The first of the SMART graduates are now entering the DOD workforce and making important contributions to our Nation's defense.

NDEP and SMART are important initiatives in addressing education issues and experience levels in our workforce today. However, we must continue to concentrate on the human capital challenges in the space workforce.

General SHELTON. I would defer to the Air Force to answer this question.

Admiral DEUTSCH. Navy provided inputs to the National Security Space Office (NSSO) on the Space Industrial Report. Navy understands the importance of the recommendations in the report and continues to implement programs to address our concerns with the space industrial base.

The Navy is an active participant in the K–12 STEP program. Our leadership across the space enterprise consistently completes community outreach in this area. Navy commands such as Space and Naval Warfare Systems Command (SPAWAR) and NRL have college internship programs where students can participate in the space system design process. The Naval Academy's Aerospace Engineering Department offers an astrospace track where approximately 40 students graduate each year. As students, they collaborate with industry, the NRO and NRL on small satellite and system design. Some of their systems are selected to be manifested for flight with the DOD's STP. The Naval Postgraduate School (NPS) plays a critical role in the development of this Nation's space professionals. The Space Systems Engineering and Operations curricula provide robust technical education to officers and government civilians of all Services. Additionally, NPS offers distance learning opportunities for officers, enlisted personnel, and civilians to earn a Masters in Space Systems Operations or a 4-course certificate in Space Operations.

The Navy is lock-step with the NSSO as they prepare the way ahead for a National Security Space Cadre. The Navy Space Cadre Office participates in the Space Professional Working Group (SPWG) where the roadmap is developed and refined. The Navy has identified its officer billets and personnel and is working with the SPWG to find a DOD solution to identifying the civilian space workforce.

All Navy acquisition personnel are held to the high standards of Defense Acquisition Workforce Improvement Act (DAWIA) and complete continuous education from the Defense Acquisition University and acquisition curricula at the NRO, SPAWAR, Naval Air Systems Command (NAVAIR), and Naval Sea Systems Command (NAVSEA). Additionally, the Navy depends on the NRO and the National Security Space Institute for additional space training ensuring that its acquirers have a well-rounded space and acquisition foundation.

Ms. CHAPLAIN. We are aware of this particular study but have not been provided a copy or briefed on it. However, our work has also identified gaps in technical and program management skills in space programs and made numerous recommendations for closing these gaps. These include recommendations to the Air Force to conduct a zero-based needs assessment of its space acquisition workforce, recommendations to DOD to adopt best practices to support program managers and hold them accountable, and recommendations to DOD to address critical skill shortages in the area of cost estimating. We are happy to brief your staff further on this work as well as the scope and methodology of ongoing work we are doing for the committee on broader acquisition workforce issues.

[Whereupon, at 3:40 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2009

WEDNESDAY, MARCH 12, 2008

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

STRATEGIC FORCES PROGRAMS

The subcommittee met, pursuant to notice, at 10:10 a.m. in room SR–232A, Russell Senate Office Building, Senator Bill Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Bill Nelson, E. Benjamin Nelson, Inhofe, Sessions, and Graham.

Majority staff members present: Madelyn R. Creedon, counsel; and Richard W. Fieldhouse, professional staff member.

Minority staff members present: Michael V. Kostiw, Republican staff director; Gregory T. Kiley, professional staff member; Robert M. Soofer, professional staff member; and Kristine L. Svinicki, professional staff member.

Staff assistants present: Kevin A. Cronin and Ali Z. Pasha.

Committee members' assistants present: Christopher Caple, assistant to Senator Bill Nelson; Andrew R. Vanlandingham, assistant to Senator Ben Nelson; M. Bradford Foley, assistant to Senator Pryor; Anthony J. Lazarski, assistant to Senator Inhofe; and Todd Stiefler, assistant to Senator Sessions.

OPENING STATEMENT OF SENATOR BILL NELSON, CHAIRMAN

Senator BILL NELSON. Good morning. Thank you all for being here today.

We are starting out with the first of two panels, and we are privileged to have General Chilton, the Commander of Strategic Command, with us.

General, we will put your written statement in the record.

General CHILTON. Thank you, Senator.

Senator BILL NELSON. Senator Sessions' and my written statements will be in the record so that we can get right into questions.

[The prepared statements of Senator Bill Nelson, Senator Sessions, and General Chilton follow:]

PREPARED STATEMENT BY SENATOR BILL NELSON

I would like to welcome our witnesses this morning. On the first panel we have General Kevin Chilton, the new Commander of the Strategic Command. On the second panel we have with us Assistant Secretary of Defense Michael Vickers; General Weber, Assistant Deputy Chief of Staff of the Air Force for Air, Space, and Information Operations; Admiral Stephen Johnson, Director Strategic Systems Programs; and Tom D'Agostino, Administrator of the National Nuclear Security Administration. We welcome all of you and look forward to a good conversation this morning. We will move to the second panel at around 11:00 or so.

General Chilton we welcome you this morning in your new role at the Strategic Command.

Both panels have submitted statements that will be included in the record, so there is no need to read formal opening statements.

The record will remain open until close of business Monday for any additional questions for the record.

PREPARED STATEMENT BY SENATOR JEFF SESSIONS

We meet today to receive testimony from two panels on strategic forces programs in review of the National Defense Authorization Request for Fiscal Year 2009 and the Future Years Defense Program. For the first panel, we welcome General Chilton, who is making his first appearance before the subcommittee as Commander of U.S. Strategic Command. General Chilton, you are now responsible for assisting this subcommittee in our evaluation of whether our U.S. strategic forces and policy are appropriate to the post Cold-War security environment in which we find ourselves. We are pleased to be working with you in this capacity as we examine these important efforts.

The second panel will provide an opportunity to delve more deeply into the various service plans and programs for strategic forces as well as examine plans for revitalizing our nuclear infrastructure. Witnesses on the second panel include Mr. Vickers, the Assistant Secretary of Defense for Special Operations/Low Intensity Conflict and Interdependent Capabilities; Major General Webber, USAF; Rear Admiral Stephen Johnson, USN; and Mr. D'Agostino, the Administrator of the National Nuclear Security Administration (NNSA), an element of the Department of Energy.

This hearing is an opportunity to assess the progress our Nation has made toward adapting our strategic forces and deterrence doctrine to a new security environment characterized by terrorist groups and rogue nations—groups against which traditional deterrence approaches may not work—as well as the need to defend our interests against more traditional threats and peer competitors.

The 2001 Nuclear Posture Review (NPR) established a conceptual framework for thinking about deterrence in this new strategic age, and serves as a useful guide for understanding the relationship between offensive and defensive strategic forces, as well as the relationship between nuclear and conventional weapons—all of which must play a role in deterring strategic attacks against the United States, its forces, and its friends and allies. If we examine how well we have done in drawing down our nuclear forces while simultaneously improving our conventional strike capabilities, fielding missile defenses, and securing a responsive nuclear infrastructure that hedges against future changes, I assess that our progress has been mixed.

While the nuclear-drawdown appears to be proceeding in good order, the same cannot be said about the fielding of the advanced conventional strike capabilities necessary to reduce reliance on nuclear strike forces. We lack today the capability to deliver prompt, conventional strikes against fleeting, high value targets at extremely long ranges. The development of this capability, sometimes referred to as "Prompt Global Strike," lagged in the past due to a lack of consensus between Congress and the administration over the administration's preferred approach, known as the Conventional Trident Modification. Congress, however, has demonstrated a willingness to consider alternative approaches to PGS, and has provided funding in a defense-wide account to do so. We look forward to hearing from the witnesses about their respective PGS candidate solutions.

The most impressive change in our strategic posture since the NPR lies in the area of missile defense. In 2001, we could count only upon our Patriot batteries to provide limited missile defense protection against short range ballistic missiles. Today, we deploy over 24 ground-based interceptors for the defense of the United States against long-range North Korean ballistic missiles; a similar number of SM–3 missiles are available for deployment on some 17 Aegis BMD ships to defend against short to medium range ballistic missiles; and the Army deploys thousands

of improved Patriot PAC–3 missiles to defend our forces against short-range threats. Supporting these interceptors is a global system of upgraded early warning and tracking radars and the command and control system necessary to link together these multiple sensors and interceptors. We must continue to field missile defense capabilities in numbers sufficient to address the threat, while ensuring sufficient testing and improvements to these systems to stay ahead of adversary capabilities. Additionally, we must continue to extend missile defense coverage to our allies, who arc now under increased risk of ballistic missile attack; by doing so, we preserve alliance cohesion and freedom of action in defense of our combined national interests.

The NPR also called for a threat and capabilities-based approach in the area of nuclear weapons. Specifically, the NPR called for a transition from a nuclear stockpile with large numbers of deployed warheads to a smaller stockpile augmented with a responsive infrastructure which would be capable of responding to emerging threats and to changes in the global security environment. Although the concept of a Reliable Replacement Warhead (RRW) emerged after the development of the NPR, the RRW was—and perhaps still is—viewed as a key enabler on the path to this smaller stockpile. This committee, on a bipartisan basis, authorized funding to continue the study of the RRW but the final Omnibus Appropriations Bill for Fiscal Year 2008 did not provide funding. In spite of that outcome, I am pleased that the administration has requested funding, once again, in fiscal year 2009 for continuing the design definition and cost study for the RRW.

General Chilton, in a speech you gave in January, you addressed the topic of RRW in very plain terms. You said, "This is not a problem that we can push down the road to another generation to worry about. This is a problem that we have to face today. . . . I don't say we need a decision right now, but we ought to be spending the resources to answer the questions . . . that are on the table today. A decision on which way we are going to go to make sure we have the most capable nuclear deterrent . . . that we can provide for the citizens of this country for the remainder of this century. . . . These are century-long decisions. I say let's get on with it."

I agree with your comments, General, and hope the committee will again this year—as it has done in the past three authorization bills, support funding for the RRW.

The subcommittee will also hear today from Mr. D'Agostino, on the progress being made in developing the "responsive infrastructure" called for in the NPR. My own assessment is that metrics of responsiveness were slow to be developed; that progress against existing metrics was not rigorously exercised or measured; and as a result, progress has been largely unrealized. Last year, Los Alamos successfully re-established the capability of manufacturing plutonium pits for use in the stockpile. Prior to this achievement, however, the Nation had been without the capability to manufacture this essential nuclear component for over 18 years. I take nothing away from the hard work it took to achieve this milestone. I ask only if this is the pace of progress that was contemplated in the NPR and if not, what can we do to move toward a more responsive infrastructure.

The NNSA has also embarked upon an analysis of alternatives for what it calls "Complex Transformation." The objective of this transformation is to make the nuclear weapons complex smaller, more responsive, efficient, and secure by consolidating operations and relocating activities among sites. These consolidations would result in a reduction in total facility square footage of approximately 9 million square feet. I believe that it is important to size our nuclear weapons complex for the stockpile we are supporting while maintaining the essential capabilities. I hope that this important initiative will be sustained over time.

I look forward to discussing these and other topics with our witnesses today. I thank them for their service to our Nation.

PREPARED STATEMENT BY GEN. KEVIN P. CHILTON, USAF

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, and distinguished members of the subcommittee:

Thank you for the invitation to be here today. This is my first opportunity to appear before you as Commander of United States Strategic Command (USSTRATCOM). I look forward to further strengthening our relationships in pursuit of our common enduring goal of protecting this great Nation. The men and women of USSTRATCOM are committed to achieving this goal as well. They have

performed superbly over the last year, demonstrating dedication across the breadth of our assigned missions both at home and abroad.

Under the superb leadership of my predecessor, USSTRATCOM underwent remarkable change in a very short period of time to stand up new organizations to address a broad range of mission assignments. USSTRATCOM is now in the process of maturing these organizations with an increased focus on day-to-day operations and integration. I am here today to provide my thoughts on the challenges we face, and to ask for your assistance to ensure USSTRATCOM possesses the means to accomplish our missions.

NATIONAL SECURITY CHALLENGES

Many of our national security structures, processes, and capabilities were developed during the Cold War, shaped by DOD's focus on a singular, symmetric threat. The dangers of the past have evolved and are complicated by new sources of conflict and challenges to stability. These new and evolving challenges defy the primarily force-on-force solutions of yesterday; requiring more complex, and in some cases, elegant solutions tuned to each adversary and circumstance.

Our Nation faces four persistent and emerging global challenges. First are the challenges posed by established nation-states, some resurgent, others emerging, who seek to undermine or subvert U.S. policy objectives.

Second, we note the continued rise of non-state actors, predominantly in the form of global terrorists rooted in extremist and violent ideologies. These new adversaries are distributed, networked, and fleeting. Enabled by information technology and financial support, they are able to maintain a global presence by recruiting, training, inciting, and directing attacks in a variety of ways, including through cyberspace.

Third, we continue to face the potential catastrophic use of weapons of mass destruction (WMD). We believe the most dangerous threat to the U.S. today is that of non-state terrorist groups acquiring and subsequently using WMD against the U.S.

Finally, we see both state and non-state actors attempting to supplant our advantage in various operational domains. The "global commons" of space and cyberspace are vitally important to our way of life. Our civil, military, and commercial activities are dependent upon access to cyberspace and space-based capabilities, and we can expect future adversaries to attack these dependencies. Our dependence on these capabilities and their associated vulnerabilities requires us to focus our efforts to ensure U.S. freedom of action in these domains.

ASSESSMENT OF THE COMMAND

Following my confirmation, I conducted a review of USSTRATCOM's roles, missions, capabilities, and priorities. I discovered a command working arduously to execute a diverse set of global missions, each vital to the security of our Nation. On advice from Members of Congress, I toured our National Laboratories to better understand our nuclear stockpile. I also met with a number of Members of Congress and their staffs to determine how we might work together to resolve outstanding deficiencies in critical capabilities.

I believe USSTRATCOM's missions can be divided into two major categories. In the first category are global missions that require us to operate across physical and/or functional boundaries. The three mission areas within this category are Strategic Deterrence Operations, Space Operations, and Cyberspace Operations. We have forces assigned to USSTRATCOM in each of these mission areas that execute operations every day. All of these missions are global in nature and are insensitive to lines drawn on a map.

The second category is comprised of those global missions where our purpose is not to operate across boundaries, but rather to knit together seams between boundaries. Today, USSTRATCOM is not assigned operational control of any forces within this category of missions. However, we have dedicated teams addressing the challenges of fielding and advocating for an integrated Missile Defense system; integrating Department of Defense (DOD) planning and advocacy efforts to better combat the threats posed by WMD; managing the allocation of DOD's high demand/low density Intelligence, Surveillance, and Reconnaissance (ISR) assets; and integrating Information Operations (IO) in support of all combatant commands. As our missions develop, we are placing emphasis on readiness, detailed planning, command and control, and execution; supported by robust, realistic, and periodic command-wide exercise programs.

STRATEGIC DETERRENCE

During the Cold War, the U.S. model for deterrence was based upon a robust capability to employ nuclear weapons via aircraft, intercontinental ballistic missiles (ICBMs), and submarine launched ballistic missiles (SLBMs). Known classically as "nuclear deterrence", this original Triad was designed to deter the Soviet Union. When combined with razor-sharp readiness and a bilateral dialogue that stressed both a mutual understanding of one another's capabilities and decisionmaking processes, the Triad underpinned the U.S. deterrence posture that successfully kept the peace for over 50 years.

Although the strategic landscape has dramatically shifted since the end of the Cold War, the concept of deterrence and the need to deter adversaries from attacking our vital interests is just as important in the 21st century as it was in the last century. However, today's more complex strategic landscape demands excellence and nuance across a much broader set of national security challenges. To address these challenges, our model for deterrence has evolved. Today, strategic deterrence is embodied by a new Triad borne of the 2001 Nuclear Posture Review. The Triad now emphasizes the integration of offensive capabilities, both nuclear and conventional; defensive capabilities; and a responsive defense infrastructure, all enabled by intelligence, planning, and global Command and Control (C2). These efforts are ably led by our Joint Functional Component Command (JFCC) for Global Strike and Integration (JFCC–GSI).

The nuclear capability of the original Triad remains a vital part of our deterrence strategy. In light of this, USSTRATCOM is re-examining our oversight role of the Nation's strategic nuclear forces. We reviewed the U.S. Air Force report of the Minot weapons transfer incident, as well as other independent investigative reports, and have implemented organizational and oversight changes to refocus USSTRATCOM on our nuclear mission responsibilities. We also intend to increase the oversight of Operational Readiness and Nuclear Surety Inspections of our assigned or gained units.

While our nuclear capability remains vital, our ability to integrate conventional long-range precision weapons is every bit as important. Although our conventional forces are second to none, we no longer have these forces forward-deployed permanently throughout the world. Therefore, it is prudent to have the ability to defeat attacks and eliminate high value targets at global ranges on short notice. We have a Prompt Global Strike delivery capability on alert today, but it is configured only with nuclear weapons, which limits the options available to the President and may in some cases reduce the credibility of our deterrence.

The capability we lack is the means to deliver prompt, precise, conventional kinetic effects at intercontinental ranges. The ability to hold at risk sites in otherwise denied territory is a key element of our strategic deterrent capability. At present, the complex and evolving threat environment necessitates the rapid development and demonstration of a prompt conventional global strike capability. I appreciate past congressional discussions concerning the need to fill our Prompt Global Strike (PGS) capability gap and wish to thank Congress for providing the fiscal year 2008 resources as we continue to address this capability shortfall. The Air Force, Navy, and Army are coordinating with USSTRATCOM and the DOD Office of Acquisition, Technology, and Logistics to conduct research, development, test, and evaluation of technologies which hold the greatest promise for new capability development. While we are making progress, we must place emphasis on a near-term solution to fill a gap that exists today.

Reliability, Safety, and Security of the Nuclear Stockpile

The National Nuclear Security Administration (NNSA) and DOD share responsibility for the reliability, safety, security, and effectiveness of the Nation's stockpile of nuclear warheads, and for the quality and responsiveness of the enterprise necessary to sustain it. I want to assure the committee that as a member of the Nuclear Weapons Council (NWC), I appreciate the concerns expressed by Congress with respect to both the status of our nuclear stockpile and the role nuclear weapons will play in our Nation's defense in the 21st century. Congress has directed a number of activities in the coming year which will provide opportunities to further the national dialog on our strategic posture. We look forward to participating in this national discussion.

Our strategic nuclear forces have stood watch over the Nation for over 50 years, always prepared to conduct a mission we all hoped would never be necessary. Supported by weapons and infrastructure that were as modern as we could make them, and military and civilian personnel that were ready 365 days a year, 24 hours a

day, we succeeded in deterring our adversaries, assuring our allies, and preserving the peace.

Our Nation has invested heavily in increasing our scientific understanding and extending the life of nuclear weapons designed during the Cold War. To date, these efforts have successfully provided confidence in the reliability of our weapons without the need to conduct nuclear tests. Today the Stockpile Stewardship Program (SSP) is working—our nuclear stockpile remains reliable, safe and secure. Our assessment is based upon a solid foundation of past nuclear testing and augmented by cutting-edge scientific and engineering experiments and analysis, advanced computing and simulation, and extensive flight tests of warhead components and subsystems.

However, we are not confident that the SSP, or any conceivable weapon's life extension program will provide future USSTRATCOM Commanders the same level of confidence that I am pleased to express to you today. We recognize the current path of indefinitely relying on legacy nuclear weapons refurbished through a series of life extension programs entails accepting significant future risks to reliability, safety, security, and maintainability, as well as considerable expense.

Our legacy weapons were designed to maximize destructive capability while minimizing weight and volume, facilitating long range weapons delivery with great effect to deter a threat with a similar symmetric capability. Weapon performance margins, maintainability, and longevity, while important design criteria, were made a lower priority in the manufacture of these weapons to facilitate higher yield to weight ratios. These design trade-offs were acceptable at the time for several reasons. First, our Nation maintained a robust nuclear weapons production infrastructure that was able to quickly fabricate large numbers of weapons. Second, we produced successive generations of nuclear weapons every 15–20 years. Finally, we were able to routinely test our weapons.

As the threat to our Nation has evolved, so have the requirements driving nuclear weapons design. Emergent states seek a nuclear weapons capability and non-state actors and terrorists seek to acquire nuclear weapons. Other declared nuclear powers continue to modernize their nuclear weapons, delivery platforms, and infrastructure. Conversely, the U.S. has effectively eliminated its nuclear weapons production capacity and allowed its infrastructure to atrophy. We no longer produce successive generations of nuclear weapons and we have discontinued underground testing. Current U.S. policy is to retain the fewest number of operationally deployed nuclear weapons required to meet national security objectives.

Over time, the environment degrades the functionality of both non-nuclear and nuclear weapons components, negatively impacting extremely tight performance margins that exist in our weapons today, thereby reducing weapon reliability. The highly optimized designs of our legacy weapons limit opportunities to improve safety and security standards through a warhead life extension strategy. A broad suite of modern safety and security features that were not available during the design and development of our legacy systems are available today and could be used to help prevent exploitation by terrorists, rogue nations or criminal organizations. Modern design technology will dramatically increase the maintainability of our stockpile which will serve to maximize long term reliability while minimizing long term costs. Finally, modern warhead designs offer a high potential for avoiding future nuclear testing.

In light of these changes in the strategic environment and the aging of our stockpile and its supporting infrastructure, we recommend pursuing an alternate weapon modernization strategy. This strategy should focus on improved weapon reliability, safety, security, and maintainability. These are the priorities for 21st century nuclear weapon design, not the 20th century criteria of maximizing destructive capability and minimizing weight and volume.

If the Nation is going to maintain a nuclear deterrent, the capabilities that support this deterrent should be second to none. We must care for the stockpile whether we possess one weapon or thousands. It is important to note that improvements to our aging infrastructure will be required whether or not we decide to pursue an improved warhead design. This cannot be accomplished without investment in requisite infrastructure and human capital. The last nuclear design engineer to participate in the development and testing of a new nuclear weapon is scheduled to retire in the next 5 years. The transition to a more modern stockpile will re-invigorate the design and engineering technology base—especially its human resources—and enable a more responsive and cost-effective infrastructure. A revitalized infrastructure will facilitate a reduction of the large inventory of weapons we maintain today as a hedge against strategic uncertainty and weapon reliability concerns, and will allow us to sustain our nuclear capability and expertise throughout the 21st century.

Some contend that an effort to modernize our nuclear stockpile would lead to increased proliferation. We assert a modern stockpile designed to provide a reliable, safe, and secure nuclear umbrella will serve to dissuade and deter our adversaries, and assure our allies, reducing their perceived need for an indigenous nuclear program.

To facilitate an informed national debate of all of these issues, USSTRATCOM supports the continuation of the Reliable Replacement Warhead (RRW) Design Definition and Cost Study to explore a replacement for aging warheads in the stockpile. Completion of this study during fiscal year 2009 in parallel with the planned Nuclear Posture Review will provide Congress and the administration the information needed to effectively evaluate alternative strategies for the long-term maintenance of the Nation's nuclear weapons stockpile. The information from this study is critical to developing a comprehensive nuclear strategy that meets future national security requirements.

National Command and Coordination Capability (NCCC)

The strategic environment is fundamentally more complex than it was when our current point-to-point nuclear command and control (C2) system was developed more than 50 years ago. For example, the threat that some states will acquire and deploy ICBM technology, combined with our ability to counter these threats with missile defense systems, demands a C2 capability that rapidly and efficiently provides assured and responsive connectivity between national leaders. This scenario reduces our decision time to mere minutes and calls for a C2 capability that extends beyond legacy Cold War systems and capabilities. We have set a course to modernize our single-purpose and aging C2 system to allow for secure, enduring, and continuous communications under current scenarios as well as those emerging threats that we are likely to confront.

Our strategy is to sustain our legacy nuclear C2 system while expanding our capabilities to address a broader scope of military challenges. We are transforming the circuit-based, point-to-point communications systems that comprise our legacy nuclear command and control capability to a system that fully leverages new information technologies. Furthermore, we are focusing resources and efforts to implement a C2 architecture that provides global C2 capabilities, as well as systems that can be seamlessly integrated with the broader, national capabilities that support the President and senior leaders. We are working diligently to ensure our ability to provide end-to-end C2 under the most stressful scenarios envisioned.

Our concept of operations calls for the enduring and survivable ability to conduct operations from geographically dispersed locations through collaborative access to data, services, and information. The evolution of our legacy nuclear command and control system will undergo careful evaluation and review to ensure no reduction in capability. It is imperative that as we assess and deploy our new systems and capabilities, they be subjected to rigorous testing to ensure interoperability with other ongoing initiatives to enhance national and senior leader communications capabilities.

SPACE OPERATIONS

During the 20th century, the Nation approached space as a new frontier. Our focus was to win the exploration race and to understand and develop our capabilities in this ultimate high ground. Today, we depend upon space-based capabilities to conduct commerce, advance our interests, and defend our Nation. To this end, USSTRATCOM's Joint Functional Component Command for Space (JFCC–SPACE) conducts space operations on a daily basis.

Increasingly, space-based capabilities enable all other war-fighting domains. In the 21st century, the mindset of space as purely an "enabler" must change. We must view our activities in the space domain in the same way we regard activities in the domains of land, sea, air, and cyberspace. As space-based capabilities provide critical support to forces in other domains, space operations must also receive support from forces outside the space domain.

The Chinese kinetic antisatellite test (ASAT) conducted in early 2007 made it clear that space is not a sanctuary. We can expect similar challenges in the future. To ensure our freedom of action in space we need to maintain an acute awareness of the objects in space, and the terrestrial threats that could interrupt or deny our space operations. Our adversaries understand our dependence upon space-based capabilities, and we must be ready to detect, track, characterize, attribute, predict, and respond to any threat to our space infrastructure.

Space protection requires robust Space Situational Awareness (SSA). While sustaining our current space surveillance systems, we need to simultaneously improve our sensor coverage of the space domain with a mix of ground and space-based sen-

sors, and improve the data transmission architecture and equipment necessary to fuse the data we collect into useable information. Additionally, we must continue to foster collaborative datasharing with our allies to enhance global coverage. The analogy of a 1,000 ship navy built through a coalition of nations can be applied to space, and the ability to leverage and expand space partnerships with our allies holds the potential to dramatically improve Space Situational Awareness.

Global satellite communication to include nuclear command and control, uninterrupted position, navigation, and timing, missile warning, intelligence collection, and environmental observation are essential space-based capabilities required by the warfighter and the Nation. These existing space-based capabilities must remain viable while conducting research, development, and fielding of replacement capabilities. We must also ensure that the current space-based capabilities we provide to the Nation can be either adequately defended or delivered by alternate means in times of crisis. We ask for funding support to ensure there is no interruption in the provision of these capabilities to our warfighters and our Nation.

Assured access to space will remain an imperative for the U.S. Today, the dominant threat to access does not come from an external threat, but from the need to properly sustain and modernize our launch ranges at Vandenberg and Cape Canaveral. We ask for continued attention to and appropriate investment in these mission assurance programs.

We must also continue to make investments in the human capital that will enable USSTRATCOM to face the challenges of tomorrow. These challenges require the development of a cadre of space professionals, in all Services, with the requisite skill, talent, training, and focus that will ensure our ability to develop new or improved capabilities and operate and defend them in the future.

CYBERSPACE OPERATIONS

Like space, cyberspace is a unique global domain in which the U.S. must maintain freedom of action. It serves as a worldwide neural network, a conduit that links human activity and facilitates the exchange of information at speeds measured in milliseconds. Potential adversaries recognize the U.S. reliance on the use of cyberspace and constantly probe our networks seeking competitive advantage.

In this emerging warfighting domain, USSTRATCOM, through the Joint Task Force for Global Network Operations (JTF–GNO) and the Joint Functional Component Command for Network Warfare (JFCC–NW), in partnership with the Joint Staff is leading the planning and execution of the National Military Strategy for Cyberspace Operations. In this role, we coordinate and execute operations to defend the Global Information Grid (GIG) and project power in support of national interests.

Over the last year, the Defense Department has sought to enhance the security of the GIG by improving personal identification and authentication measures, standardizing operational security procedures and software, and reducing access to nonmission essential web sites. While generally effective, these defensive measures require augmentation to defeat sophisticated adversaries. As the cyber attack on Estonia demonstrated, the Defense Department must also plan and train to operate the GIG while under attack. USSTRATCOM is actively planning and executing operations to detect and counter attacks on the GIG while coordinating responses with other DOD and interagency elements.

For as much as USSTRATCOM has accomplished in this domain, cyberspace operations is the least mature of USSTRATCOM's operational mission areas. Our challenge is to define, shape, develop, deliver, and sustain a cyber force second to none. We pledge to continue to work with Congress as we continue to develop future resource and manpower requirements. As we continue to define the necessary capabilities to operate, defend, exploit, and attack in cyberspace, we ask for increased emphasis on DOD cyber capabilities. Our most immediate challenge is adequately trained personnel. USSTRATCOM needs a dedicated and highly trained force provided by the Services to conduct network warfare. As we continue to develop our cyberspace capabilities, we look forward to the day when we have trained and equipped Service organizations (e.g. brigades, battalions, wings, groups, and squadrons) assigned to USSTRATCOM to conduct network warfare.

INFORMATION OPERATIONS

The Joint Information Operations Warfare Command (JIOWC) remains the center of excellence for DOD IO. Through JIOWC, USSTRATCOM has refocused our IO efforts to reinforce and support our three global missions of strategic deterrence and space and cyberspace operations. Specifically, we shifted from regionally focused efforts centered on individual combatant commands to concentrate on integrating

Strategic Communication planning, Operations Security (OPSEC), Military Deception (MILDEC), and Electronic Warfare (EW) capabilities to enable USSTRATCOM's global mission sets. Additionally, USSTRATCOM recognizes that controlling the use of the electromagnetic spectrum and ensuring its constant availability to friendly forces is not only of fundamental importance to all three of our operational missions, but to every other combatant command. To that end, we have undertaken a DOD-wide effort to identify joint EW effects requirements, highlighting Service-level EW capabilities and gaps in order to provide joint solutions for ensuring global electromagnetic spectrum access.

MISSILE DEFENSE

Missile technology continues to proliferate, thereby increasing the need for a credible missile defense capability as an essential element of America's National Security Strategy. Missile defense systems raise our adversaries' ballistic missile development costs by reducing their systems' effectiveness. In addition, our missile defenses enhance deterrence by denying adversaries the benefits they might seek by threatening the U.S. or our forces and allies with a missile attack.

Our missile defense systems must be ready to defend against a missile that launches and lands in the same combatant commander's region; a missile that launches from one region and lands in an adjacent region; or is launched from one region, overflies an adjacent region and lands in a third region. It is our responsibility to ensure concepts of operations, the design and integration of sensor suites, missile warning systems, and the mechanics of battle management systems all address these scenarios.

As we move forward in the next year, USSTRATCOM, through our Joint Functional Component Command for Integrated Missile Defense (JFCC–IMD) is leading a collaborative effort with geographic combatant commanders to develop a global integrated missile defense concept of operations that will lay the groundwork for our future Ballistic Missile Defense System (BMDS) Command and Control architecture. We are also examining the merits of incorporating cruise missile defense capabilities into the BMDS Command and Control architecture to address this growing threat in a cost-effective manner. We continue to support DOD and Department of State efforts to deploy the BMD mid-course radar and Ground-Based Interceptor capabilities in Europe, which are an integral part of the transition from limited defensive operations against a North Korean ICBM attack to an architecture capable of defending the U.S. and Europe from missile attacks originating from Southwest Asia as well.

The Missile Defense Agency (MDA) had an excellent year. In 2007, MDA conducted five successful AEGIS Standard Missile flight tests (one in conjunction with the Japanese Maritime Self-Defense Force) and four Terminal High Altitude Area Defense (THAAD) flight tests. Additionally, they conducted one Near-Field Infrared Experiment (NFIRE) test on-orbit, and one Network-Centric Airborne Defense Element (NCADE) air-to-air test. In September 2007 a successful ground-based mid-course interceptor test was conducted using operational crews. In July 2007, the early warning radar at Fylingdales Royal Air Force base completed a major hardware and software upgrade to improve detection, object classification, and precision tracking of ballistic missiles launched against the U.S. This site, along with the site at Beale AFB is now equipped with the Upgraded Early Warning Radar (UEWR), making both sites critical components of the BMDS. These modernizations contribute significantly to the accuracy, and hence effectiveness, of missile defense tracking information and provide a single configuration that will enhance the sustainability of these radars.

The BMDS was exercised extensively throughout 2007. Between April and August, operational warfighters exercised missile defense operations in six joint and combined combatant command level exercises. These efforts dramatically increased the level of operational warfighter involvement in the development and fielding of the BMDS.

In the coming year, multiple BMDS exercises and tests, complemented by the development of the global integrated missile defense concept of operations will serve to validate our ability to ensure the efficient, coordinated, and prioritized use of limited missile defense resources. In support of the development of critical capabilities, USSTRATCOM has also continued to perform its advocacy responsibility for the global missile defense mission area, in full collaboration with the MDA and the combatant commanders.

As our missile defense system continues to mature, it will continue to influence our adversaries' perception of the economic and political cost they must incur to pursue missile technologies. While missile defense as a defensive shield is important,

its ability to assure allies, dissuade competition, and deter adversaries is equally vital. To achieve these goals, we need your continued support.

I would like to emphasize that the recent successful operation to intercept the decaying satellite was not a test of our missile defense system. Some components of the system underwent a one time modification to facilitate accomplishment of this mission. However, these components are being returned to their original configurations to continue defending against the ballistic missile threat.

COMBATING WEAPONS OF MASS DESTRUCTION (CWMD)

For more than half a century we lived in a world in which a few major powers possessed nuclear, chemical, and/or biological weapons. The U.S. has led efforts to encourage nuclear-capable nations to secure their materials and technology, as well as encourage those nations retaining chemical and biological weapons to disavow them as the major powers did long ago. While we have had some successes, such as Libya, and more recently, progress with North Korea, a number of nations continue to possess or seek WMD. Additionally, some nations with WMD capability are experiencing political unrest, thus placing their weapons at risk of capture by those hostile to the United States and our allies.

Presidential direction, the National Strategy to Combat WMD, and the recently publicized Inspector General report on DOD Initiatives for CWMD made it clear the U.S. requires an integrated approach to deterring our adversaries and protecting our Nation from those who would employ WMD against us.

While every regional combatant command is assigned the mission to counter WMD in its geographic area of responsibility, it is USSTRATCOM's responsibility to integrate the family of DOD CWMD plans and to advocate within DOD for desired CWMD capabilities from a global perspective. We do this through the USSTRATCOM Center for Combating Weapons of Mass Destruction (SCC). Last year the Department's concept plan to integrate and synchronize CWMD operations and activities was approved by the Secretary of Defense (SECDEF). This plan provides the blueprint to coordinate worldwide CWMD operations by supplying an effects-based template for regional combatant commanders to use in tailoring their regional CWMD plans, operations, and activities. USSTRATCOM has enhanced DOD's operational capability suite by initiating the standup of a Joint Elimination Coordination Element (JECE) to conduct operational level WMD-Elimination planning (including deliberate, crisis action, and adaptive planning), joint training, command and control, and elimination operations exercises in support of joint force commander requirements. The JECE focuses on the activities and operations necessary to train and prepare joint forces and command and control elements to conduct WMD-Elimination missions. Recently deployed in support of U.S. Pacific Command's major force exercise, Ulchi Focus Lens, the JECE performed admirably, supporting the formation of the first Joint Task Force Headquarters for the elimination of WMD.

In our advocacy role, leveraging the Defense Threat Reduction Agency's (DTRA) WMD expertise, SCC completed the CWMD Joint Integrating Concept (JIC) outlining the future integrated architectures and capabilities (2015–2027) for the CWMD mission. We have used this visionary document as the foundation for development of the first CWMD Joint Capabilities Integration and Development System (JCIDS) requirements document which provides a holistic prioritization of current combatant command capability needs.

Over the past year, Congress supported our top two capability needs; technologies for detecting shielded nuclear materials at standoff distances, and a joint effort with United States Special Operations Command to develop a CWMD intelligence predictive assessment capability. USSTRATCOM continues to support DTRA through the integration of interagency activities with the Departments of Energy, State, Homeland Security and the Defense Advanced Research Projects Agency to accelerate research and development efforts for critical standoff detection capabilities. Timely response to nuclear and radiological events through enhanced sample collection, packaging, transport, and precise data analysis is required to establish attribution, thus contributing to deterrence.

We ask for your continued support in helping us build on the successes realized through Proliferation Security Initiative programs and the Nunn-Lugar Cooperative Threat Reduction initiative, the DTRA CWMD mission portfolio, and the Chemical/Biological Defense Program. These programs enhance the capacity and capability of partners and allies to better secure and govern their own countries. By building global partnerships, the U.S. enhances the development of resident counter-proliferation capabilities. This strategy facilitates the interdiction and elimination of

WMD by other nations, promotes regional stability, presents a consolidated front to the threat, and enhances U.S. security by eliminating threats far from our shores.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

In 2007 USSTRATCOM and our Joint Functional Component Command for Intelligence, Surveillance, and Reconnaissance (JFCC–ISR) led ISR planning in support of the operational surge in Iraq. The planning, allocation, execution, and assessment of ISR missions have been vital to the improvement of the security situation in that region. We continue to improve our global ISR management processes. As the sophistication and volume of warfighter ISR needs continue to grow, so does the need to employ DOD's limited ISR assets in close coordination with the rest of the Nation's surveillance and reconnaissance capabilities, as well as those of our allies.

To that end, we have invested significant effort in strengthening DOD's internal and external organizational relationships to enable more efficient ISR operations. When we assessed strategies to achieve a more efficient ISR enterprise, the need to integrate national and Defense ISR capabilities to satisfy the Nation's intelligence requirements became clear. In October 2007, the DOD took a major step toward improving the Defense ISR Operations Enterprise by integrating the functions performed by JFCC–ISR and the Defense Joint Intelligence Operations Center to form the Defense Intelligence Operations Coordination Center (DIOCC). The DIOCC serves as the primary focal point for interface with the recently established National Intelligence Coordination Center and is part of a strategy to help ensure our limited surveillance and reconnaissance capabilities are aligned with the Nation's and the Department's strategic priorities. These changes reflect the direction, concurrence, and collaboration of the SECDEF and the Director of National Intelligence.

In addition to improving our organizational approach, we are reviewing USSTRATCOM's intelligence structure. When USSTRATCOM established joint functional component commands, some of its key intelligence functions were divested. We are reviewing our intelligence support requirements at the component and headquarters level to better posture intelligence support for each of USSTRATCOM's mission areas.

CONCLUSION

We live in a world where threats to our safety and security emerge and change daily. USSTRATCOM's missions and capabilities support our national objectives of protecting and defending the homeland, assuring our allies, dissuading undesirable competition, and deterring and when necessary, defeating our adversaries. The men and women of United States STRATCOM form a responsive warfighting command with a global perspective that is in the fight today, and perhaps even more importantly, is uniquely positioned to anticipate, prepare for, and deter future crises.

I appreciate the opportunity to share my thoughts with you and I look forward to partnering with you in the future as we work together to ensure our Nation is secure. Thank you.

Senator BILL NELSON. I want to give the courtesy of turning that opportunity over to Senator Sessions for his questioning. I'm going to have to step out of the room for just a minute, and will be back in, so Senator Sessions.

Senator SESSIONS. Thank you, Senator Nelson.

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS [presiding]. Thank you, Mr. Chairman, and thank you for your leadership and commitment to the subject of our subcommittee. It's an important subcommittee.

General Chilton, thank you for being here. We value your leadership.

Senator Inhofe, I know you have another committee hearing, at this very moment. If you'd like to go first or—I will be pleased to yield to you—if that would be convenient with your schedule.

Senator INHOFE. Here's the observation I want to make, and I wanted to do it when the chairman was here. We actually have two hearings going on at the same time now, the Readiness and Management Support Subcommittee and this one. I was looking for-

ward to hearing the opening statement of General Chilton, and what I'd like to do is get an opinion from General Chilton on the three phases of missile defense: the boost phase, the midcourse phase, and the terminal phase and to get, in your opinion, your thoughts on where we are on each one.

This is one of the major areas of misunderstanding by the American people. I can remember people introducing amendments on the floor of the Senate that we never did consider. But, they were there, saying, well, we don't need to have redundancy in midcourse, for example, and we don't need to be putting money into kinetic energy booster, would, in fact, on the boost segment we're pretty much negative right now, we don't have anything that's out there working.

So, I'd just like to have you give us a little update on where you think we are—what our timing is, and what is really important that is coming along in these three phases of progress.

General CHILTON. Senator, I'm happy to discuss that. I'll caveat my comments, first, by saying that, of course, the Missile Defense Agency (MDA) is the technical expert in this area.

Senator INHOFE. Yes.

General CHILTON. But as a warfighter, when I look at missile defense, writ large, I do look at it in those three phases that you described, for the following reasons. Again, I'll tell you, I'm a little colored by my youth, where my father worked, actually, on the Anti-Ballistic Missile (ABM) system, way back in the early 1970s, and I remember him telling me, as a young man, he said, "Son, the best way to get these things is in the boost phase," he says, "because that's when they're hot, the thrust is coming out, you can see them," he says, "but it's a challenge, because you have to get a little closer. The hard part is the later you get into the flight." That wisdom of my father has not changed.

Boost phase: you have the rocket coming off the pad, it's a limited 2- to 3- to 4-minute time period, where it's very visible and trackable and discernible, and it's very vulnerable. The key there is to be able to bring effects to bear against it, ordnance to bear against it. There's the issue of being close enough and having a weapon that can do that. It's an area that we are probably least mature in. I'd say we are, as you look at what's deployed today. But, an area we want to continue to work very strongly, because every warfighter will demand that.

The midcourse phase we're talking about is when the rocket quits and before the reentry vehicle enters the atmosphere, so it's actually in space as it's transiting space at this phase. It's another time when, if you can get at the threat early in that phase, that's desirable. It's also, obviously, desirable to develop and field technologies to interdict in this phase. The ground-based missile defense system that we have deployed in Alaska and in California addresses this.

Envisioned improvements to the sea-based system will add another weapon system that can address this phase, and it's an equally important phase. What gets hard in this phase is you go from tracking a really hot booster to a very cold reentry vehicle up in space. So different sensors are needed, and it's a different chal-

lenge, but one that we've worked through pretty successfully with our deployed systems.

Probably our most mature, if you think about how long we've had them deployed, is the terminal phase. Now you're talking about the reentry vehicle as it starts coming down through the atmosphere into the local area. We've started that, back in 1991, in Operation Desert Storm, with the improvements to the Patriot system, and we've advanced those with PAC–3. That is your last effort, last opportunity to do it.

The terminal systems are not particularly capable, if at all, against intercontinental-range missiles, but they are more capable against—theater-based short-range to medium-range missiles. So, when you look at the threat in total, whether it be that you're concerned about defending the United States of America from an intercontinental attack or a region, forces deployed in a region from a short- or medium-range attack, I think the approach that we're taking, the layered approach of trying to address the vulnerabilities of these systems in boost, midcourse, and terminal is the right approach to take.

Senator INHOFE. I think the greatest deficiency to work with right now is the boost phase.

General CHILTON. It's the most challenging, for sure, Senator.

Senator INHOFE. Senator Sessions and I have been around long enough to remember when this all started, and fighting the battle that's been in a continuous fight, particularly through the 1990s. We even had one veto of a defense authorization bill, in 1996. The reason was that we don't need to be moving as fast as we're moving on this whole system.

If you're going to get into this cyber thing, this might be a good time to do it, because I was fascinated by his discussion, there.

Senator BILL NELSON [presiding]. You all go ahead and continue your questions, both of you.

Senator SESSIONS. Since Senator Inhofe has another committee at the same time, but——

Senator BILL NELSON. Sure.

Senator SESSIONS. Why don't we follow up a little, for the record, on the discussion we had about cybersecurity.

I would just note that, World War II, decisive events occurred when we were able to break the Japanese and German codes and have information that was critical to the war, and saved lives, and assisted us dramatically. We're so committed, as a nation, to computer systems: our Future Combat System (FCS) for the Army, and our Air Force and Navy systems are all computerized.

First, to what extent is maintaining security of those systems your responsibility, General Chilton? Can you tell us whether or not you have a plan in place, that you're moving forward with, that will provide us confidence in the security of this system? If you haven't gotten it, how close are you to getting it?

General CHILTON. Thank you, Senator.

You're exactly right, there's good analogies to the World War II time period and to now and the future, when we think about how we protect that critical information to our military operations. When I think about where we are in computers, I just put it in respect that we've transitioned from the ways that we used to trans-

mit and store information, which was in file drawers and paper and through, maybe, radio frequency communications, to this network that we're involved with now, where we store information on, and transmit information.

Senator SESSIONS. Could I ask a question on that?

General CHILTON. Sure.

Senator SESSIONS. Would one difference in today and in World War II be that in World War II you had to intercept the message while they were being sent, which is a very short period of time, but today so many of these messages are permanently recorded, if you could penetrate the system, you could recall those messages years before?

General CHILTON. That's a great point, Senator. If what we're seeing today, in the taking of information from networks, or storage devices on the network, is akin to what? I would say espionage. So, in your analogy, in the old days, you would have to go and break into those files with a flashlight in your teeth and a camera, or take them away. Now you can do that from the comfort of your desk and your access to a computer system, or attempt to go into stored information on the network. So we have to be very cognizant of that vulnerability.

What Strategic Command (STRATCOM) has been chartered to do, with regard to the network, is to operate and defend the Department of Defense (DOD) portion, which you'll hear it referred to as the Global Information Grid. That's another coined phrase to talk about the set of addresses that end in .mil, for military, or .smil, for classified military.

What we're not chartered to defend—and I think this is important to understand—is the .gov—so, probably the domain that you operate in quite frequently on the Hill—or any other agency within the government; the .edu, which our science and university systems exchange a lot of information on, and we actually go out and get information whether it be through Google or whatever search engine; or the .com networks that a lot of our financial systems or other systems throughout the infrastructure of the country rely on for their operations. STRATCOM is not chartered to defend those.

Senator SESSIONS. Who defends those?

General CHILTON. The Department of Homeland Security is chartered to do that. The President's initiative that was just signed out in his recent National Security Presidential Directive is the kickoff, really, of a large effort to go off and address that.

Senator SESSIONS. Are you responsible for the Services—Army, Air Force, Navy, Marines?

General CHILTON. We're responsible for the network, and they use that network: .mil and .smil. So we have set up a construct, under the Joint Task Force for Global Network Operations, under the command of General Charles Croom, who reports to me, to operate that military network and to promulgate orders to bring unity of command and effort, to make sure we're configuring it using the right defensive systems, the right procedures, to protect that DOD portion of the network.

But, it's not just enough to build defenses, in my mind; because no defense will ever be impenetrable. I think, as we think about defending this vital domain, we have to go from the high end of

technology investments all the way down to the lowest end, which is your newest recruit coming in, and he's going to get on and use that system, whether he be a soldier, sailor, airman, or marine, and to make sure that individual knows that the way he behaves and utilizes his or her computer on their desk can affect the entire system. They can create vulnerabilities by not following the correct procedures. They can also be a defender, even though they may be a maintenance officer working on airplanes, or enlisted person working in administration, they can be part of a network of people who are watching out for people misusing or abusing that network.

So when I think about our responsibilities, and I think about it from a very low to a very high-end continuum, and I'm very encouraged by the seriousness with which the Services are taking this issue, and the attention they're bringing to it, to address it across the spectrum.

Senator SESSIONS. There's an article, recently, indicating that our networks are increasingly under attack. Can you, in this open forum, share some of the things that——

General CHILTON. Yes, Senator, and I would characterize them not "under attack" as much as being exploited. When I say that, to go back to what I talked about earlier, from an espionage perspective. There are individuals or entities coming into the networks and downloading vast quantities of information. Now, that doesn't impede the way we work, day in and day out, but it's a collection of unclassified information that, if you put those pieces together, you can, maybe, discern certain things about the way we operate or uncover certain vulnerabilities in the way we might operate. You're doing that without having to actually train someone to infiltrate the United States of America and get access to files in a file cabinet.

Senator SESSIONS. You could do that from a foreign nation.

General CHILTON. You could, and so, that to me is different than an attack. I think what we saw in Estonia, previously, was more of an attack, where there was an effort by an unknown entity or group of people to come in and actually slow down the network and the responsiveness of the Estonian network. That was more of an attack, rather than espionage. But you have to worry about both. We have to be worried about both.

Senator SESSIONS. General Chilton, I don't think this would break the defense budget. I think it is very important. My personal view is that you should have the money and the personnel needed to do this job. In the scheme of things, it would be a small investment that could be exceedingly important to us, because there's just no doubt, if our adversaries have figured out a way to penetrate our systems, the costs could be far greater than we would have to expend to make them more secure.

General CHILTON. Senator, I would agree with you, but I would also add that it's not just operating and it's not just defending. We have to make sure we have the focus on operating, because I'm convinced, after the Estonia incident, that we'll never build the perfect defense. We will be attacked in time of war, and we need skilled people who understand, and that can train to continue to operate that system and make it fight, even though it's under attack, just like we do in every other domain. We don't shut down our airfield

operations just because we're under attack. We keep working through it, and we have the right equipment, et cetera, to do that. So, we need to be thinking about that.

But, we also need to be thinking about offense through this domain. The New Triad talks about having strike capabilities that include kinetic nuclear, kinetic non-nuclear, and nonkinetic. This is the perfect domain to conduct nonkinetic attack in the event of war in the future, and to have those capabilities. This is the area, I would say, where we are least mature or robust in manpower, expertise, and focus. We at STRATCOM right now, are doing studies with the Services and with our partners at the National Security Agency (NSA), who are a big part of this program, in bringing capabilities to understand exactly what we need as we go forward in this century. I expect that, when we come in, in the fiscal year 2010 budget, the 2010 Program Objective Memorandum, we'll have laid out those requirements and started to see the investments in the offensive part of this domain, which is equally important, in my view, to the defense. If for no other reason, it's because we've always looked as having offense as part of any good defense in any domain.

Senator SESSIONS. That's well said.

Mr. Chairman, I'll be glad to turn back to you. I have a few more questions, but I'll be glad to follow up.

Senator BILL NELSON. As a courtesy to the Senator from Nebraska, and rather than hold you up, I've flipped it to our colleague from Alabama. Just be mindful that we have to finish the first panel in 30 minutes, and I have a stack of questions.

So, the other Senator Nelson is recognized.

Senator BEN NELSON. Thank you, Mr. Chairman, and I'll be mindful of the time requirements.

Thank you, General Chilton. We are very pleased that you're at the helm for the STRATCOM. With all the elements that are required to be on both offense and defense, we believe that you're well positioned to do it. We want to make certain that you have all the financial tools and other tools necessary to be able to do that.

If we think about Cold-War legacy, and you've indicated this before—that we can't just maintain that deterrent that we've enjoyed in the past indefinitely by extensions and by life-extension programs. At what point in time, in your opinion, do we reach a tipover, where we just are only trying to extend the life of that deterrence? Then, number two, what is your sense of the importance of the Reliable Replacement Warhead (RRW) as a key component of both land-based and sea-based deterrence, respectively?

General CHILTON. Thank you, Senator, for that question. I want to begin by thanking the chairman for some advice he gave me as I was leading up to confirmation hearings. Senator Nelson, I think you'll remember an office call, where you asked me some questions, and used some acronyms that I confessed ignorance to, and you commended that I go out and immerse myself in the nuclear enterprise early in my command. I have done that, sir, and I've learned a lot.

Senator BILL NELSON. There's the expert, right over there.

General CHILTON. I know.

I have gotten to know Secretary D'Agostino very well. But, I have done that, Senator, and I've formed some views, and also some concerns. Your first question would be one of my concerns that I've come to appreciate better.

Every year, STRATCOM is required to certify the reliability, safety, and security of our current nuclear stockpile. Every year, that stockpile gets older, and we do this on 1-year increments. The program put in place, the Stockpile Stewardship Program has been a tremendous thing for the United States of America. It's identified issues with our old weapons early enough for us to start working on them, and that has led to the Life Extension Programs that we're seeing, particularly in the W–76 right now.

What I can't get comfortable with is you know there's an edge out there that you're creeping toward with regard to these weapons, because they were designed to be 15- to 20-year-life weapons. Because of the way we made them, and our whole architecture that was in place in the Cold War, which was based on: if you have a problem, test or make a new one; and when you had an infrastructure that could produce thousands a year, that was a reasonable way to approach it. Now we don't want to test, and we don't have an infrastructure that can really produce anything. That makes me nervous, as you go forward, about any problems that might develop in the current old inventory.

I try to pin down the scientists, but they will not be pinned down, because they are very objective about this, and rightfully so. I liken it to approaching a cliff, and I don't know how far away from that cliff I am, and that gives me discomfort with regard to continuing a strategy of life extension.

I think there's an economic side of that, too, that I'm probably not the best to speak to, but I liken it to trying to maintain our 40-year-old automobile vanishing vendors, parts, and technologies, suppliers change. Not only that, these 40-year-old automobiles were not designed to be maintained, they were designed to be replaced at about 15- to 20-year intervals. That gives me pause, as you go down a life-extension approach.

That said, I think we need to answer these critical questions, and address them.

As we look to the future, I support a modernization of the weapons that we put on top of these delivery platforms, which I think the Services have done a very good job in modernizing and sustaining. But, they do us no good if we don't have a warhead on top of them to provide the deterrent for the future. I believe that deterrent will still be required in the 21st century. I believe we need a modern weapon that's designed with 21st century requirements, as opposed to 20th century Cold-War requirements, that can meet those future requirements. Those are some of the conclusions that I've drawn on that.

Senator BEN NELSON. If we look at the fiscal year 2009 funding as it is at the moment, do you think it's sufficient to complete the Phase 2A study? Is it possible to get us some idea of what the costs might be in order to do that, particularly if this budget's not sufficient to do that, because I agree with Senator Sessions that we want to make certain you have the tools that are necessary to carry out the responsibilities for deterrence.

General CHILTON. Senator, the funds to do the Phase 2A study are in Dr. D'Agostino's portfolio. I don't want to speak for him, and he will be on the second panel, and will perhaps address them more specifically. What I can tell you, in the 2008 submission there is an estimate in the order of around $60 to $80 million, if my memory refreshes me, to complete that study. I think that is still a valid number required somewhere near the high 60s or high 70s—million dollars—and he can give you the exact number—that's needed to finish the study. What's important about doing that study is, it's not a decision to go down the path; it will inform a decision for the next administration, next year. My concern as the warfighter is, as I look at the enterprise, in general and across the needs to the future, it's just clear to me that this is a problem that's been brewing for a while, and now is the time to address it, now is the time to answer the questions, so that we can come to a decision in the next administration, preferably early, and move out, both to guarantee our security posture for the future, but to make sure we're heading down the correct business path for the country to achieving that.

Senator BEN NELSON. Whether it's the airplane life extension or whether it's the life extension of the weapons, there has to be a point where it's no longer either economically feasible to do it, nor is it possible to get that extension, indefinitely. So, that's why I think it's extremely important that we know what it's going to take, and some idea of what kinetic nuclear and kinetic non-nuclear warheads are going to be required as a replacement, over some period of time, of what we currently have.

General CHILTON. I couldn't agree more, Senator. Thank you for the question.

Senator BEN NELSON. As probably a lot of people know, western Nebraska hosts the balance of the missile fields of the 90th Space Wing, the Mighty Ninety. Last year, the Air Force was directed to extend the life of its intercontinental ballistic missile (ICBM) fleet from 2020 to 2030. I'm assuming, based on what you've said, that we've been able to modernize and keep the lift instrument in a modern state of preparation. Is that fair?

General CHILTON. Senator, there's two parts to that. One is the security of those systems, and the other is their capability to launch. I bring a bias to this, I'll admit to you, because my job was to make sure both of those were adequately supported in my last job. But I think the record will show that the Air Force has made substantial investments in improving the security of the launch facilities and the training of the forces that protect those facilities, and I think they're moving in the correct direction there.

With regard to the life extension of the Minuteman III, the big issue last year was not having enough test resources to be able to certify its readiness to the 2030 time period, and that was addressed in the funding, and supported.

We knew, at the time, though, that, since the rest of the infrastructure was set for a 2018–2020 comfort level, that there would probably be additional investment required in some areas. This would be in support equipment, like transporters that move the missiles to and from the field, or when you have to pull one out for maintenance, various test equipment in the back shops, that,

maybe in the past, if you said, "I only had to get to 2018, I don't need to put any more money into these, but now, if I'm going to go to 2030, there'll be some level of modernization or refreshment, or at least sustainability for another 10 years, that's required."

So, I anticipate that the Air Force will take a real hard look at that to make sure that they've crossed the t's and dotted the i's in their investments to be able to get out 2030 across the spectrum. That's important to do.

Senator BEN NELSON. Thank you very much, Mr. Chairman.

Thank you, General.

General CHILTON. Thank you, Senator.

Senator BILL NELSON. General, share with the subcommittee what you think is the most significant management issue and the programmatic issue that you're concerned about.

General CHILTON. Yes, with regard to all the programs across STRATCOM?

Senator BILL NELSON. STRATCOM.

General CHILTON. I have two that come to mind, Senator, if I might say two. One would be the—and it's not quite a program yet—and I've already referred to it—and this is the modernization effort for our warheads. I think the investments need to be made to answer the tough questions now.

For an established program, the Transformational Satellite Communications (TSAT) program, I would say, comes to mind, Senator. Where we are on that program in this submission is the Air Force is going off and restudying the program, with responses to be provided in the April time period, as far as the way ahead for that program. As the combatant commander (COCOM), I hesitate to champion any one particular system. My charter, I think, is to talk to capability. So, Senator, what I'd like to address is my capability concerns here, that I've felt that particular program was addressing. Now I ask: So, how do we get there from here?

Senator BILL NELSON. Let me just ask you, right there since it looks like it's going to be delayed to 2018, what are the options?

General CHILTON. Sure. I shared that same question with the Air Force, Senator. Because here's what I'm worried about: one is, our nuclear command and control relies on a survivable and secure connection that runs through the satellite constellation belt in the Extremely High Frequency (EHF) radio frequence spectrum. We get that today through Military Strategic and Tactical Relay (MILSTAR). It will be replaced by the Advanced EHF (AEHF) satellite system. In the last design construct, the TSAT system, that would be one element of the TSAT system that would continue that capability.

This capability is one that I would lump with Global Positioning System, I'd lump with weather, I'd lump with intelligence gathered from space, as a capability we have just become used to and we just don't envision ever having to tolerate a gap in these capabilities. We wouldn't want to plan for it, that's for sure.

So, the risk in that EHF connection was always on the back end, because we were only getting three Advanced Extremely High Frequency (AEHF) satellites, and you really needed four. What was the fourth? TSAT was a vision. The acquisition of the fourth AEHF, kind of, addresses that back-end concern, but only sort of.

Here's where I have my concern. We're still going to launch the very first one in calendar year 2008—by the schedule, early fiscal year 2009. So, it only lasts so long. So, you have to be looking long range, out in the 2018 time period, the 2020 time period there, on how you're going to continue this connection. I haven't seen a complete storyline of how you're going to do that for that capability. Now that's a STRATCOM parochial perspective.

The second area where I'm chartered to look across all COCOMs needs would be the ever-increasing bandwidth demand that we see coming down the road, whether it be for our increased investment and fielding of systems like the Global Hawk, full-motion video systems like Predator, et cetera, of envisioned space architectures that will demand higher bandwidth, of systems like the Army FCS that demands higher bandwidth. In that regard, it's not so much a uninterrupted capability that I worry about, it's a step up in capability that seems to be—on the horizon to be demanded. So, probably like you, I await, anxiously, for the Air Force's report back, in April, to see what they're going to do with the remainder of the money in the program, how they're going to reconstruct that to address these capability issues that I'm concerned about.

Senator BILL NELSON. Well, they delayed the program between 2008 and 2009. I'd like to know, for the committee, were you consulted when $3.6 billion was removed from the program in the 2009 budget request?

General CHILTON. Senator, as far as the 2008 reduction and time schedule, I was part of that. So I was very aware of that, and the development of it, and I believe I testified to this—I was comfortable with a 2016 initial launch date, because it, classically, takes about a year and a half, a year, to check out the first satellite on orbit—a year. I like that extra year of pad to support what we envision as a 2018 need date if you didn't have an AEHF–4, which was not in the program then, and so I was comfortable with that.

Now we have an AEHF–4, and the question is, how long does AEHF–1 last? Are we comfortable with that? When does the fifth element, whether it's TSAT or something else, come onboard? Is 2018 the right time period? 2020? That's the decision space we're in.

With regard to the reduction in the program that was taken when it was and I was not consulted when that decision was made.

Senator BILL NELSON. I think that's significant.

Senator Sessions.

Senator SESSIONS. Thank you.

On the TSAT, my understanding of the concept was that we needed to transition to a more capable satellite, and the TSAT would replace the fourth, and would put us on the road of increased capabilities. That's the leap-ahead technology that President Bush talked about, and others have. So, the sooner you can do this, the better. But, if we can't get there, we need to know that. How do you see that possibility of—occurring now?

Have we given up? I mean, we've basically made a decision not to go with a fourth?

General CHILTON. Sir, I've heard no one say that, with regard to giving up, in any conversation I've had. I've had multiple conversations since this——

Senator SESSIONS. Giving up, in terms of——

General CHILTON. Going to the next level, at some point.

Senator SESSIONS. But, didn't we originally plan to do it with the fourth satellite?

General CHILTON. That was going to be the beginning of the next level, because, really, to get there, you have to add more than just the one new satellite. Most every constellation we have requires three to four to complete the global-nature capability of this. That first satellite's schedule was primarily being driven by the first need that I said STRATCOM has, which was to make sure we could sustain that command-and-control network that I needed in STRATCOM for our nuclear command-and-control mission. But, it was also the first step up in capability to a new approach to moving information around.

Senator SESSIONS. Has that slipped? I know we've been discussing that. Is it still possible that we can bring TSAT online—I mean, I guess what I'm saying is, if you're going to put a—launch a satellite—AEHF, I guess, is what we call it. But you could put a TSAT instead of that, then you've begun the new system, and have greater capability, instead of our bringing up a fourth older satellite system and always slipping that.

General CHILTON. Yes. What the Air Force is going to answer for us in April is what the actual schedule impacts and capability impacts. I'm not sure which way they're going to go, if they're going to reduce the delivery time or the capabilities, or whatever. They're going to have to make some decisions, though, because of the reduction.

But, when you think about it, AEHF is a tremendous step up from where we are today. I mean, it's a tenfold increase. So, don't get me wrong on my support for that program. I'm excited about AEHF coming up, and the increased bandwidth that'll provide to the warfighter.

TSAT, though, was a whole different approach. I use the analogy from the old Laugh-In days, when Lily Tomlin was sitting there, plugging in telephone calls. That's kind of the way our satellites work today. You have to have dedicated switching between the two people that are communicating. The promise of TSAT was, it would take us to the way our Internet works today, where you don't have to dial up somebody, you can just message, and it'll get to them through the network system. If you want to get information from the system, you don't have to have a specific phone number, you can search and find a menu of opportunities, and pull that information down. That's the vision of TSAT as we move into that new technology in space, that we really enjoy today in our networks on the ground today.

Again, I'd reiterate, I've heard no one in the Services say we want to step back from moving to that step. They are my concern's as I've described them.

Senator SESSIONS. Let me follow up on your study on the Reliable Replacement Warhead (RRW). We need to make a decision about that. I think you are correct that now's the time to do so, and we're not prepared to make it, because we don't have enough information and we haven't studied the issue sufficiently. Is that correct?

General CHILTON. That's fair, Senator. I think what the RRW–2A proposed study was to answer questions, to tee us up for a decision.

Senator SESSIONS. Now, you just indicated it would take $60 to $80 million to complete that study. That's the best estimate we have?

General CHILTON. I would defer the exact number, to the next panel. But, my understanding is around $66 million to complete that study.

Senator SESSIONS. Well, our difficulty, Senator Nelson, is, the President's budget is only a $10-million request, and we have some members in the House that are not supportive, and that may have had some impact on the budget request they made. I just think this is, in the scheme of things, a real important decision, and we might as well do it now and not put it off. If the report comes back and says, "RRW is not the best way to go," so be it. But, to continue to muddle on with life-cycle improvements or trying to keep these systems going is worrisome to me. So, that's just something I think we're going to have to confront. Are we going to put the money up and make this decision, or are we going to let it go without the kind of analysis that ought to be given to it?

On the RRW, we're drawing down nuclear weapons now, according to our Moscow Treaty we signed, and we will dramatically reduce the numbers to, what, 1,700 to 2,200——

General CHILTON. That's correct, Senator.

Senator SESSIONS.—warheads, and there are fewer types of warheads in our inventory, in the stockpile. All of these warheads will also have exceeded their designed lifetimes, and some have aged to multiples of their designed lifetime.

So, now, do you do the certification of the warhead?

General CHILTON. A group that does report to me, and then I certify the reliability and safety and security of the stockpile.

Senator SESSIONS. So, it's the fact that concerns over the age of these warheads. Now that we have a lot fewer of them, so if a defect appears, we have a problem. We don't have, at this time, an ongoing system to build any warheads. We may be the only nuclear-power country in the world that does not have an ongoing manufacturing system. Is that correct?

General CHILTON. I'll take that for the record, Senator.

[The information referred to follows:]

All other declared nuclear weapon states, to include Russia, China, Pakistan, India, United Kingdom, and France are continually improving their nuclear delivery systems, weapons infrastructure, weapons, testing facilities, and technologies. Since the early 1990s the Presidential moratorium on nuclear testing and suspension of new warhead development, the U.S. no longer maintains the continuous cycle of new development, production, deployment and retirement of warheads that other nuclear weapon states sustain. Our current focus is on extending the lives of existing warheads in the stockpile well past their original design lives. We currently only have the capability to produce individual replacement components and are currently producing about 10 plutonium pits per year in a converted research and development lab to replace pits destroyed during surveillance testing. This lack of production capability and responsive infrastructure forces the U.S. to maintain a larger stockpile than necessary as a hedge against a technical failure of a weapon or unforeseen geopolitical risk. The result is the U.S. is the only nuclear weapon state that is not modernizing its weapons to increase their performance margin confidence, security, safety, and maintainability.

General CHILTON. But, your assessment, I would not call what we have today any kind of a manufacturing capability. We have a laboratory-type environment that can produce, at best, eight, my understanding, a year. So I don't consider that it's certainly not robust, and I don't consider that a manufacturing capability.

Senator SESSIONS. So all of these factors that lead you to believe it's time for us to do a study and make a decision about the future needs and other factors that you've mentioned?

General CHILTON. That's correct, Senator.

Senator SESSIONS. Have you personally reviewed this, as commander of STRATCOM—do you favor moving to an RRW, based on what you know today?

General CHILTON. Senator, based on what I've learned over the last several months, and my look at this, I won't pick a design here, but I'll tell you, as a COCOM and as someone who's chartered to provide a nuclear deterrent for this Nation, in the future, I would say we need a modernized nuclear warhead that has high reliability, safety and security features that are improved over what we currently have, and maintainability of design, which we absolutely do not have in the basic design today. Those would be my capability requirements for our warheads. In the safety and security area, they are safe and secure today, by 20th-century standards. But, I think we are responsible to look forward, and a lot has changed since 2001 with regard to threats to these weapons from terrorist-type organizations that didn't exist before.

The reliability issue is important, because, as I stated earlier, these weapons were designed in a time period where you would refresh them about every 20 years, you could produce thousands in a year, and you could test, if you had a question. So reliability was pretty low on the design criteria for these weapons, as compared to where it needs to be today, which is right up at the top, if you don't want to test.

Then the maintainability issue, I've said also, I think they were not designed to be maintained, and, as we look to the future, both from an economic standpoint and from a standpoint of being able to make sure we can continue to preserve the capability, we need to put that in the design criteria right upfront.

Senator SESSIONS. Well, I thank you for that, and just mention one question, and our time is running short. I know we need to get to the second panel. Some notable strategic experts, such as former Secretary of Defense William Perry and former Secretary of State Henry Kissinger, have written an article calling for the United States to set nuclear disarmament as a goal. Perry and others believe that the goal of nuclear disarmament accords the United States the high moral ground for its nonproliferation initiatives. On the other hand, such a goal makes it more difficult for the United States to achieve a national consensus on nuclear weapons policy, because compromise is unattainable between those who support and reject that goal.

How would you assess the strategic implications of a world in which the United States does not possess nuclear weapons?

General CHILTON. Senator, first, I do not consider those to be diametrically opposed positions. As a father, and someday, hopefully, a grandfather, I would, of course, love to envision a world

free of nuclear weapons. But, I also envision, and desire to envision, a world that is free for my children and grandchildren to grow up in, a country that is free to do that. Unilateral disarmament will not preserve that in a world where other countries possess nuclear weapons, particularly in quantities enough that could destroy our way of life, if they should decide to use them against us.

Senator SESSIONS. So, if a country had a few nuclear weapons, and let's say, they knew we considered them a rogue state, and we were to abandon our nuclear weapons, would it not be in their interest to seek to achieve checkmate potential by expanding their production of nuclear weapons?

General CHILTON. Well, I think that's good logic. I think the possession of nuclear weapons by other countries demands that the United States have a nuclear deterrent. I would like to see that day when there aren't any, but I don't envision that, personally, from a practical sense, in the remainder of this century. Given that position, and given the, I think, very important mission that this command has been given, to preserve our strategic deterrence for the preservation of this country, it is time for us to make the hard decisions and the investments to answer the questions of: how are we going to posture ourself for this century, while, at the same time, working to achieve that other goal? I don't think that it's an either/or. I think we need to dream and work toward the day, with other countries, hand in hand, not unilaterally, to achieve that vision someday. But, at the same time, we cannot let our guard down, so long as they're a threat to this country.

Senator SESSIONS. You have to go on. You just made me recall the late William Buckley, I think, on Firing Line with Norman Cousins on the Saturday Review. He was editor, I think, of that, at the time. Cousins waxed eloquent on the need to reach out and be peaceful and create a world in which a war didn't take place. Buckley listened patiently and concluded, saying, "Well, Norman, I'm glad you're working for those goals, and I'm very supportive, but I hope you won't mind if I take care to preserve and protect the security of the United States while you're working all this out." I think it's fine for people to talk about ideas, but I want to see if it's going to work before I buy into it. I think perhaps we've overinterpreted, perhaps, what they were saying. I don't think they expected us to act in any reckless way. But we need to confront these issues, deal with them effectively, make our plans for the future. I can't imagine it would result in the elimination of warheads, although we are drawing down the number dramatically.

General CHILTON. Dramatically.

Senator SESSIONS. If we're going to maintain warheads, should there be a newer, safer, more reliable warhead, or can we continue the whole stockpile? Those are the questions that we need to be making now, I think and answers that we need to be getting.

General CHILTON. Thank you, Senator.

Senator BILL NELSON. General, let me pose a series of questions, here, to you, and let's get them on the record, and then we'll get on to the second panel.

General Cartwright had said, when he was the Strategic Commander, "It's very important to me, the expansion of the system beyond the long-range ICBMs, to start to address those that hold at

threat our forward deployed forces, our allies, and our friends." Those are more in the short- and medium-range ballistic missiles, things that Patriot and Standard Missile II and III will be able to address, and Terminal High Altitude Area Defense (THAAD), as it comes on. Do you agree?

General CHILTON. I do, Senator. I would say that I'm much encouraged by the block approach that MDA has taken. I think it has added clarity to the investment, and also helps us focus on how we're moving forward. Block one being initial capability to defend against North Korea; and block two focused on the regional area and increasing investments there; and block three, for steps to take to defend to the United States against Iran; four, to expand that defensive capability to include our allies; and five, to flesh out the second major contingency approach to the regional threat. So, as you see that, we have fielded the North Korean portion of that already, and I think we are taking the appropriate emphasis in block two right now, while working in each of the blocks across the board.

Senator BILL NELSON. All right. There's something called the Joint Capability Mix (JCM) Study. Now there's a second version. It suggests that we need more THAAD and Standard Missile III interceptors than envisioned in the first study. Is that correct?

General CHILTON. Senator, I'm not sure that that has reported out formally; let me take that for the record, to get back to you on that, because I want to be absolutely certain.

[The information referred to follows:]

Senator, the recently completed study, which I believe you refer to as the second version, was a sensitivity analysis on the Joint Capability Mix (JCM) Study II called JCM II Plus. With this additional information, the Joint Requirements Oversight Council validated the JCM II Study recommending an increase in minimum quantity of upper tier interceptors needed beyond those programmed in the President's budget 2008.

General CHILTON. I have heard the same reports that you have had on that, but I have not seen the second JCM study that would say that. It wouldn't surprise me. I think it's certainly recognized in the block approach by MDA, that's saying that, no, what we're today is not going to be adequate for the long term.

Senator BILL NELSON. Well, when you find out, then, we want to be briefed on that second version of the study, as well.

General CHILTON. Absolutely, Senator. I'd be happy to.

Senator BILL NELSON. All right. Now, your command had the lead for planning the shootdown of the satellite that just came down. I need you to be brief, because we need to change panels, here, but I want you to explain the process, which started back in December, including when the decision was made that it was possible to get it, and the agencies involved.

I want you to do that right now, and then I want you to provide, for the record, the modifications that were made to the Aegis Ballistic Missile System to enable to do that, those modifications that you made on the software and all that.

Senator BILL NELSON. Well, go on and answer that quickly.

General CHILTON. Sure.

Senator, I'd like to provide, for the record, a written portion of what you asked for, for me to do quickly, verbally, here, because

I'm sure I'll not be able to do it very fast, because it was pretty extensive, all the work that was done there.

Let me begin by saying first, how proud I am of STRATCOM and all the agencies that participated in this. Just to be a part of that, it was such a humbling experience to watch this Government, this Nation, come together in the fashion that it did to solve this problem as quickly.

It began before Christmas, when the Director of the National Reconnaissance Office (NRO) expressed a concern about the frozen hydrazine aboard this satellite, his concern that it could endanger the populace on the ground, and his question to the Director of MDA, "Is there anything you can do?" I was brought into the loop immediately, when those questions were asked, in a phone call from General Obering to me that said, "Here, take a look at this. We'll get back to you after Christmas." Between Christmas and New Year's. I received a call from General Obering, and he says, "We're not there yet, but so far, on where we've looked at this, our experts say they don't see any showstoppers. This is going to be challenging. The schedule's going to be an issue, because we knew about when the satellite was going to come down." Essentially, they had 6 weeks to do what they would normally do in 6 months. We knew, at STRATCOM, there was going to be a lot of information brought together to help advise a decision on even—if we determined was technically feasible; in parallel, we had to be building a decision package to decide even if you could do it, "Assuming you could do it, would you do it? What are the pros and cons of that?" Sir, that took the great support of the National Aeronautics and Space Administration, the NRO, Air Force Space Command, contractor workforce, MDA, to do that.

But, as this moved forward to the culmination of this event, the United States Navy was obviously at the tip of the spear there and did a marvelous job. It was a complete joint-service approach and interagency, too. If you numbered them all up, I think we counted 16 different organizations in our Government, from organizations like Federal Emergency Management Agency, Defense Threat Reduction Agency, et cetera, that helped us be successful in mitigating this threat to the people of the world.

Senator BILL NELSON. Okay. Now, why isn't that an antisatellite capability (ASAT)?

General CHILTON. Well, Senator, I think we approached this completely—and the analogies have been made in the press, "What's the difference between you, and what you did, and the Chinese?" I think they're absolutely, completely apples-and-oranges in the description of them.

First of all, we told the world what the problem was and what we were going to do. We did extensive analysis and research, and have been very transparent on what our estimations of the increased risk to on-orbit vehicles would be as we approached the decision, and we've continued to publish exactly what's happened as a result of that. The Chinese, on the other hand, didn't tell anybody what they were going to do, they didn't advise anybody of the risks they were going to increase. We took steps to make sure that we mitigated the risks, not only to the populace of the planet, which was our mission and why we did this, but we were worried

about on-orbit capability, and we took this intercept at an altitude that would ensure that that problem would go away in short order. The Chinese effort will be and the consequences of that effort will be with us for estimates of up to a century, the risk that that will pose.

Their intentions on why they developed this system have not been stated. Our intentions have been clearly stated, and our transparency in what we have done and our modification of a system to do this, and our intent to unmodify those systems and go back to what they're originally intended to do, has been very transparent, I think, Senator.

Senator BILL NELSON. The bottom line is that the Chinese have left tens of thousands of pieces up there, at least 250 miles high and higher, that are going to be up there, as you say, for decades, and that pose a threat to everybody else's space assets; whereas, our intent, in shooting this down, was exactly the opposite, at about 120 miles high, get it so it's going to degrade faster and it's going to have a more predictable landing, and you're going to bust up that thousand pounds of hydrazine.

General CHILTON. That's correct, Senator. I'd only just make one minor correction. I would have liked to have waited til it was down to 120, because our vision of shooting it as low as possible. What turned out to be as low as possible was around 150 nautical miles. But, that said, our pre-shot estimates were tracking very closely, if not better, to those estimates, because the intercept was so successful, it really fractured the satellite dramatically, and we think the size of pieces that we can trace will all be down in the next 60 days, and the modeling of the pieces that are too small for us to see will be down before the end of the year. So I think that's a dramatic statement, that we took that level of interest and sensitivity into the mission that we executed.

[The information referred to follows:]

Previous testimony addressed the meetings and discussions that occurred during the December 2007 timeframe between Mr. Large (Director, National Reconnaissance Office (NRO)), Lieutenant General Obering (Director, Missile Defense Agency (MDA)), and General Chilton (Commander, U.S. Strategic Command (CDRUSSTRATCOM)) which lead to the initial planning efforts.

The planning team met in early January 2008 to determine potential options for presentation to the NSC. This team included personnel from USSTRATCOM and its Joint Functional Component Commands, NRO, MDA and Aegis-MDA. In mid-January CDRUSSTRATCOM presented the concept brief for satellite engagement to the President and received direction to focus on a course of action involving intercept with an SM–3 missile.

This direction permitted MDA to begin software and system modifications enabling the SM–3 to execute the intercept. MDA spent months altering software to permit optimal target recognition. Target characterization and desired aim point determination were key parameters to be addressed by the software.

In late January, CDRUSSTRATCOM presented the refined course of action and was directed to begin operational planning for the satellite intercept. MDA continued to work on ship and missile system modifications necessary for successful engagement.

All modifications and deliveries took place on schedule in the first half of February 2008. In mid-February, CDRUSSTRATCOM presented the Operational Intercept Plan to the NSC; received Presidential authorization for intercept which culminated in a Chairman, Joint Chiefs of Staff, Execution Order.

Following this execute order, CDRUSSTRATCOM began rehearsals for the intercept operation. Six days after being directed to intercept the satellite, all engagement parameters were favorable and the satellite was successfully intercepted on February 20, 2008.

Senator BILL NELSON. Well, congratulations to you and to all your team and all the multiple agencies that were involved on this.

General CHILTON. Thank you, Senator.

Senator BILL NELSON. As you look at the Minot-Barksdale problem, do you think that your command is going to have the oversight and the inspections to see that we have this nuclear security for the future?

General CHILTON. Yes, Senator. We've taken some steps since then. Now, what I've found out is that, over years gone by, the STRATCOM went from actively participating, in the days of Strategic Air Command, before STRATCOM, to the migration through the post-cold-war period, had stepped back from, obviously, conducting, because that was no longer their job, but to even monitoring, kind of, over-the-shoulder, if you will, these inspections. That was reinstituted immediately after the Minot incident. So, all the inspections then—and we intend to move forward, to have a member of our inspector general team, not conducting the inspection—that's not our job—but, to be there when they're done, and make and report back to me about how comfortable they are with the way these inspections are being conducted: Are they standardized? Are we satisfied with the level of scrutiny being taken? That's only a minor step that we have done, but important.

Additionally, we've increased focus, up to the commanders level in STRATCOM, on the status of our nuclear forces. It's part, in my immersion in the weapons side that we've discussed already here, but weekly I am briefed on our entire nuclear force structure, all our task forces, their readiness, any issues that may come up; and those are done to—a weekly briefing to me and the entire staff, that everyone is aware of. That's new.

In addition to that, we've set up a construct within the headquarters that will report up to the vice commander of STRATCOM, on a quarterly basis originally, that is chartered from a colonels working group, general officer intermediate group, to take a look at the entire nuclear enterprise, so that we're not only watching security of the weapons, we're watching security of the facilities, we're paying attention to the health of the launch platforms and delivery platforms, as well as the weapons. So, an across-the-board enterprise examination that will address issues that, maybe, before were understood at lower levels, but not being elevated to the appropriate levels in the command. These are a few of the steps we're taking.

I'll tell you, we're also going to robust our exercise program in this area. We had devolved to—I believe, into a kind of a checklist or command-post-type exercise when we exercised these systems. I'm a little bit from Missouri on this. If you tell me you can do this, I'm going to ask you, on occasion, through exercises, to show me that you can still do that. That's above and beyond the safety and security inspection; this is more of an operational focus. So, we're going to increase that emphasis in the command, as well.

Senator BILL NELSON. Okay. Last question, and then we'll bring the other panel up, and the record will remain open for any questions that we want to submit in writing.

We have this little conflict here between the warfighter in the area of title 10 military authority and title 50 intelligence authority

as we look at this cyberspace operation and responsibility. So, can you give your thoughts of what you think it's going to take to resolve this quandary? Could you tell us if you think legislative action is needed?

General CHILTON. Right. Senator, I do not think legislative action is needed. I think there's honest disagreement among some people, but pretty good agreement among others. I'll give you an example. I mean, title 50 is an important law that we have, that protects the citizens of the United States from intelligence—the intelligence collection that is rightly targeted at adversaries. There are some who think, because of that, that only people with title 50 organizational responsibilities, that those organizations should be in charge of anything that would have title 50 associated with it. But, we have examples today where we maintain that protection of the U.S. citizens, we maintain the rules of title 50, but we actually use the title 50 assets in combat operations. The examples I would use would be the RC–135 platform, which is stationed at Offutt Air Force Base, the U–2 platform, a unit that I used to command, where we have people that have title 50 authorities, that examine the intelligence collected by those platforms, but day-in and day-out, they're deployed, working for the CENTCOM commander, and they're using that information to conduct combat operations. At the same time, the title 50 chain-of-command authority has to certify that they are following the rules, and that they're trained and certified to do that. So, there you see a classic case of title 10 combat operations being closely supported by people with title 50 authorities, that are certified and kept—and held to be accountable to those laws, that's in a very effective application of those two titles.

I think that, as we look forward into the cyber domain, is a model that I would advocate for.

The tension today is based, in a lot of areas, on the limits of resources that we have. As I spoke with Senator Sessions earlier in the testimony, growing and—for us, identifying the requirements and growing those capabilities, which is primarily human capital for the future, is very important for us in this stage of development of the cyberspace domain and how we think about how we would conduct warfare in the future there. They're just aren't quite enough people that we need in some areas; in other areas, it's a matter of focus. There are talents that we can use, and we just need to bring them to bear to this command. As a COCOM, I need to demand the Services provide those resources so that I can conduct the mission that I've been assigned. The Services, we've had good dialogue with them and they are excited about doing that.

Senator BILL NELSON. Well, thank you, General. We appreciate it. Thank you for your service to our country, and you are always welcome in this committee.

General CHILTON. Thank you, Senator.

Senator BILL NELSON. We look forward to the continuing very good relationship.

May I call up the second panel, please.

General CHILTON. Thank you, Senator.

Senator BILL NELSON. Thank you. [Pause.]

We're pleased to have Assistant Secretary of Defense, Michael Vickers. We're pleased to have Major General Richard Webber, who

is the Assistant Deputy Chief, Operations, Plans, and Requirements; Rear Admiral Stephen Johnson, Director of Strategic Systems Programs for the Navy; and the Honorable Dr. Thomas D'Agostino, Administrator of the National Nuclear Security Administration.

Each of your statements will be put in the record.

[The prepared statements of Mr. Vickers, Major General Webber, Rear Admiral Johnson, and Mr. D'Agostino follows:]

PREPARED STATEMENT BY HON. MICHAEL G. VICKERS

OPENING REMARKS

Chairman Nelson, Senator Sessions, and distinguished members of the subcommittee: I welcome the opportunity to describe our progress in transforming the Nation's strategic capabilities to meet 21st century security challenges. I know that you understand the importance of this effort, and I want to thank the members of the subcommittee for your support. Successful transformation of our strategic capabilities will require a sustained partnership between the Department of Defense (DOD) and Congress.

IMPLEMENTING THE NUCLEAR POSTURE REVIEW (NPR)

The NPR determined that the Cold War Triad of nuclear strike systems is not adequate to address the range of potential challenges in the new security environment. Accordingly, the NPR established a New Triad possessing broader capabilities, including offensive strike systems (nuclear, non-nuclear, and non-kinetic); defenses (active and passive); and a revitalized defense infrastructure, supported by enhanced Command and Control, Intelligence, and adaptive planning capabilities. Though not explicitly addressed in the NPR, capabilities in the areas of space and Information Operations are clearly among those needed to meet current and future security challenges.

We have had mixed progress to date in fielding these capabilities. We have had significant success in achieving an initial capability to defend the United States against the emerging long-range ballistic missile threat from North Korea and the Middle East, and in fielding defenses to protect U.S. deployed forces and those of our coalition partners. Much more challenging has been the effort to sustain nuclear force capabilities and revitalize the nuclear infrastructure, and to develop a prompt, non-nuclear global strike capability.

NUCLEAR FORCES AND A RESPONSIVE INFRASTRUCTURE

We continue to draw down the number of operationally deployed strategic nuclear warheads, as well as our supporting stockpile of nondeployed warheads, to the lowest level consistent with our national security requirements and commitment to allies. That said, nuclear forces remain the ultimate deterrent capability that supports U.S. national security. Even as they decline in numbers, nuclear weapons are an essential and enduring element of the New Triad, and they underpin these New Triad capabilities in a fundamental way.

The extended nuclear deterrence commitment the United States provides is key to assuring allies and friends of the credibility of U.S. security commitments. U.S. nuclear weapons deter potential adversaries from the threat or use of weapons of mass destruction against the United States, its deployed forces, and its allies and friends. In the absence of this "nuclear umbrella," some non-nuclear allies of the United States might perceive a need to develop and deploy their own nuclear capability.

At present, the United States is the only recognized nuclear weapons state that does not have the ability to produce new nuclear weapons in quantity. Accordingly, the lives of existing warhead types are being extended through refurbishment. Successive programs to extend the service life of the current inventory of warheads, however, can decrease our confidence in their performance as these warheads deviate from their baseline designs validated using nuclear test data.

Our long-term goal is to rely more on a revived infrastructure and less on the nondeployed warhead stockpile to respond to unforeseen events. We seek replacement of existing warheads with Reliable Replacement Warheads (RRW) of comparable capability to our current weapons that would be less sensitive to manufacturing tolerances or to aging of materials. They would be certifiable without nuclear

testing, and have advanced safety and security features that can not be built into our current weapons.

Safety and security take on enhanced importance in the post-September 11 world. While our current systems are safe and secure, RRW will incorporate improved, state-of-the-art safety and security features that will reduce still further any chance of unauthorized use.

The desired size of a responsive nuclear infrastructure, measured in terms of the number of warheads it could produce or refurbish per year, would depend on a number of key variables; but once RRWs are deployed in significant numbers, many of the warheads now retained in the stockpile as a hedge against reliability problems could be retired. Until a truly responsive nuclear infrastructure is operational, however, the United States will need to retain an appropriate inventory of nondeployed warheads to manage geopolitical, technical, and operational risks. The Department will soon provide a white paper, "National Security and Nuclear Weapons in the 21st Century," discussing the considerations behind U.S. requirements for nuclear weapons in greater detail. This paper will help inform the Nuclear Posture Review to take place next year.

NON-NUCLEAR PROMPT GLOBAL STRIKE

The 2006 Quadrennial Defense Review highlighted an important gap in prompt, long-range conventional (non-nuclear) strike capabilities. Land-based conventional forces, such as fighter and bomber aircraft, could take hours to days to deploy and strike a target. Prompt Global Strike capabilities may be needed for time-sensitive operations such as interdicting the transfer of WMD to terrorists, or preventing a rogue state from launching a ballistic missile armed with a WMD payload. Today, nuclear-armed ballistic missiles are the only means the United States possesses for engaging distant, fleeting targets promptly (within about an hour from the time of an execution decision).

Last year, in response to our request for funding for the Conventional Trident Modification program, Congress appropriated funds for research and development of technologies that could be applied to a wider range of concepts that might provide a prompt, non-nuclear, global strike capability. I want to thank the members of this subcommittee for your support of Prompt Global Strike. DOD accordingly will continue to develop and propose options to expand the range of our strategic capabilities in this area.

MISSILE DEFENSE CAPABILITIES

Missile defense remains a top priority for the administration. Missile defenses constitute an essential element of our overall national security strategy to dissuade and deter states of concern from acquiring or using ballistic missiles, and to protect our citizens from the threat of missile attack should deterrence fail. We greatly appreciate the strong support this subcommittee has provided toward developing and procuring this critical capability.

We continue to make good progress in providing an initial capability to protect our population and territory against the emerging long-range ballistic missile threat from North Korea and the Middle East. At the same time, through deployment of Aegis SM–3 and PAC–3 systems, and continued development of Theater High Altitude Area Defense and the airborne laser, we are ensuring we can protect our forward-deployed forces and those of our coalition partners against shorter-range missile threats.

We have already seen the benefits of the initial defense against long-range missiles when we activated the system during the North Korean ballistic missile tests in July 2006. The capability to engage a missile launched in the direction of the United States allowed U.S. leaders to consider a wider range of options than would have otherwise been available. This capability also serves to devalue any future North Korean attempt to use its missiles to threaten or coerce the United States.

INTERNATIONAL MISSILE DEFENSE COOPERATION

The United States is committed to working with allies and friends to strengthen our collective capabilities to deal with the dangers of WMD and ballistic missiles. Our largest missile defense cooperation partner is Japan. Facing a direct threat from North Korean missiles, Japan is acquiring both Aegis SM–3 interceptors and PAC–3 batteries. Japan achieved a major milestone in December 2007, when its destroyer Kongo successfully intercepted a ballistic missile target with an SM–3 interceptor—a first for an allied naval vessel. In March 2007, Japan deployed its first PAC–3 firing unit, which together with the Kongo affords the Japanese a layered capability to defend against ballistic missiles. With Japan, the United States is co-

developing the SM–3 Block IIA interceptor, a more capable version of the current sea-based interceptor, and we are developing operational plans to share information and to integrate our systems more effectively.

Another important area of missile defense cooperation is our work with Israel. We continue to cooperate on the Arrow missile defense system and have begun to explore with Israel options for addressing ballistic missile threats that exceed the Arrow's defensive capability. An important component of our missile defense cooperation is an ambitious bilateral exercise program over the next 2 years that will realistically test our joint capability to address ballistic missile threats.

EUROPEAN MISSILE DEFENSE SITES

In January 2007, the President directed us to proceed with negotiations on basing U.S. missile defense elements in Poland and the Czech Republic. These defenses are intended to counter the emerging threat both to the United States and to friends and allies in Europe posed by Iranian development of longer-range ballistic missiles. We have had several rounds of negotiations with Poland on a draft agreement to base ground-based missile defense interceptors on its territory. These sessions have been productive, and we have made good progress on a draft text. While the new Polish Government has emphasized its position that the agreement should result in a net benefit to Poland's security, it recognizes the growing ballistic missile threat to Europe and the contribution these missile defense assets can make to the North Atlantic Treaty Organization (NATO) security.

In parallel, we have had a number of rounds of negotiations with the Czech Republic on an agreement to base a missile defense tracking radar on its territory. These talks have also made great progress and we are in the process of addressing a small number of issues that, once resolved, will allow us to finalize the draft text. Czech officials have shared our commitment to concluding these agreements, while at the same time ensuring that U.S. missile defense assets in Europe will be interoperable with, and complementary, to ongoing NATO missile defense efforts.

MISSILE DEFENSE AT NATO

In addition to pursuing bilateral cooperation programs in missile defense, we are working within NATO on the Alliance's response to the growing ballistic missile threat. We are pleased with the progress being made in the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) program, which will provide the Alliance's deployed forces a defense against short- and medium-range missiles.

To protect the indivisibility of Allied security, it is important for the rest of the Alliance to be protected against ballistic missile attack. NATO Heads of State and Government recognized the technical feasibility of missile defense at the 2006 Riga Summit, and NATO continues to make progress in this area. While the planned U.S. sites in Poland and the Czech Republic will be important contributions to Allied security, these elements will not protect Allies in southeastern Europe from shorter-range ballistic missile threats. It is our hope that at the Bucharest summit in April, the Alliance will be in a position to recognize the growing missile threat; support territorial defense as a means of addressing that threat; and welcome the contribution that European-based U.S. missile defense assets will make in protecting most Allies against long-range ballistic missiles. NATO also continues to cooperate with Russia in the NATO-Russia Council on Theater Missile Defense, and we have expressed our willingness to work with Russia on broader Missile Defense in the NATO context.

MISSILE DEFENSE COOPERATION WITH RUSSIA

Because we are building a new security relationship with Russia whose foundation does not rest on the prospect of mutual annihilation, and because we believe that Russia also faces an emerging ballistic missile threat from states such as Iran, we have invited Russia to join us in a cooperative effort to pursue missile defense.

U.S. and Russian missile defense experts have met a number of times over the last year to share intelligence assessments of the Iranian ballistic missile program; discuss transparency and confidence building measures that could address Russia's concerns about our planned missile defenses in Europe; and seek ways in which we could work jointly with Russia to address ballistic missile threats. We have proposed cooperation in such areas as modeling and simulation; sharing of early-warning data; building a joint regional missile defense architecture; and conducting joint exercises and wargames. Missile defense also featured prominently in last October's "2+2"meeting in Moscow, where Secretaries Gates and Rice discussed a number of strategic issues with their Russian counterparts. We remain committed to showing through our continued discussions, and through our concrete proposals, our sincere

desire to work with Russia to address an emerging threat that affects us all while demonstrating that our missile defense program poses no threat to Russia.

SPACE CAPABILITIES

We rely on services provided by space capabilities in all facets of our daily lives, and these capabilities are vital to our national security and the global economy. At the same time, potential adversaries continue to seek means to counter the advantages we obtain from space and to use space capabilities against us. Our space capabilities face a wide range of threats such as radio frequency jamming, laser blinding, and anti-satellite systems, including the anti-satellite capability demonstrated by China last year. In this regard, we are working to assess the strategic implications of such counter-space capabilities for our vital interests in space, and are carefully factoring the results of our assessments into our architecture planning efforts and investment priorities.

U.S. National Space Policy is based on a number of longstanding principles. The U.S. rejects claims of sovereignty by any nation over space; rejects limitations on the fundamental right to operate in or acquire data from space; and retains the right of free passage through and operations in space without interference. Consistent with these principles, the U.S. views purposeful interference with its space systems as an infringement on its rights and will take those actions necessary to preserve its freedom of action in space.

U.S. National Space Policy directs the Secretary of Defense to develop capabilities, plans, and options to ensure freedom of action in space, and if directed, to deny such freedom of action to adversaries. The Department's investment strategy for space and space-related activities seeks to balance a number of requirements. We need to: modernize space situational awareness capabilities to ensure ample warning of hostile acts; improve protection plans to ensure required capabilities are available in a contested space environment; develop architectural solutions, including Operationally Responsive Space concepts, to ensure capabilities are available when needed; establish an operations posture, to include appropriate planning and exercises, to respond to attacks on U.S. space interests; and ensure the ability to deny adversaries the use of space capabilities to harm our forces or our homeland.

The DOD further implements our National Space Policy by supporting efforts to promote safe and responsible use of space. We seek mutually beneficial international cooperation on space activities, and support commercial and foreign space surveillance needs to ensure safe space operations. DOD seeks to promote compliance with existing legal regimes, acceptance of international debris mitigation guidelines, and development of additional voluntary guidelines for safe and responsible space operations. We also do our best to protect mutual security interests related to dual-use space technology and services.

INFORMATION OPERATIONS AND CYBERSPACE

Providing our combatant commanders the capability to integrate into their planning the various elements of Information Operations—computer network operations, electronic warfare, psychological operations, military deception, and operations security—has become even more important in the information age. Our potential adversaries, both nation-states and non-state actors, continue to seek ways and means to counter the advantages we obtain from our use of information, and to turn those same advantages against us in both conventional and in unconventional ways. We are assessing the strategic implications of our potential adversaries' capabilities in this regard, and factoring those results into our planning and investment priorities for information operations.

We are continuing to develop deterrence strategies to address potential adversaries' attempts to counter our information advantages. We are working closely with our interagency partners, to define this domain in terms that will allow us to scope the missions that we will be asked to conduct. This domain crosses the physical boundaries within which we operate—space, air, land, and sea—as well as the organizational boundaries—military, civil and commercial—making this a complex problem. It is imperative that we understand our roles, both active and supporting, so as to provide the best possible options for the Nation.

The ability to operate freely within cyberspace is critical to military operations and U.S. national security, but the threats to our computer networks are real and growing. Numerous organizations, such as the Joint Task Force-Global Network Operations, the Defense Information Systems Agency, U.S. Strategic Command, and the National Security Agency's Information Assurance Directorate are working together to defend our Global Information Grid. But while these significant resources and effort are devoted to defending our computer networks against attempted intru-

sions on a daily basis, technology changes, and so do the threats. We recognize that this will be a long-term effort, and while much remains to be done in this area, we are making progress.

CONCLUSION

Transformation of our Nation's strategic capabilities to meet the uncertainties and challenges ahead depends critically on a sustained partnership between DOD and Congress. We need to continue the progress on missile defense; sustain our nuclear capabilities through the RRW program and revitalization of the nuclear infrastructure; develop and deploy a conventional, prompt Global Strike capability; ensure continuity of service of our space systems as we recapitalize and modernize these capabilities; and protect our ability to operate freely within the information environment while preventing adversary use of information against our interests. I look forward to working with you to achieve these goals.

PREPARED STATEMENT BY MAJ. GEN. RICHARD WEBBER, USAF

I. INTRODUCTION

Mr. Chairman and distinguished members of the subcommittee, thank you for the opportunity to discuss our Strategic Nuclear posture. Your Air Force is fully engaged around the world fighting terrorism and insurgents in the global war on terror and fulfilling our roles as Airmen for the joint team. Simultaneously, we stand prepared for rapid response to conflict around the globe as our Nation's strategic Reserve. Air forces succeed when they have the resources to shape the future strategic environment and prepare for tomorrow's challenges. Air forces succeed when they remain focused on their primary mission as an independent force that is part of an interdependent joint team. Above all, the U.S. Air Force delivers sovereign options for the defense of the United States and its global interests: To fly and fight in air, space, and cyberspace.

II. WIN TODAY'S FIGHT

Supporting U.S. Central Command (CENTCOM) and the global war on terror is a portion of what your Air Force does for our Nation's defense. Your Air Force is prepared to respond across the entire spectrum of conflict from rapid humanitarian aid to major combat operations.

Fighting and winning the global war on terror is the number one priority; however, it is important to focus on protecting our Nation from other potential enemies, both traditional and nontraditional.

Air Force engagement in CENTCOM is only the tip of the iceberg. Your Airmen operate around-the-clock and around-the-globe to provide all Combatant Commanders (COCOMs) with critical capabilities. Over 40 percent of the total force and 53 percent of the Active-Duty Force are directly engaged in or supporting COCOM operations everyday. On any given day, the Air Force has approximately 206,000 airmen (175,000 active duty plus an additional 31,000 Guard and Reserve) fulfilling COCOM tasks. This includes approximately 127,000 airmen conducting activities such as operating and controlling satellites, standing alert in our Intercontinental Ballistic Missile (ICBM) facilities, operating unmanned aerial vehicles, launching airlift and tanker sorties, providing intelligence assessments, and many other functions critical to each of the COCOMs. Also included are 57,000 airmen stationed outside the continental United States in direct support of the Pacific Command and European Command missions. Finally, a portion of the above forces plus an additional 22,000 airman from the current AEF rotation are made available for deployments in support of other COCOM requirements. At any given time, 34,000 of these airmen are deployed with 25,000 of them deployed to the CENTCOM AOR of which approximately 6,600 are in-lieu-of (ILO) taskings. Since 2004, we have deployed approximately 24,000 airmen to perform ILO taskings.

III. STRATEGIC NUCLEAR FORCES

The United States Air Force has underwritten the national strategy for over 60 years by providing a credible deterrent force, and we continue to serve as the ultimate backstop, dissuading opponents and reassuring allies by maintaining an always-ready nuclear arm. Airmen continue to stand silent sentry around-the-clock to protect our national security, and respond to any adversary should deterrence fail.

Since the weapons-transfer incident of 30 August 2007, we have initiated multiple levels of review to ensure we have not only investigated the root causes of the inci-

dent, but more importantly taken this opportunity to review Air Force policies and procedures in order to improve the Air Force's nuclear capabilities. The Commander of Air Combat Command commissioned a Commander Directed Investigation (CDI), a tactical level investigation that focused on the facts of the incident and determined accountability. The Chief of Staff of the Air Force (CSAF) commissioned the Blue Ribbon Review, an operational-level review that focuses on the entire Air Force enterprise including both the aircraft and ICBM and reviews policies, procedures. The Secretary of Defense commissioned the Defense Science Review Board (DSB) review, a strategic-level independent review that focuses on the Department of Defense (DOD) enterprise and joint organizations. The Air Force takes its nuclear obligations seriously, and will continue to take any measure necessary to deliver this strategic capability safely. Consequently, we have identified the actions required to both enhance our strengths and correct those areas needing improvement. We have also submitted the Air Force unfunded requirements list to the House Armed Services Committee with a number of nuclear surety and security initiatives for consideration. The United States Air Force is committed to the nuclear mission.

Air Force Intercontinental Ballistic Missiles

Minuteman is and will remain the Nation's land-based strategic deterrent through 2030.

The National Defense Authorization Act (NDAA) for Fiscal Year 2007 mandated that the Air Force modernize Minuteman III (MM III) ICBMs in the United States inventory as required to maintain a sufficient supply of launch test assets and spares to sustain the deployed force of such missiles through 2030. The Air Force is currently analyzing MMIII missile and ground systems to determine what activities are required to sustain the force through 2030. The Air Force has ongoing life-extension programs designed to extend ICBM service life beyond 2020.

During the 2005 Quadrennial Defense Review (QDR), the Defense Department agreed with the U.S. Strategic Command (USSTRATCOM) recommendation to reduce the ICBM force from 500 to 450. The USSTRATCOM analysis concluded a 450 Minuteman III force was sufficient to assure allies and deter potential adversaries. Headquarters Air Force Space Command (AFSPC) recommended and the USAF agreed that the 564th Missile Squadron (564 MS) at Malmstrom AFB, MT, was best candidate for deactivation. The 564 MS increased logistics sustainment costs because of its unique operating system versus other Minuteman III squadrons. Reduction of 564 MS also standardized the unit size and configuration at three bases.

The NDAA for Fiscal Year 2008 requires the Secretary of Defense to submit a report to the Congressional Defense Committees ". . . on the feasibility of establishing an association . . ." between the 120th Fighter Wing, Great Falls, MT (Air National Guard) and the 341st Space Wing, Malmstrom AFB, MT (Active Duty Air Force). The Air Force must submit the report 15 days before removing the 41st missile from the 564th Missile Squadron. The report is currently in coordination and anticipated delivery to Congress is April 2008.

AFSPC commenced deactivation activities within the 564 MS in June 2007. The Air Force will retain and modernize the 50 removed ICBMs for use in the Force Development Evaluation (FDE) program. Conversion of the 50 missiles for use as flight test, replacement and aging/surveillance assets meets congressional direction to extend Minuteman operations through 2030.

ICBM Life Extension Programs (LEP)s

1. Guidance Replacement Program:

Replaces guidance set electronics on MMIII and improves reliability on the ground and in flight. The replacement program calls for 652 kits: 450 are fielded; 180 are used for tests, spares, etc.; the final 32 will be delivered in fiscal year 2009.

2. Propulsion Replacement Program:

Extends booster life through 2020 by re-pouring stages one and two, and re-manufacturing stage three. The replacement program calls for 605 kits: 376 are fielded; 173 are used for tests, spares, etc.; the final 56 will be delivered in fiscal year 2009.

3. Propulsion System Rocket Engine Program:

Refurbishes seven components and assemblies in the liquid propulsion post-boost vehicle. The Air Force installed 154 kits and will purchase 96 additional kits in fiscal year 2009. The future installation of 574 total kits will complete the program.

4. Safety Enhanced Reentry Vehicle (SERV):

Enables MMIII to carry the more advanced Peacekeeper MK 21 Reentry Vehicle (RV) while retaining the powerful MMIII MK 12A RV multiple independently retargetable RV (MIRV) capability. Retirement of the older MK 12 RV is now possible,

avoiding a costly $1 billion LEP. The Air Force fielded 75 kits and will purchase the 111 additional kits in fiscal year 2009. The fielding of 570 total kits completes the program. Deployment of the MK 21 RV enhances nuclear safety because the MK 21 RV design incorporates three additional safety features: Insensitive High Explosive, Fire Resistant Pit, and Enhanced Nuclear Detonation Safety, which the Drell Commission recommended, but not incorporated in the older MK 12 RV design. The Insensitive High Explosive and Fire Resistant Pit features reduce the likelihood of plutonium dispersal in cases of inadvertent impact or accident. The Enhanced Nuclear Detonation Safety design protects those electrical components critical to detonation from sources of unintended energy in order to prevent premature arming in abnormal environments. The Air Force is continuing to deploy SERV, with 75 kits already fielded, and will purchase 111 additional kits in fiscal year 2009. The program will procure 570 kits total.

5. Environmental Control System:

Modernizes cooling system equipment in the Minuteman launch facilities and missile alert facilities. The Air Force installed 71 launch facility kits and 6 missile alert facility kits and will purchase 126 kits in fiscal year 2009. Deployment of 499 total kits to all the launch facilities, missile alert facilities, and training sites will complete the program.

6. ICBM Security Modernization Program:

This three-part program consists of concrete enhancements, a fast-rising secondary personnel access hatch, and a Remote Visual Assessment (RVA) camera. This comprehensive program began in fiscal year 2004. The Air Force completed concrete enhancements at all 450 launch facilities in 2007, more than a year ahead of schedule and 35 percent under budget. The Air Force installed fast-rising secondary personnel access hatches at 21 launch facilities. The Air Force also installed RVA at 5 missile alert facilities and 50 Launch Facilities. The $10.5 million Congressional increase in fiscal year 2008 allowed the Air Force to purchase 90 additional RVA kits, enough to complete deployment at the first wing. Taken together, these programs give responding security forces situational awareness and adequate time to deny adversarial access to our launch facilities. In fiscal year 2009, the Air Force will purchase 100 fast-rising secondary personnel access hatches and 147 RVA kits.

Helicopters

The primary AFSPC helicopter mission, flown by UH–1N platforms, provides security forces with a continuous contingency response capability for the National ICBM complex. The Air Force District of Washington (AFDW) and several other MAJCOMS also use the UH–1N as an Operational Support Airlift/Very Important Person Special Air Mission (OSA/VIPSAM) platform. The UH–1N has noted deficiencies in payload, speed, range, endurance, battle space awareness, survivability, and adverse weather operations.

Your average Air Force UH–1N airframe is 39 years old and some aircraft in the inventory exceed 13,000 flight hours. The UH–1N fleet shows its age with fatigue-related cracks in the tail boom and is currently undergoing its second tail boom replacement that will enable it to meet flight safety standards.

The Common Vertical Lift Support Platform (CVLSP) is an Air Force effort to replace these UH–1Ns. AFSPC is the designated lead command and is in the process of finalizing the Analysis of Alternatives (AoA) to scope the available pool of platforms capable of accomplishing the multiple missions required by all users of the UH–1N. Following the AoA, AFSPC anticipates a final Capability Development Document (CDD) in early fiscal year 2009. Once the Joint Requirements Oversight Committee and the Office of the Secretary of Defense approve all requirements, the Air Force will develop an acquisition strategy to field this capability.

Nuclear Cruise Missiles

The Air Force analyzed current and future roles for nuclear cruise missiles during the 2005 QDR and the fiscal year 2007 budgeting cycle. The Defense Department issued guidance on 20 December 2005 directing USSTRATCOM and the Air Force to study the nuclear cruise missile force structure, including the Air-to-Ground Missile (AGM) –86, Air Launched Cruise Missile (ALCM), and the AGM–129 Advanced Cruise Missile (ACM). The guidance also directed the Air Force to build a retirement schedule for the missiles.

The USSTRATCOM/Air Force study examined considerations such as cruise missile inventory, operational capability, reliability, DOD direction and COCOM requirements. Based on these factors, the study recommended that the Air Force retire all ACMs, reduce the ALCM force to 528, retire all excess ALCMs, consolidate

the ALCM force at Minot AFB, and retain ALCMs in the inventory through at least 2020, possibly 2030. On 12 April 2006, the Deputy Secretary of Defense accepted the study recommendations. On 23 June 2006, the Commander of USSTRATCOM sent a letter to the Secretary of Defense supporting the study's findings and advocating adoption of the ALCM/ACM force structure recommendations. The Joint Chiefs of Staff and National Security Council endorsed the study recommendations as they pertained to the Air Force. On 17 October 2006 the Secretary of Defense directed the Air Force to retire the ACM and reduce the ALCM fleet to 528 missiles.

The Air Force is removing from service, demilitarizing and destroying all ACMs and the excess ALCM missile bodies at the rate of 6 ACMs and 12 ALCMs per month. We forecast completion of demilitarization for excess ALCMs in fiscal year 2011 and all ACMs in fiscal year 2013. The remaining nuclear cruise missile force will be consolidated at Minot AFB, North Dakota. These cruise missile force structure changes are part of a balanced force reduction that supports both the President's direction to reduce the active nuclear stockpile, and the United States' obligation under the 2002 Moscow Treaty to reduce the number of operationally deployed strategic nuclear warheads to 1,700–2,200 warheads.

Warhead Replacement and Refurbishment

A viable program of warhead replacement and refurbishment is essential to sustain a nuclear weapons stockpile of any size. Warhead replacement concepts continue to show promise for increasing long-term confidence in warhead reliability, and this strategy offers other advantages when compared with refurbishment. For example, a replacement warhead could incorporate improved safety and security features not considered feasible in a refurbished weapon, and replacement weapons could be better designed to interface with modern delivery platforms such as the Joint Strike Fighter. Decisions must be made very soon if we are to find the most cost-effective strategy to meet current and projected requirements. To that end, it is imperative that we pursue and complete the studies needed for informed decisions.

In the absence of a replacement warhead, the Nuclear Weapons Council commissioned a 1-year phase-one study to define concepts for refurbishment of existing warheads for current and future air-delivered systems in November 2006. We are reviewing the findings of this study, and expect to recommend further studies to the Nuclear Weapons Council.

Strategic Bombers

A new bomber is critical to upgrading the Nation's long-range strike capability to ensure range and payload, and ability to hold any target anywhere at risk. The Air Force has a three-phased approach to meet the Nation's long-range strike requirements. The first phase is to continue with the modernization of legacy bomber fleet to ensure sustainability and increase combat effectiveness. The 2008 NDAA mandated that the Air Force maintain a 76 Total Aircraft Inventory (TAI) for B–52s. This inventory includes 44 combat-coded, 15 training, 4 test, 11 backup, and 2 attrition reserve B–52s. Additionally, the Air Force is complying with congressional language, which directs that no funds be obligated or expended for retiring any of the 93 B–52H aircraft 60 days after the Secretary of the Air Force submits a bomber force structure report prepared by the Institute for Defense Analyses (IDA). The IDA will deliver its report to the Air Force later this month and the Secretary of the Air Force will subsequently forward the report to Congress. The Air Force will retain the B–2 fleet at the current TAI. The second phase of the Air Force's approach is to leverage near-term technologies to field a next-generation long-range strike (NGLRS) capability to replace the oldest B–52s by 2018. This could include beginning the divestiture of legacy bombers as the NGLRS bomber reaches initial operational capability. The final phase consists of a quantum leap in technology and capability that employs a system of systems technology push for advanced improvements in speed, range, accuracy, connectivity and survivability in the 2035 timeframe.

IV. CLOSING

The United States Air Force continues to serve as the ultimate backstop, dissuading opponents and reassuring allies by maintaining an always-ready nuclear arm. Airmen continue to stand silent sentry around-the-clock to protect our national security, and respond to any adversary should deterrence fail.

Your Air Force is preparing to dominate in the 21st century strategically, operationally, and tactically. Air Force strategic forces, the bulwark of our strategic deterrent capability, give us the means to ensure Global Vigilance, Global Reach, Global Power, and worldwide Expeditionary Combat Support by providing sovereign

options for the defense of the United States and its global interests: These capabilities are essential to the joint fight and are a critical component of the future joint force. The Air Force is committed to advancing strategic capabilities to fully support the joint team. In order to maintain our strategic dominance, the Air Force must recapitalize and also be allowed to divest itself of outdated, excess platforms. Divesting excess platforms will provide the means to shift vital funds to recapitalization and modernization of the Air Force and to maintain a strategic deterrent second to none. Your Air Force appreciates your continued support in turning our vision into an operational reality. Above all, our Nation must invest today to ensure tomorrow's air, space, and cyberspace dominance.

PREPARED STATEMENT BY RADM STEPHEN JOHNSON, USN

Chairman Nelson, Senator Sessions, distinguished members of the Strategic Forces subcommittee. Thank you for affording me the opportunity to appear before you to discuss our Navy's deterrent fleet and the ongoing efforts to ensure the continued reliability of our submarine strategic forces. The men and women of Strategic Systems Programs (SSP) are committed to maintaining the high reliability of our deployed *Ohio* class submarines with their Trident II D5 Missiles and to supporting emerging requirements of our combatant commanders. I am pleased to report to you that the Trident Strategic Weapons Systems continues to exceed the operational requirements established for the system. On 29 November 2007, U.S.S. *Henry M. Jackson* (SSBN 730) conducted the 120th consecutive successful missile launch as part of her Demonstration and Shakedown Operation. This record is unmatched by any previous missile launch system.

Our 14 Trident Submarines, 8 of which are deployed in the Pacific and 6 in the Atlantic fleet, continue to provide an affordable and credible sea base deterrent for our national leadership. Two of our submarines, U.S.S. *Alabama* (SSBN 731) and U.S.S. *Alaska* (SSBN 732), are undergoing Engineering Refueling Overhauls. U.S.S. *Henry M Jackson* has completed her overhaul and post availability testing and is preparing for her strategic outload and return to the operational cycle.

D5 LIFE EXTENSION

The Trident II missile continues Life Extension on schedule and on budget. The Life Extension program procures an additional 108 missiles and redesigns missile and guidance electronics due to obsolescence to meet long-term inventory requirements which will ensure that our *Ohio* class submarines are fully out loaded throughout their service lives.

The first Life Extended missile will be delivered to the Navy in fiscal year 2011. Testing of all components has gone well. Continued production of rocket motors has proven to be successful in maintaining our capability to field these critical assets.

In Partnership with the United Kingdom, the Navy is evaluating a follow-on platform to replace the current *Ohio* Class SSBNs. The U.S. lead-ship will occur in fiscal year 2019.

NUCLEAR WEAPONS SECURITY

SSP continues to pursue technologies which will provide credible, cost effective security for the nuclear assets entrusted to our watch. Our Marines and Navy Masters at Arms are providing an effective and integrated elite security force at both of our strategic weapons facilities. We will soon begin construction on our Limited Area Production Security Complex at Strategic Weapons Facility Pacific, Bangor, WA. When complete, this facility will provide a significantly higher degree of security for our ashore operations.

The first of our Maritime Protection Force Units has been commissioned at Kings Bay Georgia in support of the Transit Protection System (TPS). The recently commissioned United States Coast Guard Cutter *Sea Dragon* will comprise a major part of our TPS, providing a security umbrella for our *Ohio* class submarines as they deploy and return from their deterrent patrols. The United States Coast Guard has been an exemplary partner in this essential mission.

PHASE 2 STUDY IN SUPPORT OF THE RELIABLE REPLACEMENT WARHEAD (RRW)

The Strategic Systems Program chaired and coordinated the RRW Phase 2A design definition and cost study until the suspension of work by our national laboratories in accordance with congressional direction. The first order analysis of mass properties for the entire system are satisfactory, which means a modern warhead approach will fit within the space and weight constraints of our missile. At the stop

work point, the directors of Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratories remain confident that a modern warhead design:

- Can be certified without underground testing;
- Will significantly improve safety and security;
- Will significantly reduce the use of toxic material; and
- Can significantly improve manufacturability.

It is important this study or one similar be resumed so that the next administration has the information it needs to complete, as mandated by Congress, a timely review of its nuclear posture. We should be developing the technologies needed for a modern warhead approach now, regardless of specific program application, in order to make these safety and security capabilities sufficiently mature for future application.

SSGN

The flexibility of this new capability was clearly demonstrated in May 2007 when U.S.S. *Florida* launched two Block IV Tomahawks from the same tube. The following day one Block IV and Block III were launched, demonstrating system capabilities of the Attack Weapons System including in-flight updates and retargeting, the first time this had been done from a submerged submarine. All missiles flew their complete profiles flawlessly to target. All four submarines have completed their conversion to SSGN Attack and Special Operating Force Platforms, with U.S.S. *Georgia* being returned to service later this month. U.S.S. *Ohio* (SSBN 726) has recently conducted the first operational SSGN deployment in the Pacific and is on her second deployment. U.S.S. *Florida* has completed her initial load out of Tomahawk missiles and is making final preparations for her first deployment.

PROMPT GLOBAL STRIKE

SSP will leverage our successes with ongoing programs such as our Reentry Systems Applications and Guidance Applications programs and collaborate with other services as we participate in a new Defense Wide Conventional Prompt Global Strike Initiative to deliver a new conventional strike option to the combatant commanders. SSP continues to investigate technologies which will become viable for use on future Prompt Global Strike weapons systems which could be tailorable and adaptable into several platforms across the Department. Technologies such as thermal protection, navigation guidance and control, and advanced fuzing concepts must be further developed.

Mr. Chairman and distinguished members of this subcommittee, I sincerely appreciate your continued support of Strategic Systems Programs and our Deterrent Fleet. Your efforts will ensure the continued credibility and reliability of our Trident II Weapons System and its remarkable Trident II D5 Missile, maintaining an unmatched record of success by any missile system. The men and women of Strategic Systems Programs are committed to the highest standards of safety, surety, and reliability of this remarkable system. Thank you again for the opportunity to appear before you today.

PREPARED STATEMENT BY THOMAS P. D'AGOSTINO

INTRODUCTION

Mr. Chairman, thank you for the opportunity to discuss U.S. nuclear weapon policies and programs. My remarks focus on our efforts to transform the nuclear weapons complex into a 21st century national security enterprise. I will address why we believe that the Reliable Replacement Warhead (RRW) concept should be pursued notwithstanding the recent decision by Congress not to fund completion of the RRW design definition and cost study.

Before I begin, I want to remind you of the tremendous progress made over the past few years in reducing the size of our nuclear weapons stockpile. As you recall, in 2002, President Bush and President Putin signed the Moscow Treaty, which will reduce the number of our operationally deployed strategic nuclear warheads to 1,700 to 2,200 by 2012. In 2004, the President issued a directive to cut the entire U.S. nuclear stockpile—both deployed and Reserve warheads—in half by 2012. But this goal was later accelerated and achieved 5 years ahead of schedule in 2007. As of the end of 2007, the total stockpile was almost 50 percent below what it was in 2001, when the President took office.

On December 18, 2007, the White House announced the President's decision to reduce the nuclear weapons stockpile by another 15 percent by 2012. This means the U.S. nuclear stockpile will be less than one-quarter its size at the end of the Cold War—the smallest stockpile in more than 50 years.

My Department of Defense (DOD) colleagues are prepared to address fundamental questions of why in the post-Cold War era we continue to need nuclear forces and why, although dramatically reduced, we need the number of nuclear warheads in the stockpile that we plan to have. My testimony will focus more narrowly on our efforts to "transform" the U.S. nuclear weapons stockpile and supporting infrastructure. In this regard, further stockpile reductions rest on: (1) our ability to transform the nuclear weapons complex into a more responsive enterprise, (2) ongoing efforts to understand challenges to the stockpile and modern means of addressing these challenges such as the RRW, and (3) efforts between successive administrations and Congress to restore a consensus on the future nuclear deterrent, force posture and resulting nuclear weapons stockpile.

TRANSFORMING THE NUCLEAR WEAPONS COMPLEX

The Nuclear Weapons Complex is at a crossroads—maintaining the status quo is not an option we can afford. Delay and inaction will only increase the costs and elevate the risks associated with maintaining an aging stockpile. Regardless of stockpile transformation plans, these facilities need to be upgraded. The challenge for us will be to move from an aging nuclear weapons complex designed for the Cold War to a smaller 21st century national security enterprise that is integrated, modern, cost-effective, and that eliminates unnecessary redundancy, but that is also at the forefront of science and technology and responsive to future national security requirements.

Complex transformation is more than simply replacing an aged physical infrastructure, it includes transforming our contracting, procurement and management practices to embrace the best in business and human capital practices. We also seek to leverage our core competencies in nuclear weapons design and engineering to advance our leadership in counterterrorism, nonproliferation, physical security, cyber security and support of the Intelligence Community. Our transformation strategy relies on four pillars:

- Transform the nuclear stockpile through the Stockpile Stewardship Program (SSP) in partnership with the DOD.
- Transform to a modernized, cost-effective nuclear weapons complex to support needed capabilities in our physical infrastructure.
- Create an integrated, interdependent enterprise that employs best business practices to maximize efficiency and minimize costs.
- Advance the science and technology base that is the cornerstone of our nuclear deterrence and essential to our national security.

Infrastructure improvements are a major part of complex transformation and we have made important progress in this area. For example, with the support of this committee, in 2007, we produced tritium for the first time in 18 years, and the Tritium Extraction Facility at Savannah River is now online. Still, some major facilities date to the Manhattan Project and cannot easily meet today's safety and security requirements, and the capabilities they provide must be restored. Let me cite two key examples:

Plutonium "Pit" Production:

A sufficient capacity to produce plutonium pits for nuclear warheads is an essential part of a responsive national security enterprise and is required for as long as we retain a nuclear deterrent. Currently, we have a very small production capacity at Los Alamos National Laboratory (about 10 pits per year in Technical Area 55 (TA–55). This capacity took 10 years to reconstitute, using aging scientific and manufacturing facilities. It is insufficient to support the stockpile for the long term and, if not redressed, requires maintaining a larger stockpile than would otherwise be desired. There are two key reasons why this is so:

- Depending on warhead type, our best estimate of minimum pit lifetime is 85–100 years. While this lifespan exceeds previous estimates, degradation from plutonium aging still introduces uncertainty in overall system performance, particularly for lower margin systems. As the stockpile ages, we must plan to replace many pits in stockpiled weapons.
- As the stockpile continues to be reduced, we must anticipate that an adverse change in the geopolitical threat environment, or a technical problem or development, could require manufacture of additional warheads on a relatively rapid schedule. Currently, if we found a major system-wide problem

in the stockpile requiring pit replacement, we have insufficient capacity for a timely response.

As part of our transformation, the National Nuclear Security Administration (NNSA) has evaluated a variety of future pit production alternatives. NNSA's preferred alternative is to retain and build on the existing production facilities at Los Alamos. Whether we continue on our existing path or if we move towards an RRW based stockpile, we will need a capacity to produce about 50–80 pits per year. To do this, we would use existing facilities in TA–55 with the addition of a new Chemistry and Metallurgy Research-Replacement (CMRR) Nuclear Facility. In addition to its role in pit production, the CMRR will be the sole facility where we will be able to carry out pit surveillance, essential to maintaining the existing stockpile, as well as plutonium and actinide research and analysis. Our approach would provide sufficient production capacity to support smaller stockpile sizes, particularly when coupled with potential reuse of pits. A production capacity of 50–80 pits per year is less than one-tenth of Cold War levels, when we were producing not 10 or 100, but thousands of warheads a year.

Uranium Component Production:

As with plutonium, regardless of the type of stockpile we maintain, we will require a responsive capability and capacity to produce uranium components. Our uranium component production facilities date to the Manhattan Project. Securing these facilities from terrorism threats we face after September 11 is increasingly difficult and costly, as is operating them to modern safety standards. Every warhead, whether refurbished or replacement, will require uranium component manufacture. Construction of the Highly Enriched Uranium Materials Facility at the Y–12 National Security Complex in Oak Ridge will allow us to consolidate uranium storage with a significantly reduced security "footprint."

Although our emphasis has been on maintaining the stockpile by embarking on complex transformation and examining the potential promise of RRW, we have not lost focus on meeting our commitments to the Defense Department and to other customers. As I pointed out earlier, last year we reconstituted a limited plutonium pit manufacturing capability and produced new pits for the W88 warhead. This year we will continue to produce new W88 pits and begin installing equipment to increase pit production capacity to 30–50 pits per year by 2012–2014. In 2006 and 2007, respectively, we delivered the first refurbished B61–7 and B61–11 bombs to the Air Force. We intend to maintain on-time delivery of these weapons to the Air Force in 2008.

In addition, our 21st century national security enterprise will continue to leverage the scientific underpinnings of its historic nuclear weapons mission to respond to a full range of national security challenges beyond nuclear weapons. Indeed, the scientific capabilities and infrastructure developed for nuclear weapons are already being utilized by the Departments of Defense and Homeland Security, and by the Intelligence Community, and are recognized as essential to fulfilling the responsibilities of these organizations. For example, the NNSA laboratories have participated jointly with other government agencies in addressing a wide range of national security challenges—all of which leverage NNSA's core mission of nuclear weapons development and sustainability. Recent examples include:

- Supporting warfighter needs in Iraq with modeling, analysis and systems to counter improvised explosive devices (IEDs).
- Supporting the DOD and the Federal Bureau of Investigation in emergency render-safe and post-event technical nuclear forensics.
- Aiding the Intelligence Community in its counterterrorism and nonproliferation efforts by drawing upon our nuclear weapons expertise.
- Developing and deploying integrated systems for countering biological releases and bio-decontamination technologies.
- Developing and deploying portal detector technology to prevent smuggling of special nuclear materials.

Our challenge is to maintain these scientific and technical capabilities, which evolved from the weapons program when budgets were expansive, into the future when resources will be relatively constrained. We must find ways to leverage key capabilities by developing and strengthening strategic relationships with other Federal agencies in meeting our Nation's security needs.

Our plan for transforming our physical infrastructure, released this past December and detailed in the draft Supplemental Programmatic Environmental Impact Statement as required by the National Environmental Policy Act, will consolidate special nuclear materials to fewer sites and locations within the nuclear weapons complex, close or transfer hundreds of buildings that are no longer required for the

NNSA mission, and reduce NNSA's overall footprint by as much as a third. Over 10 years, we expect to eliminate at least 9 million square feet, or the equivalent of almost 200 football fields of floor space! Additionally, by eliminating multi-site redundancies and consolidating both mission and capability at our sites, we expect to dramatically improve efficiency and cut costs.

EVOLUTION OF OUR STRATEGY FOR SUSTAINING THE NUCLEAR STOCKPILE

Let us turn to the problem of stockpile stewardship and recall how we got to where we are today. In the years following the end of the Cold War, budgets for nuclear weapons programs were in "free fall"—funding was simply not available to sustain both research and development (R&D) and production capabilities. A strategic decision was made to emphasize R&D to ensure future capabilities to certify the stockpile while neglecting production—we mortgaged the present to ensure the future.

That future was seen as science-based stockpile stewardship and life extension of our Cold War legacy warheads. When the U.S. stopped nuclear testing in 1992, it sought to replace this critical tool with a new SSP that: (1) emphasized science and technology coupled with a vigorous experimental program as a means to understand better the physics and chemistry of nuclear weapons and their operation, and (2) provided enhanced warhead surveillance tools so that we would have a much better chance of detecting the onset of problems in the stockpile.

The goal of the SSP was to predict the effects of aging in our warheads so that we could replace aging components before they degraded overall system reliability. The end of the Cold War provided this opportunity—our focus was no longer on a continuous cycle of fielding new warheads to provide new military capabilities, but on sustaining existing nuclear capabilities.

We call this "life extension"—the process of observing the aging of individual components of warheads and replacing them before they fail. Consider this challenge. Your vintage 1965 Ford Mustang—maintained as a collector's item—has been sitting in your garage for 40 years. You monitor it for such items as a clogged carburetor, corrosion in the engine block, battery discharge, and you replace parts when you deem it necessary. But you don't get to start the engine and take it for a test drive. The trick is to assure that if you do need it right away—to take your wife (or husband) to the hospital in an emergency—that it would work with certainty. That's sort of what we have to do with nuclear weapons LEPs.

Following the administration's Nuclear Posture Review, in 2003 we "took stock" of 10 years of the SSP and came to some important conclusions.

First, the SSP is working—today's stockpile remains safe and reliable and does not require nuclear testing. This assessment is based on a foundation of past nuclear tests augmented by cutting edge scientific and engineering experiments and analysis, and improved warhead surveillance. Most importantly, it derives from the professional (and independent) judgment of our laboratory directors advised by their weapon program staffs.

Second, as we continue to draw down the stockpile, our laboratory directors are concerned that our current path—successive refurbishments of existing warheads developed during the Cold War to stringent Cold War specifications—may pose unacceptable risks to maintaining high confidence in warhead performance over the long-term absent nuclear testing.

These concerns arise as we move further and further away from designs certified with underground nuclear tests, resulting from inevitable accumulations of small changes from a continuous process of aging, and refurbishment of aging components, over the extended lives of these highly-optimized systems.

So, while we are confident that the SSP is working and that today's stockpile is safe and reliable, it is only prudent to explore alternate means to manage risk in seeking to ensure stockpile reliability over the long term.

This is, in part, the impetus for our proposed work to study reliable replacement concepts: to ensure the long-term sustainment of the military capabilities provided by the existing stockpile, not to develop warheads for new or different military missions as is often portrayed.

Specifically, we have examined the feasibility of providing replacement warheads for the legacy stockpile. By relaxing Cold War design constraints that sought maximum yield in a minimum size/weight package, it would allow design of replacements that are easier and less costly to manufacture, are safer and more secure, eliminate most environmentally dangerous materials, and increase design performance margins, thus ensuring long-term confidence in reliability without nuclear testing.

Finally, we need to transform our complex with or without RRW. That said, we believe that RRW would offer means to transform to a more efficient and responsive, much smaller, and less costly nuclear weapons R&D and production infrastructure.

URGENCY OF RRW

We are often asked: If today's stockpile is safe and reliable, why do we believe it is important to start on RRW now? Why not wait a few years when you know more? There are four main reasons why I believe it is important to complete the reliable replacement study now.

First, the study will provide critical information to insure that the next administration, as well as the bipartisan commission established by this committee, can complete a timely review of U.S. nuclear posture as mandated by Congress.

Second, as I raised earlier, there are concerns about our ability to ensure the long-term safety and reliability of today's stockpile absent nuclear testing. For example, the first RRW was intended to replace a portion of W76 warheads deployed on the Trident SLBM system. That warhead comprises a large fraction of today's, and an even larger fraction of our future strategic deterrent force. It has no "back up." Although we have not uncovered any problems with the W76, it is prudent to hedge against a catastrophic failure of that system by introducing a significantly different warhead design into the SLBM force. Our ability over the next 15 years to produce new plutonium parts is limited—the sooner we start the sooner we could achieve this diversity.

Third, after September 11 we realized that the security threat to our nuclear warheads had fundamentally changed. The security features in today's stockpile are commensurate with technologies that were available during the Cold War and with the threats from that time. Major enhancements in security are not easily available via retrofits in the life extension programs. The car analogy is again relevant. Today's Mustang remains a high-performance automobile, has about the same dimensions and weighs only a few hundred pounds more than the first Mustangs, and has all the modern safety and security features we expect today—air bags, anti-lock brakes, GPS navigation, satellite radio, theft deterrent, and alarm systems. The 1965 version had none of these features, not even seat belts! We deploy warheads today that have 1970–1980's safety, security, and anti-terrorism features. It does not mean that these warheads are not safe and secure, but we can do better and we should do better. Based on our initial assessments, I believe that RRW provides opportunities to incorporate the latest technological advances for precluding unauthorized use in a post-September 11 threat environment.

Fourth, the RRW effort thus far has provided a critical opportunity to ensure the transfer of nuclear design and engineering skills from the generation who honed these skills with nuclear testing to the generation who will replace them. These skills are absolutely vital to the Nation, not just for sustaining our deterrent but in such areas as nuclear counterterrorism which will become even more important in the future. In a few years, nearly all of the older generation will be retired or dead. Without this opportunity coming at this time (and not 5 years hence), we would not be able to sustain key capabilities.

RESPONSE TO ARGUMENTS AGAINST RRW

A number of concerns have arisen in our deliberations with Congress and others about the RRW program. Specifically, critics argue that:

- RRW will undermine the nonproliferation regime either by providing incentives for states to acquire or improve their nuclear arsenals, or by impeding U.S. leadership in pursuing a strengthened nonproliferation regime.
- RRW will cause us to carry out an underground nuclear test.
- More broadly, the U.S. "doesn't have its nuclear act together"—its nuclear policies are not clearly embedded in a broader international security framework. At minimum, it hasn't communicated its nuclear policy clearly to Congress. Until it does, some would argue, we should delay RRW and Complex Transformation.

On that last point, the United States has a coherent and rationale policy overarching nuclear weapons programs as reflected in the 2001 Nuclear Posture Review (NPR), the Presidential directive (NSPD–28) addressing command and control and safety and security of U.S. nuclear forces, and the Nuclear Weapons Stockpile Plans issued annually by the President, among others. But we have not done as good a job as we should communicating these policies to Congress and the public. We are, however, doing better and I will return to this at the end of my statement.

How is our proposed reliable replacement strategy consistent with nonproliferation and arms control? Some of you may be convinced that there might be valid rea-

sons for going forward but are concerned that these reasons do not outweigh an overriding concern that such efforts could undermine U.S. leadership in the fight against proliferation. I appreciate such concerns, but ask that you consider the following points:

- The RRW, by design, would not provide a new role for nuclear weapons or new military capabilities, but rather would help sustain the military capabilities of the existing arsenal.
- Fielding the RRW would not increase the size of the nuclear stockpile, rather it would enable further stockpile reductions. Once a transformed production complex demonstrates that it can produce replacement warheads on a timescale responsive to technical problems in the stockpile, or adverse geopolitical changes, then many Reserve warheads could be eliminated—further reducing the nuclear stockpile and reinforcing our commitment to Article VI of the Nonproliferation Treaty.
- Because replacement warheads would be designed with more favorable performance margins, and therefore less sensitive to incremental aging effects, introducing them into the stockpile would reduce the possibility that the United States would be faced with a need to conduct a nuclear test to diagnose or remedy a stockpile problem. This supports overall U.S. efforts to dissuade other nations from conducting nuclear tests.
- By incorporating modern security features, RRW would strengthen security of U.S. nuclear weapons against unauthorized use (e.g., in the event of a terrorist attack on one of our storage facilities).
- Finally, a safe, secure, and reliable U.S. nuclear deterrent, credibly extended to our allies, supports U.S. nonproliferation efforts because allies confident in U.S. extended nuclear deterrence guarantees will not be motivated to pursue their own nuclear forces. This nonproliferation role of U.S. nuclear weapons is often underestimated. Indeed, the nuclear weapon programs of North Korea and Iran have made our nuclear guarantees to allies such as Turkey, South Korea and Japan take on renewed importance.

In summary, our vision to transform the nuclear stockpile and supporting infrastructure through reliable replacement concepts is complementary to, not inconsistent with, our nonproliferation policies and with the long-term goal of global nuclear weapons elimination.

NUCLEAR TESTING

Let me turn in more detail to the nuclear testing issue. I am most concerned about some misunderstandings expressed in the public sphere about our views on the possible need for nuclear testing. Let there be no doubt: Today's nuclear weapons stockpile is safe and reliable and has not required post-deployment nuclear testing to date, nor is nuclear testing currently anticipated or planned. But keeping this stockpile healthy is becoming an increasingly difficult challenge. Periodically we identify problems with warheads that in the past would have been resolved with nuclear tests. Our SSP has worked well so far to help us to avoid that prospect. The considered judgment of the national weapons laboratories directors, however, is that maintaining certification of the finely-tuned designs of an aging Cold War stockpile through the LEP effort and absent nuclear testing involves increasing risk.

An alternative path is a stockpile based on replacement warheads that, unlike Cold War legacy warheads, would be designed for certification without additional nuclear tests. Indeed, our experts best technical judgment today is that it will be less likely that we would need nuclear testing to maintain the safety, security, and reliability into the future of the nuclear stockpile if we pursue a reliable replacement path employing all the tools of the SSP, including advanced quantitative means, than if we continue to rely on today's legacy warheads. In December, I provided Congress classified information giving further details on these matters.

Why then do we think it's feasible to field an RRW without nuclear testing? There are four basic reasons:

- First, replacement warhead designs would provide more favorable reliability and performance margins than those currently in the stockpile, and would be less sensitive to incremental aging effects or manufacturing variances.
- Second, feasible replacement designs would be firmly rooted in the past nuclear test data base.
- Third, by pursuing reliable replacement designs now, we would be able to fully utilize the experience of those remaining designers and engineers who successfully fielded our current stockpile during the period of nuclear testing.

- Fourth, the SSP over the past decade has provided improved scientific and analytic tools, including advanced supercomputer simulation and sophisticated experimental capabilities, which were not available to the previous generation of designers/engineers. These tools have led to a much better understanding of the intricacies of nuclear weapons physics and engineering. Indeed, we know more about the complex issues of nuclear weapons performance today than we ever did during the period of nuclear testing.

These four factors, taken together, provide a solid foundation for our confidence that we can certify RRW designs without nuclear tests.

FACTORS AFFECTING FUTURE ADJUSTMENTS TO OUR NUCLEAR POSTURE

It is important for us to describe how our concept for transformation—in light of evolving geopolitical threat environments—could provide opportunities for further stockpile reductions. In this regard, the current plan for the nuclear force posture—developed in the 2001 NPR—established objectives for a range of deployed nuclear warheads, a nuclear force structure, and nuclear stockpile for 2012 as well as a general approach to sustain this force beyond 2012. Future administrations will of course adjust, refine and make changes to our posture in response to future events and circumstances. These changes might be unilateral or taken in concert with other nuclear powers. In any case, these changes will be governed by three basic factors: (1) the future geopolitical threat environment, (2) the success of technical efforts underway to ensure a safe, reliable and credible nuclear deterrent for the foreseeable future and to transform the nuclear weapons R&D and production infrastructure that supports it, and (3) our progress in fielding other strategic capabilities, including missile defenses and conventional precision strike.

Geopolitical uncertainties are likely to dominate future considerations of an adjusted force posture. Will Russia succeed in transforming to a democratic society with rule-of-law, respect for human rights, and integration, both economic and political, with the west? Will China's military modernization and political trajectory affect the ability of the United States to protect key interests in the Pacific region? Will nuclear programs of North Korea, Iran, or emerging proliferants cause a proliferation "cascade" in which U.S. allies and friends in key regions contemplate "going nuclear"? How such questions evolve over the next decade and more will affect how future administrations assess national security needs—including plans for assurance of allies—and adjust the level of deployed nuclear warheads (up or down), the composition of deployed nuclear forces, or both.

There are other major uncertainties that are largely domestic in nature, and related to our efforts to sustain and, as necessary, modernize our forces. With regard to nuclear delivery systems, the planned force of 450 Minuteman III ICBMs will begin to reach end-of-life in 2018. Will there be support to develop and deploy a follow-on capability to the Minuteman III ICBM? If so, when and how many will we deploy? If the ICBM force is not replaced at its end-of-life but retired, other nuclear force elements may need to be bolstered to take its place. There are comparable decisions regarding a possible next generation long-range bomber (sooner) and/or replacement of nuclear ballistic missile submarines (later) that will factor in as well to considerations of adjusting the future nuclear posture.

With regard to the development of U.S. non-nuclear strategic capabilities, there is another set of uncertainties. Will prompt, long-range conventional global strike weapons be developed and deployed?

How many? What types? With what effects? What will be the future direction and scope of ballistic missile defenses? What technical advances/breakthroughs (e.g., hypersonic delivery systems) by the U.S. or potential adversaries will occur? Could these affect the military balance? Answers to these questions will determine whether such capabilities could complement nuclear strike capabilities or conceivably replace nuclear weapons for certain missions and thus lead to further adjustments in our posture.

With regard to the nuclear warheads themselves, our long-term goal is to rely more on the capabilities of the infrastructure and less on Reserve warheads in the stockpile to respond to unforeseen events. Until we are confident that we have the capability to respond to unexpected developments, however, we will need to retain more Reserve warheads than otherwise would be desired. Specifically, our inability to produce plutonium pits in sufficient quantities means that additional warheads are kept in Reserve to hedge against technical problems that could arise in the stockpile or adverse geopolitical changes.

If we have an opportunity to realize the benefits of the RRW program, and a more responsive infrastructure that the RRW could facilitate, there will be opportunities

for additional stockpile reductions. We are examining a series of potential milestones, reflecting progress on RRW and a responsive infrastructure, that would allow consideration of further adjustments to the Reserve stockpile. Accomplishing these milestones would represent levels of confidence gained, or uncertainties reduced, as we proceed forward with stockpile and infrastructure transformation. At various points, accumulated progress would be assessed to see if further adjustments to the Reserve stockpile are warranted. To the degree that geopolitical trends evolve in more favorable directions, opportunities exist to consider options for lower deployed as well as Reserve Forces.

CURRENT STATUS OF THE RRW PROGRAM

As I said at the beginning of my statement, the Consolidated Appropriations Act, 2008 did not fund completion of the RRW design definition and cost study. The Departments of Defense and Energy continue to believe that the warhead features characteristic of the RRW are the right ones for ensuring the future of our Nation's nuclear deterrent. Moreover, Congress specifically requested that the administration continue related work in fiscal year 2008 in three key areas:

- First, the act provided $15 million for a new "Advanced Certification" campaign designed to address issues raised in the recent JASON's study of the feasibility of certifying reliable replacement designs without nuclear testing.
- Second, the act added $10 million to the Enhanced Surety campaign "to increase the safety and security of weapons in the existing stockpile and develop new technologies for incorporation into potential future systems." This is fully consistent with efforts to apply state-of-the-art technology to replacement warhead designs to enhance security and prevent unauthorized nuclear weapons use by terrorists.
- Third, Congress appropriated $15 million in the National Defense Appropriations Act for Fiscal Year 2008 for the U.S. Navy to carry out studies related to the integration of an RRW warhead with the Trident SLBM reentry system.

NNSA's fiscal year 2009 budget request continues and extends fiscal year 2008 related activities in the following areas:

Advanced Certification ($20 million request): To continue efforts begun in fiscal year 2008 to review, evaluate and implement key recommendations from the JASON's RRW study regarding approaches to establishing an accredited warhead certification plan, without nuclear testing, in an era where changes to nuclear components will occur due to aging or design defects.

RRW ($10 million request): To enable maturation of the RRW design in order to address questions raised by the JASON's review of RRW feasibility study activities. Design refinement is necessary to establish parameters for potential impacts on certification. It will also facilitate documenting the work that has been completed through 2007 to support future administration decisions on options for our nuclear weapons stockpile.

Completion of the RRW study was not funded in part due to concerns that the administration had not fully communicated its policies which guide nuclear forces, posture and programs, including the RRW program. The administration will shortly provide to Congress a second paper to accompany its white paper on nuclear policy transmitted to Congress in July 2007 by Secretaries Rice, Gates, and Bodman. This second paper outlines in detail the overall strategy which guides nuclear weapons programs including the size of the nuclear weapons stockpile and operationally-deployed strategic forces, and how we manage the risk of a less-than sufficient warhead production infrastructure. Our goal is to restore a consensus with Congress to complete the reliable replacement study as a means to ensure that the next administration, as mandated by Congress, can complete a timely review of its nuclear posture.

Let me conclude my statement here. I thank the chairman and the committee for the opportunity to discuss these critical issues for our Nation.

Appendix A

WEAPONS ACTIVITIES BUDGET SUMMARY

Defense Programs

The FY 2009 Budget Request for the programs funded within the Weapons Activities Appropriation is $6.62 billion, an approximately 5.1 percent increase over the FY 2008 Consolidated Appropriations level. It is allocated to adequately provide for the safety, security, and reliability of the nuclear weapons stockpile and supporting facilities and capabilities.

Directed Stockpile Work (DSW) activities ensure the operational readiness of the nuclear weapons in the nation's stockpile through maintenance, evaluation, refurbishment, reliability assessment, weapon dismantlement and disposal, research, development, and certification activities. The FY 2009 request is organized by Life Extension Programs, Stockpile Systems, Reliable Replacement Warhead, Weapons Dismantlement and Disposition, and Stockpile Services. The request places a high priority on accomplishing the near-term workload and supporting technologies for the stockpile along with long-term science and technology investments to ensure the capability and capacity to support ongoing missions.

The FY 2008 Consolidated Appropriations Act did not contain funding for the Reliable Replacement Warhead (RRW). The Administration believes that the characteristic features of the RRW are the right ones for ensuring the future of our Nation's nuclear deterrent force. The FY 2009 request includes $10 million to continue the design definition and cost study. The request also continues efforts called out in the Explanatory Statement referenced in Section 4 of Public Law 110-161 to address issues raised in the recent JASON's summer study of the feasibility of certifying RRW designs without nuclear testing.

Campaigns are focused on scientific and technical efforts essential for the certification, maintenance and life extension of the stockpile. The Stockpile Stewardship Program has allowed NNSA to maintain the moratorium on underground testing and move to "science-based" certification and assessments for stewardship by relying on experiments, modeling, simulation, surveillance and historical underground nuclear testing experience. The Science and Engineering Campaigns are focused to provide the basic scientific understanding and the technologies required for the directed stockpile workload and the completion of new scientific and experimental facilities. In the Inertial Confinement Fusion Ignition and High Yield Campaign, the National Ignition Facility (NIF) will focus on completing the first experiment on NIF with a credible chance of demonstrating laboratory-scale ignition in 2010. The Advanced Simulation and Computing Campaign will continue to improve capabilities through development of faster computational platforms in partnership with private industry, and with state of the art techniques for calculations, modeling and simulation, and analysis of highly complex weapons physics information. The Readiness Campaign consists of technology-based efforts to reestablish and enhance manufacturing and other capabilities needed to meet planned weapon component production.

The FY 2009 request makes several changes in the location of programs within Weapons Activities. The Pit Manufacturing and Certification Campaign recently concluded with the successful manufacturing and certification of the W88 pit. Pit manufacturing related activities are moved to the Direct Stockpile Work Stockpile Services program and pit certification activities are transferred to the Science Campaign. In addition, in the Science Campaign, the Advanced Certification program will

continue efforts begun in FY 2008 at the direction of the Congress to review, evaluate and implement key recommendations from the JASON's RRW study regarding approaches to establishing an accredited warhead certification plan without nuclear testing. Work being performed to understand potential improvised nuclear device designs and responses is being transferred to the nuclear weapons incident response account.

Secure Transportation Asset

The Secure Transportation Asset's FY 2009 Budget Request is an increase of $9.5 million to $221.1 million. This funding request supports the increase to transportation capacity necessary for the dismantlement of nuclear weapons, departmental initiatives to consolidate and disposition nuclear material, and the implementation of the current operational doctrine to protect nuclear weapons and material in transport.

Readiness in Technical Base and Facilities (RTBF) and Facilities and Infrastructure Recapitalization Program (FIRP)

In FY 2009, we are requesting $1.89 billion for the maintenance and operation of existing facilities, remediation and disposition of excess facilities, and construction of new facilities. Of this amount, $1.72 billion is requested for RTBF, an increase of $83.1 million from FY 2008 operating levels, with $1.41 billion reserved for Operations and Maintenance. The Operations and Maintenance portion also includes the Institutional Site Support program which supports facility transition and capability consolidation. The request includes $308.0 million for RTBF Construction.

This request also includes $169.5 million for the Facilities and Infrastructure Recapitalization Program (FIRP), a separate and distinct program that is complementary to the ongoing RTBF efforts. The FIRP mission, which we expect to be completed in FY 2013, is to restore, rebuild and revitalize the physical infrastructure of the nuclear weapons complex, in partnership with RTBF. This program assures that facilities and infrastructure are restored to an appropriate condition to support the mission, and to institutionalize responsible and accountable facility management practices. The Integrated Prioritized Project List (IPPL) is the vehicle that FIRP will rely on to prioritize and fund outyear projects to reduce legacy deferred maintenance. These projects significantly reduce the deferred maintenance backlog to acceptable levels and support the Stockpile Stewardship mission and transformation of the complex.

This request also includes $77.4 million for the newly established Transformation Disposition (TD) Program. TD is NNSA's facility and infrastructure (F&I) retirement program for old, Cold War-era structures. The NNSA owns over 35 million gross square feet of footprint and over 25% of the footprint may become excess as a result of complex transformation. TD is established with the goal of reducing non-process and contaminated excess F&I. This includes facilities that are excess to current and future NNSA mission requirements, including those contaminated structures which are not currently the responsibility of the Office of Environmental Management. This program supports the performance measure of reducing the total square feet, improves management of the NNSA facilities and infrastructure portfolio, and reduces long-term costs and risks. The TD Program will set the groundwork for a smaller complex.

All of these activities are critical for the development of a more responsive infrastructure and will be guided by decisions based on the Complex Transformation Supplemental Programmatic Environmental Impact Statement (SPEIS) and other factors such as funding and national security requirements. Since a significant fraction of our production capability resides in World War II era facilities, infrastructure modernization, consolidation, and sizing consistent with future needs is essential for an economically sustainable Complex. Facilities designed according to modern manufacturing, safety, and security principles will be more cost-effective and responsive to future requirements. For example, a facility could be designed to support a low baseline capacity and preserve the option, with a limited amount of contingency space to augment capacity, if authorized and needed, to respond to future needs.

Having a reliable plutonium capability is a major objective of NNSA planning and is a key requirement if the nation is to maintain an effective deterrent, regardless of the composition of the stockpile. Options for plutonium research, surveillance, and pit production are being evaluated as part of the Complex Transformation NEPA process, with a decision anticipated in 2008. The preferred alternative in the draft Complex Transformation SPEIS proposes that Los Alamos National Laboratory facilities at Technical Area 55 (TA-55) provide plutonium research, surveillance and pit production capabilities. This alternative includes the proposed Chemistry and Metallurgy Research Replacement – Nuclear Facility (CMRR-NF) to achieve the objectives of (1) closing the aging existing Chemistry and Metallurgy Research (CMR) facility, (2) replacing essential plutonium surveillance and research capabilities currently at Lawrence Livermore National Laboratory and those being conducted in Plutonium Facility 4 (PF-4) in TA-55, and (3) achieving a net manufacturing capacity of 50 – 80 pits per year by allowing surveillance activities now occurring in PF-4 to be conducted in CMRR.

Completion of the Highly Enriched Uranium Materials Facility (HEUMF) would allow a reduction of the overall size of the high security area at the Y-12 National Security Complex. If NNSA ultimately decides to build a Uranium Processing Facility (UPF) at Y-12, then Y-12's high security area would be reduced from 150 acres to 15 acres. This reduction combined with the engineered security features of the HEUMF and UPF, would allow NNSA to meet the Design Basis Threat (DBT) at significantly reduced costs, to lower non-security costs, and to provide a responsive highly enriched uranium manufacturing capability.

Environmental Projects and Operations

The Environmental Projects and Operations/Long-Term Stewardship Program is requested at $40.6 million in FY 2009. This program serves to reduce the risks to human health and the environment at NNSA sites and adjacent areas by: operating and maintaining environmental clean-up systems; performing long-term environmental monitoring activities; and integrating a responsible environmental stewardship program with the NNSA mission activities. The increase in this program is necessary to continue compliance with statutory requirements and to provide Long-Term Stewardship activities for two additional NNSA sites.

Nuclear Weapons Incident Response

The Nuclear Weapons Incident Response (NWIR) Program serves as the United States' primary capability for responding to and mitigating nuclear and radiological incidents worldwide. The FY 2009 Request for these activities is $221.9 million, of which $31.7 million is dedicated to the continued implementation of two national security initiatives that will strengthen the Nation's emergency response

capabilities—the National Technical Nuclear Forensics (NTNF) and the Stabilization Implementation programs.

The NTNF program will continue the development of capabilities to support pre- and post-detonation activities and enhance technical nuclear forensics capabilities. The continued development of this capability will facilitate the thorough analysis and characterization of pre- and post-detonation radiological and nuclear materials and devices, including devices used in nuclear detonations as well as interdicted devices. Developing forensic capabilities of this nature is crucial to the overall objective of identifying the origin and pathways of interdicted nuclear materials, warheads and improvised nuclear devices.

Stabilization is a capability aimed at using advanced technologies to enhance the U.S. Government's ability to interdict, delay and/or prevent operation of a terrorist's radiological or nuclear device until national assets arrive on the scene to conduct traditional "render safe" procedures. NNSA has actively sponsored new research in this area and, additionally, continues to leverage emerging technologies that have been demonstrated successfully by the DoD in support of the global war on terrorism. In the implementation phase, NNSA will transfer these matured projects into operational testing to selected teams across the country, potentially followed by their transition into the collection of tools available to Federal response teams.

Physical and Cyber Security

The FY 2009 Budget Request for Defense Nuclear Security is $737.3 million, a 7.7 percent decrease from the FY 2008 appropriation. The FY 2009 request supports the base program and the program's focus on sustaining the NNSA sites 2003 Design Basis Threat baseline operations and implementing the 2005 DBT Policy upgrades with the Nevada Test Site reaching compliance in FY 2009. Starting in FY 2009, there is no longer an offset in this account or in the Departmental Administration account for the security charges associated with reimbursable work. These activities will be fully funded by the programs with direct appropriations.

During FY 2009, the program will focus on eliminating or mitigating identified vulnerabilities across the weapons complex. Measures will include additional protective force training, acquiring updated weapons and support equipment, improving physical barrier systems and standoff distances, and reducing the number of locations with "targets of interest." Physical security systems will be upgraded and deployed to enhance detection and assessment, add delay and denial capabilities, and to improve perimeter defenses at several key sites. There are no new construction starts.

The FY 2009 Budget Request for Cyber Security is $122.5 million, an 11 percent increase from the FY 2008 appropriation. The FY 2009 Budget Request is focused on sustaining the NNSA infrastructure and upgrading elements designed to counter cyber threats and vulnerabilities from external and internal attacks. This funding level will support cyber security revitalization, enhancements in assets and configuration management, and identify emerging issues, including research needs related to computer security, privacy, and cryptography.

Additionally, the Cyber Security funding will provide for enhancement, certification, and accreditation of unclassified and classified computer systems to ensure the proper documentation of risks and justification of associated operations for systems at all sites. The funding within this request will also be applied to foster greater cyber security awareness among Federal and contractor personnel. NNSA will sponsor a wide range of educational initiatives to ensure that our workforce possesses the ever-expanding cyber security skills critical to safeguarding our national security information. Funding provided to NNSA sites will be conditioned upon their implementation of a risk-based approach to cyber security management and policy.

Appendix B

National Nuclear Security Administration

Appropriation and Program Summary Tables
Outyear Appropriation Summary Tables

FY 2009 BUDGET TABLES

National Nuclear Security Administration

Overview

(dollars in thousands)

	FY 2007 Current Appropriations	FY 2008 Original Appropriation	FY 2008 Adjustments	FY 2008 Current Appropriation	FY 2009 Request
National Nuclear Security Administration					
Office of the Administrator	358,291	405,987	-3,850	402,137	404,081
Weapons Activities	6,258,583	6,355,633	-58,167	6,297,466	6,618,079
Defense Nuclear Nonproliferation	1,824,202	1,673,275	-15,279	1,657,996	1,247,048
Naval Reactors	781,800	781,800	-7,114	774,686	828,054
Total, NNSA	**9,222,876**	**9,216,695**	**-84,410**	**9,132,285**	**9,097,262**
Rescission of Prior Year Balances	0	-322,000	0	-322,000	0
Total, NNSA (OMB Scoring)	**9,222,876**	**8,894,695**	**-84,410**	**8,810,285**	**9,097,262**

Appropriation Summary

Outyear Appropriation Summary
NNSA Future-Years Nuclear Security Program (FYNSP)

(dollars in thousands)

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
NNSA					
Office of the Administrator	404,081	419,848	436,266	451,771	469,173
Weapons Activities	6,618,079	6,985,695	7,197,844	7,286,912	7,460,318
Defense Nuclear Nonproliferation	1,247,048	1,082,680	1,076,578	1,111,337	1,133,982
Naval Reactors	828,054	848,641	869,755	880,418	899,838
Total, NNSA	**9,097,262**	**9,336,864**	**9,580,443**	**9,730,438**	**9,963,311**

OFFICE OF THE ADMINISTRATOR
NATIONAL NUCLEAR SECURITY ADMINISTRATION

Overview

Appropriation Summary by Program

(dollars in thousands)

	FY 2007 Current Appropriation	FY 2008 Original Appropriation	FY 2008 Adjustments	FY 2008 Current Appropriation	FY 2009 Request	$ Change
Office of the Administrator						
Office of the Administrator	358,291[a]	383,487	-3,490	379,997	404,081	+24,084
Congressional Directed Projects	0	22,500	-360	22,140	0	-22,140
Total, Office of the Administrator	358,291	405,987	-3,850[b]	402,137	404,081	+1,944

Public Law Authorization:
FY 2008 Consolidated Appropriations Act (P.L. 110-161)
National Nuclear Security Administration Act, (P.L. 106-65), as amended

Outyear Appropriation Summary

(dollars in thousands)

	FY 2010	FY 2011	FY 2012	FY 2013
Office of the Administrator	419,848	436,266	451,771	469,173

[a] Reflects the Congressionally approved appropriation transfer of $17,000,000 (07-D-04) from a source within the Weapons Activities appropriation and $1,000,000 from the FY 2007 supplemental in support of the Defense Nuclear Nonproliferation program.

[b] Reflects a rescission of $3,850,000 as cited in the FY 2008 Consolidated Appropriations Act (P.L. 110-161).

Weapons Activities

Funding Profile by Subprogram

(dollars in thousands)

	FY 2007 Current Appropriation	FY 2008 Original Appropriation	FY 2008 Adjustments	FY 2008 Current Appropriation	FY 2009 Request
Weapons Activities					
Directed Stockpile Work	1,430,192	1,413,879	-12,627	1,401,252	1,675,715
Science Campaign	267,758	290,216	-2,592	287,624	323,070
Engineering Campaign	161,736	171,075	-1,527	169,548	142,742
Inertial Confinement Fusion Ignition and High Yield Campaign	489,706	474,442	-4,236	470,206	421,242
Advanced Simulation and Computing Campaign	611,253	579,714	-5,177	574,537	561,742
Pit Manufacturing and Certification Campaign	242,392	215,758	-1,927	213,831	0
Readiness Campaign	201,713	159,512	-1,424	158,088	183,037
Readiness in Technical Base and Facilities	1,613,241	1,652,132	-14,751	1,637,381	1,720,523
Secure Transportation Asset	209,537	213,428	-1,905	211,523	221,072
Nuclear Weapons Incident Response	133,514	160,084	-1,429	158,655	221,936
Facilities and Infrastructure Recapitalization Program	169,383	181,613	-1,622	179,991	169,549
Environmental Projects and Operations	0	8,669	-77	8,592	40,587
Transformation Disposition	0	0	0	0	77,391
Defense Nuclear Security	656,653	806,434	-7,201	799,233	737,328
Cyber Security	104,505	101,191	-904	100,287	122,511
Congressionally Directed Projects	0	48,000	-768	47,232	0
Subtotal, Weapons Activities	**6,291,583**	**6,476,147**	**-58,167**	**6,417,980**	**6,618,445**
Security Charge for Reimbursable Work	-33,000	-34,000		-34,000	0
Use of Prior Year Balances	0	-86,514		-86,514	-366
Total, Weapons Activities	**6,258,583**	**6,355,633**	**-58,167**	**6,297,466**	**6,618,079**

Public Law Authorization:

FY 2008 Consolidated Appropriations Act (P.L. 110-161)
National Nuclear Security Administration Act, (P.L. 106-65), as amended

Outyear Funding Profile by Subprogram

(dollars in thousands)

	FY 2010	FY 2011	FY 2012	FY 2013
Weapons Activities				
Directed Stockpile Work	1,762,079	1,789,979	1,760,218	1,776,388
Science Campaign	309,091	295,192	296,662	299,902
Engineering Campaign	148,863	146,565	150,475	153,907
Inertial Confinement Fusion Ignition and High Yield Campaign	434,007	381,173	373,005	377,762
Advanced Simulation and Computing Campaign	526,373	510,808	514,405	520,645
Pit Manufacturing and Certification Campaign	0	0	0	0
Readiness Campaign	170,003	161,139	161,130	164,295
Readiness in Technical Base and Facilities	1,904,398	2,153,557	2,275,909	2,372,916
Secure Transportation Asset	249,555	261,543	268,134	269,325
Nuclear Weapons Incident Response	229,661	235,211	242,425	250,947
Facilities and Infrastructure Recapitalization Program	192,945	196,379	195,096	194,779
Environmental Projects and Operations	37,288	39,026	37,468	36,040
Transformation Disposition	89,457	88,589	88,008	87,863
Defense Nuclear Security	818,285	817,809	793,856	814,928
Cyber Security	113,690	120,874	130,121	140,621
Total, Weapons Activities	**6,985,695**	**7,197,844**	**7,286,912**	**7,460,318**

Senator BILL NELSON. Senator Sessions, I'll certainly turn to you, if you want to go ahead, depending on your time schedule.

Senator SESSIONS. Please go first, Mr. Chairman. I'll be here, and thank you for the courtesy.

Senator BILL NELSON. All right.

Secretary Vickers, when your position was reorganized, the position picked up new areas of responsibility. These areas included the strategic and nuclear matters, missile defense, and space policy. This is pretty large and diverse. What do you do to manage all of that diversity? Do you have any recommendations for changes?

Mr. VICKERS. Sir, I believe the reorganization which created Special Operations/Low Intensity Conflict and Interdependent Capabilities is actually working quite well. We've had extensive discussions with the Government Accountability Office about this. What it has provided is a single senior civilian official for—to have oversight of the—from a policy perspective, the Department's operational capabilities, from strategic to conventional to special operations and irregular warfare. It's enabled us to bring this together at a higher level in the Department than we had before, for integrated documents, such as the Guidance for the Development of the Force, which is the Department's strategic plan for capabilities out to 2020 and beyond.

My portfolio, as you said, is rather extensive. It divides between oversight of current operations worldwide, and then responsibility for the future force, but I believe it is consistent with the responsibilities of other assistant secretaries. I do have four excellent deputies—Brian Green being one of them, who does strategic capabilities. I try to concentrate my efforts among the different Deputy Assistant Secretaries of Defense (DASDs) in high-priority items; for example, our space protection strategy and space control in the strategic area, which has a lot of attention since the Chinese ASAT test; our cyber policy, and particularly cyber deterrents; and the issue you just raised earlier about the division of labor between

Title 50 and Title 10, while monitoring our missile defense efforts and our nuclear modernization efforts. Brian, for instance, has been taking the lead on negotiations in Europe in support of the State Department and Acting Under Secretary John Rood, and then do that correspondingly with the other areas, as well. But, strategic capabilities gets every bit as much of my attention as the other areas, sir.

Senator BILL NELSON. Senator Graham, we just started the second panel. As a courtesy to you, Senator Sessions and I would defer, if you have a few questions. We're going to be here and we have a long list of questions.

Senator GRAHAM. Thank you very much. I'll be short.

One, I appreciate you both allowing me to do this. Senator Sessions has been a great help with the mixed oxide (MOX) program.

My questions will be to Tom, over here.

The MOX program, Mr. Chairman, in case you're not familiar with it, we entered into an agreement with the Russians, many years ago now, during the Clinton administration, to take 34 tons of excess weapons plutonium that's not needed to maintain our nuclear arsenals, that's very dangerous weapons-grade plutonium, and convert it to commercial fuel. This is called MOX, and we're going to do that at Savannah River site. It will allow us to take 34 tons off the market, save hundreds of millions of dollars in storage costs, because it would go from being stored in an indefinite period to becoming commercial fuel. It'll go from swords to plowshares. We're building that facility at Savannah River site, and the House constantly cuts funding for this program. I think it's a huge nonproliferation effort by both countries to take weapons plutonium off the market, and turn it into commercial fuel.

Tom, could you give us an update of construction on MOX and where we stand financially?

Mr. D'AGOSTINO. Certainly.

Thank you very much, Mr. Chairman. I appreciate the committee, and Senator Graham, for your question.

The MOX program is incredibly important to the United States Government and, I believe, the citizens of this country, because it will not only eliminate the 34 tons that you described, sir, but, I feel, provides an opportunity actually to eliminate additional tonnage of plutonium that we feel is not needed for national security purposes——

Senator GRAHAM. How much money would we save if we don't have to store this forever?

Mr. D'AGOSTINO. Well, it's as you described. From a life-cycle-cost standpoint, right now we spend $750 million a year in the National Nuclear Security Administration (NNSA) to protect the weapons that we have and the material that we hold. Now, not all of that is for just plutonium, but a significant chunk of that is. It's spread out, as you described, across a few sites—Los Alamos, Livermore, and the Pantex plant. So a good chunk of those hundreds of millions of dollars that we spend would have to continue to be spent, out in the future, even if you immobilize it, because it still has to be protected. We feel, as you've described, it's much better to actually extract the resources out of that material. This country has invested a lot of money to make that material, we don't want to con-

tinue to spend hundreds of millions of dollars indefinitely out into the future. We'd like to extract the financial resource and the gain out of that material for the benefit of the citizens of this country, which, clearly, the MOX plant will do.

It's a demonstrated and proven technology. The French have been doing it for multiple decades without any safety incidents. We feel that, as General Chilton looks at the stockpile out into the future, we've already declared an additional 9 metric tons, that there may be opportunities to add more material to that inventory to be downblended and ultimately used to generate electricity.

Senator GRAHAM. Where do we stand in terms of construction?

Mr. D'AGOSTINO. The design is well over 90 percent complete, so we have a very good handle on the costs and schedule of this project. Constructionwise, overall, both design and construction, we're well over 20 percent on the construction path. We have already put down many thousands of metric tons I should say, cubic yards of concrete; the foundation is in, the construction is well underway. It's looking marvelous, actually.

Senator GRAHAM. In the House budget, what does it do to our construction schedule?

Mr. D'AGOSTINO. As a result of what we have right now in the omnibus, we will have an impact on the construction schedule. I can't tell you exactly, because we're going to do a detailed cost. What we would have to do is rebaseline the project. But we did lose more than $100 million out of that project. That will have to be added onto the project, unless, of course, it gets restored in the future 2009 budget.

Senator GRAHAM. Right.

Mr. D'AGOSTINO. I'm very concerned that it adds to the cost. We don't think it's an optimal way to put together a large project, sir.

Senator GRAHAM. Now, the nonproliferation aspect, it was under the nonproliferation part of the Government, and that's been moved. Is that a good idea?

It is a nonproliferation program.

Mr. D'AGOSTINO. In my view, it's a nonproliferation program. It's a program that this administration should, and will, take credit for as a nonproliferation activity. My focus is to get the project built. I mean, I think that's what we have to do. Clearly there's energy benefits to it, but it's primarily conceived of as a nonproliferation program to eliminate this material from further use in a warhead, either by this country or any other country.

Senator GRAHAM. Well, anything you could provide to this committee about the importance of this program.

Mr. Chairman and ranking member, South Carolina has agreed to accept 34 tons of weapons-grade plutonium that exist in different sites around the country, consolidate it at South Carolina, save a lot of money over time, take this excess plutonium, build a MOX plant, turn it into commercial-grade fuel that can never be used in bombs again, and it can go into our commercial reactors to provide power. South Carolina has agreed to do this, and we're a couple of years behind schedule, so anything this committee can do to get this program moving forward would be a great benefit to the country, because the Russians have agreed to do the same thing. You know, 34 tons of weapons-grade plutonium is a large

amount of plutonium existing here and in Russia, and if we can turn that sword into a plowshare, I think the world will be safer. We're willing to do that in South Carolina, save the system billions of dollars over the life of this plutonium, but we just need to get it moving.

Mr. D'AGOSTINO. Yes, sir.

Senator GRAHAM. So thank you for the opportunity to put that on the record.

Senator BILL NELSON. Tomorrow at 2:30, the Emerging Threats and Capabilities Subcommittee is having a hearing on this subject, and they will go into detail. So, you might make a note of that.

Senator GRAHAM. Well, thank you very much, Mr. Chairman. Senator Sessions was great, last year, making sure we keep this thing on track.

Thank you, Senator.

Senator BILL NELSON. Senator Sessions, go ahead.

Senator SESSIONS. Secretary Vickers, can you bring us up to date on the Department-wide activities to implement the Prompt Global Strike concept? This is the concept that we would be able to strike, globally, within minutes, without using a nuclear warhead, just a conventional-type missile, and maybe even an inert warhead. The plan had originally been to convert Trident submarine missiles for this project, and Congress has not approved that. Where are we heading on that?

Mr. VICKERS. I'd be happy to, sir.

As you noted, the near-term operation of Conventional Trident Modification (CTM) has moved into a defense-wide account to look at a broader range of technologies, from hypersonics to conventional ICBMs to new reentry vehicles that could be used in our sea-based platforms. Common aerospace vehicle is another air option that's under consideration. So, there's a fairly wide range of technologies that have different characteristics, in terms of overflight, but still meet the Prompt Global Strike requirement.

The key aspect of that is that they are in the research-and-technology phase, and they're basically oriented at the midterm efforts, so 2015 CTM remains our, really, only near-term option in the next 3 years, so we continue to pursue, as aggressively as we can, this wide range of technologies, and that's where we are right now.

Senator SESSIONS. Admiral Johnson and General Webber, would you describe your services' ideas and alternatives that you're looking at?

General WEBBER. I'll go first.

Yes, Senator Sessions. On the Air Force side, again, it's a technology effort. We are working carefully with a program that started off under the Defense Advanced Research Projects Agency, called hypersonic technology. We're looking at a potential test in the fiscal year 2009 timeframe, to start making sure that we understand and are properly developing that technology. But, it's a technology effort, at this time.

Admiral JOHNSON. Sir, the Navy has proposed several technologies to Secretary Vickers and the team that's working the defense-wide account. We think that there are a wide range of opportunities, including scaling up the Flechette warhead that was the previous research and development effort that the Navy did. That

warhead's been tested at 5,000 feet per second and a little over 7,000 feet per second. It's particularly effective for the purposes, and it can be used in a wide range of applications, other than Navy. So, we would propose two flight tests, one to meet the necessary range safety requirements, whether it would be a ballistic missile or some other Air Force options, but it would be a common range-safety approach; and then further tests on warheads.

Mr. VICKERS. Senator Sessions, if I could just add one point and this is very important. We talked about the technology options that we have in the midterm—it's a very important capability, to give future presidents additional options for this Prompt Global Strike requirement that we don't have today, for terrorists transferring nuclear material, a ballistic missile launch, or perhaps a space control ASAT launch, or something else, where we have, essentially, nuclear-only options for Prompt Global Strike today.

Senator SESSIONS. I agree that this is an alternative to nuclear weaponry. It's a concept that is really part of a drawdown of our nuclear stockpile. It's something that we need to work out. I offered the amendment—which lost—to convert our Trident missiles—conventional Trident missile modification that we talked about, and so I'm worried about it.

It's not any large change, except we can go longer distances, quicker. I mean, if we're having aircraft in the air, and they could use a missile to strike a target if they happened to be there, and they happened to be close—so, this is—in terms of—if it doesn't have a warhead on it, it's really no different than that, is it, Secretary Vickers?

Mr. VICKERS. It is not, sir.

Senator SESSIONS. Now, General Webber, the Air Force concept concerns me, because it seems to run afoul of the same criticisms that Congress, who didn't agree with me, the majority, found fatal with the conventional Trident modification. Can you tell us, is this a concept that would in any way be more palatable than what we have now?

General WEBBER. Senator, absolutely. I think it starts to get at the issues of ambiguity that Congress was concerned about. First, you worry about, where did this item launch from? Is it coming from a platform that's a declared strategic platform or from a location on the Earth, like an ICBM field, that's a declared strategic location? So, this concept could be moved to a different location.

The second step is, when it launches out, what does that profile look like, in terms of the flyout of the trajectory? What does it look like to sensors, in terms of the kind of missile it is, how hot it burns, et cetera? We're looking at profiles, trajectories, and missiles that would be completely different from declared strategic platforms. So, you'd have a different location and a different profile.

Senator SESSIONS. I think we need to look at that, Mr. Secretary, because, rightly or wrongly, if our colleagues here think that's going to somehow implicate the same risk that we had before, that it might be misinterpreted, then we don't have enough money to do everything we'd like, so we're going to have to be careful about that.

General WEBBER. Yes, sir.

Senator SESSIONS. Mr. Vickers, the European site—I won't go into detail about that. I had the opportunity to meet with the Czech ambassador last night. We know the President has met with the Polish leadership. Can you give us any update on the current status of the negotiations between Poland, the Czech Republic, and the United States with regard to establishing what I think to be very important—a strategic missile defense site in Europe?

Senator BILL NELSON. We are going to have General Obering here on April 1.

Senator SESSIONS. All right.

If you'll be brief on that——

Mr. VICKERS. I will, sir. We're very close with the Czechs, we believe we essentially have concluded negotiations for the remaining environmental issue. With the Poles, we are a bit further behind. It has been brought up with modernization issues, with the discussion the President's just had with Prime Minister Tusk. But, we're very optimistic that we can conclude both agreements this year.

Senator SESSIONS. Well, I think that's important, and I think we need to do our part, in the U.S. Congress. It's going to protect the United States and would keep our allies in Europe far safer than they would be, far less subject to intimidation and threats from a nation like Iran, who continues to develop missile systems.

Thank you.

Senator BILL NELSON. Mr. Secretary, the Defense Science Board Nuclear Task Force report on this Minot-Barksdale fiasco, one of the main conclusions of the task force was a decline in nuclear focus, and I quote, "characterized by embedding nuclear mission forces in non-nuclear organizations." The criticism was aimed at both the Air Force and the Office of the Secretary of Defense. One of the recommendations was that there should be an Assistant Secretary for the nuclear enterprise.

What say you?

Mr. VICKERS. Well, I have extremely high regard for General Welch. I respectfully disagree about the Assistant Secretary. It is true that, across the enterprise, nuclear weapons issues have been embedded with other organizations. Before, it was with regional, Europe and Russia. Today, it is more of a capabilities focus. But, we've always had a DASD under various names—forces policy, strategic capabilities—that has had oversight of those capabilities; Brian Green being the current one today. I believe the capabilities approach provides a better approach than the regional approach. Assistant secretaries are fairly scarce to deal with problems like China, for example, and to integrate it with other capabilities, where we want to bring to bear space, information, or conventional strike options—for instance, next-generation bomber is a subject near and dear to my heart, both a conventional platform and a strategic platform; it's vital for both. So no organizational arrangement is perfect. I believe the current one provides good oversight over strategic policy and operational capabilities across the board. But, again, I have the highest regard for General Welch.

Senator BILL NELSON. All right.

General Webber, that same task force took to task the structure of the Air Force, because they recommended that a single technical organization be created, headed by a major general who reports di-

rectly to the Chief, and I quote, "that has full responsibility and accountability with the Air Force for, and only for, nuclear systems and procedures."

What do you think, and what's the status?

General WEBBER. Sir, we have moved out smartly on all of these recommendations. When you take the Commanders Directed Initiative, the Commander-Directed Investigation, the Blue-Ribbon Review, and the Defense Science Board, and if you roll them up together, 128, roughly, recommendations, and we are tracking that with an Air Force general officer, a Nuclear General Officer Steering Group that has resulted in these activities. We've upped from a one-star to a three-star to oversee how we work out all of these recommendations. Of 128, all but 3 were directly for the Air Force, and those other 3 might be things that were going to go to the Office of the Secretary of Defense (OSD), but we're going to follow how we hook up with those changes in processes.

Now, turning specifically to what we've already changed, in addition to a three-star now leading the General Officer Nuclear Steering Group, we have made the decision to have a two-star-led director for plans, operations, and requirements on the air staff, that would be a direct-report to my boss, Lieutenant General Darnell. So that will be the rollup of all of the nuclear responsibilities.

Also, within the Air Force, on the technical side, we have now combined, under a one-star—it used to be a colonel—all of our nuclear weapon activities in the Nuclear Weapons Center. So, now you have cradle-to-grave responsibilities for Air Force nuclear weapons in one single activity.

Senator BILL NELSON. So, the Defense Science Board recommendation that the commander of the Air Combat Command should ensure that the 8th Air Force has the full authority for the daily B–52 operations, both nuclear and conventional, that's not being adopted by the Air Force, is what you're saying.

General WEBBER. Sir, that is not correct, and that recommendation was dealing very specifically with the skip-echelon relationships that 8th Air Force had with Air Combat Command Headquarters, in terms of day-to-day responsibilities. That is one of the activities that's already been changed, and those responsibilities are now aligned under the 8th Air Force commander, sir.

Senator BILL NELSON. How about the B–52 initial training course at Barksdale and the B–52 weapons school course? Will the flight training include the nuclear mission?

General WEBBER. Yes, sir. Those are also items that have already been fixed. We now will have a nuclear curriculum in the B–52 weapons school curriculum—that's already been added—as well as, the flight training unit now has a simulator of—both classroom and simulator profiles that involve the nuclear mission.

Senator BILL NELSON. The Air Force and the nuclear community categorizes accidents and incidents involving nuclear weapons, depending on the nature and the severity of the accident. The lowest-level category is a "dull sword" followed by "bent spear," "broken arrow," "empty quiver," and "nuke flash." Has this Minot-Barksdale incident been so categorized?

General WEBBER. Yes, it has, sir, and I am not familiar with how that was categorized. I can provide that for the record.

[The information referred to follows:]

[Deleted.]

Senator BILL NELSON. Well, it appears that over 200 "dull swords" have been categorized since 2001. How many "dull swords" have occurred since the Labor Day incident involving this Minot-Barksdale incident?

General WEBBER. I'm not aware of that, and will provide that for the record, sir.

[The information referred to follows:]

[Deleted.]

Senator BILL NELSON. Okay.

Admiral Johnson, on to the RRW. The first warhead to be replaced under the original schedule was the W–76. Now, with the schedule change, what is the decision with respect to the W–76? Are they going to undergo a life extension?

Admiral JOHNSON. Yes, sir. The W–76 life-extension program is ongoing. When we met, last year, on these same subjects, we were about to go into production on the arming, fusing, and firing circuits, which are provided by the Navy. We have done that. We are in production on that portion. The warhead section, which is done by Mr. D'Agostino's team at the Department of Energy (DOE), is about to go into production. The W–76, one program, life-extension program, will move forward, even if we work on RRW or some other variation of a modern warhead.

Senator BILL NELSON. Well, it's run into some technical problems. Have you been involved in the resolution of the technical issue?

Admiral JOHNSON. Yes, sir. Mr. D'Agostino's probably best qualified to answer the details of that.

Senator BILL NELSON. All right, I'll get to him in a minute.

Admiral JOHNSON. Yes, sir.

Senator BILL NELSON. Has it been resolved yet?

Admiral JOHNSON. No, sir, although I believe we are about to resolve our production issues. It's an example of restarting a vendor base and a capability that existed years ago and has been shut down. I think, from my perspective, we're experiencing reasonable and relatively predictable delays, although you don't know exactly where they'll show up, in restarting production. I would think we will find similar but different kinds of delays, if Congress chooses to life-extend other programs.

Senator BILL NELSON. All right. Is it going to impact the schedule of having the first life-extended W–76 ready in early fiscal year 2009?

Admiral JOHNSON. I don't know for sure. If we stick with early in 2009, I think it's likely that we'll make that, or mid-2009. Most of our decision meetings are, maybe, 60 days from now, and we can give you a joint technical answer with more skill then. Part of this—and we're in an open hearing, but part of the material issues that we're talking about require time to do tests. Of course, concrete takes 21 days to set. You can't make it set faster than that. Although this isn't a concrete material, it has that kind of time-related testing that goes with it. So, I think we'll know pretty well in 60 days.

We see no delay whatsoever in our ability to operate the W–76 warhead series. We have a great deal of flexibility on schedule, and although it's an important subject, I don't consider it a crisis, by any means at all. It's, I think, normal for a restart.

Senator BILL NELSON. So we're looking at the middle of 2009 for the life extension at the earliest.

Admiral JOHNSON. At the earliest. Yes, sir.

Sir, I lost track of whether you said fiscal year or calendar year, but I'll go with calendar year—shortly after the new year, I think, would be about the earliest.

Tom, you're more qualified than I.

Senator BILL NELSON. Go ahead, Mr. D'Agostino.

Mr. D'AGOSTINO. Okay. Certainly. Admiral Johnson was actually right on the money. We are continuing the tests on this particular material. If the tests continue, hopefully, as we expect they will, we'll be able to make a decision, on being able to use this material, within the next few months, as part of our production cycle, which takes us probably to April 2009 to actually get that first production unit up and out the door.

I would note that, of the hundreds of different types of materials and parts that need to be made, this was the one that really hung us up, and it's very important, as Admiral Johnson mentioned, that it really demonstrates the issues associated with trying to re-establish a capability that was established many decades ago, and build things exactly the way we did it during the cold-war era. That is the type of thinking that we want to make sure that this administration, but, more importantly, future administrations, aren't hampered by our inability to replicate the past perfectly. So, this provides us an opportunity to study different approaches. That was one of the main ideas behind looking at reliable replacement concepts, is there a better way, now that we know that we have different priorities on importance, to do things, out in the future?

Senator BILL NELSON. Well, another reason was the safety and surety.

Mr. D'AGOSTINO. Yes.

Senator BILL NELSON. Now, given the fact that, in creating one of the newest warheads, the W–88, there was a conscious decision not to use all the available safety features—how can you assure us, in this RRW, that we're going to have all of the safety in that or the life-extension program?

Mr. D'AGOSTINO. It's a great question. The W–88 was designed and fielded in—basically, starting in the late 1970s, early 1980s time period. So, the design effort actually goes back to a point in time, as the General described, where we were constantly in a cycle of designing and building and replacing warheads, and we weren't as concerned about whether these things would have the longevity, because we expected, at least, if the trend would continue, that we would take that system out of the stockpile and would replace it with new. Now that we are looking at a different strategic environment, now that we know a lot more—we have these supercomputers that tell us a lot more about materials and how things age—now that we have a security environment that's dramatically different than we had during the cold war, to evaluate options to input into future systems, safety features like insensitive high ex-

plosives, security features that would be important, and we could discuss in a closed session, that reflect future threats. We think it's important to study those and those are important things for a future deterrent.

Senator BILL NELSON. Last year, you had some requests scattered throughout several budget lines in the NNSA budget for the work in support of the RRW. So, tell us, what's the scope of the work in support of it?

Mr. D'AGOSTINO. Certainly. Last year, we submitted one line, actually, for RRW. It wasn't—about $88 million, as General Chilton described earlier. We felt that it capitalized on work that we had been doing for the Nation, actually, in looking at enhanced surety, or enhanced safety and security for future systems.

What we've proposed in the 2009 budget is activities consistent with congressional direction, which is to do work in advanced certification, which is to answer this whole question of: certification—can you deploy a warhead without underground testing?—which is a key factor, for me personally, as well as for this administration, and, I believe, future administrations, to examine that question, and also to put in these safety and security features.

So, we have a budget line for advanced certification, of $20 million. We have an additional $10 million for enhanced surety, which is the safety-and-security piece. Then, we have this $10 million requested for RRW in order to be able to answer the questions that the JASONs asked and that Congress has asked us to answer.

Realistically, the only work on RRW-type system—type work, which is specific to the joint Navy/DOE project is this $10-million effort, and it is focused on answering the questions that Congress had asked of us.

Senator BILL NELSON. General Webber, on ICBM security, one measure was the remote visual assessment cameras at the sites, to monitor them. Yet, the Air Force hasn't funded this. They put it on their unfunded list, and then, Congress has to add the funds. So, again, the same thing has happened in your budget, just $300,000 on the unfunded list, to sustain this system and install what you all say has high military utility and avoids a lot of security personnel. What should we assume?

General WEBBER. Sir, I would take a different perspective. We are very excited about what remote visual assessment is doing for us, so much so that in my previous job, before coming here, I was working with the folks on what the requirements would be for block one of the capability, so that we could actually get it out there faster.

We now have 5 missile alert facilities and 50 launch facilities installed. What you see in that 2009 unfunded line is the fact that we bought the hardware and installed the hardware. We didn't program because we were moving it as fast as we could, we didn't program the satellite access that would take the pictures and move that back to the missile alert facilities. So, that's why it showed up in the fiscal year 2009 unfunded requirements list.

Senator BILL NELSON. Well, you don't have any money in there to run them.

General WEBBER. That's what I'm talking about, sir. We purchased them through a contract, and the contract folks are—they're

paid for to buy the kits, and install and maintain the kits. What we didn't purchase was the satellite access fees to move the picture back to the missile alert facility.

Senator BILL NELSON. So, you want us to do that for you.

General WEBBER. We put that on the list. But, it's going to be programmed, from 2010 on out. The fact that we were able to break the program into a block approach and move capability forward meant that we got out of our own synchronization.

Does that answer your question, sir?

Senator BILL NELSON. Often, we see things that are put on the unfunded list that you expect Congress to bail you out. It looks like this is one.

Senator Sessions.

Senator SESSIONS. Mr. D'Agostino, I have just a few brief questions. If we develop a new RRW, will it be your agency that supervises the production of that?

Would DOE be the entity that procures it?

Mr. D'AGOSTINO. We would be the agency that procures it. Before we would get to that point, we would finish the study to tee up for a future administration whether or not to develop——

Senator SESSIONS. You're right.

Mr. D'AGOSTINO. But, the Navy actually has the lead—on the joint project team, to get that study completed. Then if it gets to production, then we would produce it for——

Senator SESSIONS. All right. With regard to maintaining our current stockpile—you are in charge of that, and you put out the money to pay for that, right?

Mr. D'AGOSTINO. Yes, sir. That's correct, Senator.

Senator SESSIONS. Now, the money you put out does not come from the DOE, does it?

Mr. D'AGOSTINO. The money that I put out to maintain the stockpile comes from the DOE. It is part of the NNSA budget.

Senator SESSIONS. Is that Defense Department budget or is it Energy?

Mr. D'AGOSTINO. It's Energy budget, sir.

Senator SESSIONS. So, the maintenance of the warhead would be Energy budget?

Mr. D'AGOSTINO. The maintenance of the stockpile—I mean, we do it there but it's not completely Energy. The majority of it is Energy; however, we provide components to the Department of the Navy and to the Air Force, components that have to be switched out. So, the Services also have a maintenance activity——

Senator SESSIONS. My time's running out—but, with regard to any new systems, would that come from the Defense budget or Energy budget? Our RRW, let's say that were approved.

Mr. D'AGOSTINO. With regards to that, we're in charge of producing and providing it to the Defense Department. That part would come from the Energy Department budget. Then, once the warhead is in the Services' custody, they have an obligation and it depends on the warhead itself, of how often certain parts have to get switched out, so there's a joint responsibility for maintenance, which comes out of both budgets. Once the Services are done, they provide it back to the DOE, and we have 100-percent maintainability requirement.

There's a period of time in the warhead's life where there is a joint responsibility for maintaining the warhead itself. During that time, we integrate quite closely to provide parts.

Senator SESSIONS. It's a DOE budget request, but it's a Defense 050 budget category on the Federal budget. Is that correct?

Mr. D'AGOSTINO. That part is correct. I'm not sure about the 050 part, but I think that's correct, yes.

Senator SESSIONS. I just want to point out that there are a number of instances in this whole process in which Defense Department needs something, and Energy delivers. I'll just be frank with you, I sense Energy lacks the intensity of interest in keeping costs down because it's really coming from another source other than your budget. If the Air Force needs an aircraft, and they can save money on it, they can generally spend that money on other priorities the Air Force needs. You don't have that intensity of interest. So, I'd encourage you, because these projects are nuclear, not to yield—not to accept any bid—any costs we hear about it. I think we're paying too much for some of these things, and DOE needs to be very aggressive in containing costs. Just my two-cents worth.

Mr. D'AGOSTINO. Yes, sir.

Senator BILL NELSON. We're going to wrap up here pretty quick. I just have a couple of questions.

Mr. Secretary, you heard me talking to the STRATCOM commander earlier about THAAD and the Standard Missile 3. Were you consulted on the 1-year delay of the THAAD program?

Mr. VICKERS. My staff was aware of it, I was not personally consulted. I believe the program is now back on track from the delays of the four firing units; 6 months and 12 months, respectively, is the latest information I have.

Senator BILL NELSON. Well, the information we have is that the Department has not gone beyond planning for 96 THAAD missiles and 147 SM–3 interceptors, and that the MDA has delayed the next version of the SM–3, and the budget request would produce a 1-year delay in the THAAD system.

Mr. VICKERS. What I was referring to, sir, was the four firing units that had been slipped to schedule—6 months, I think, for one and two, and 12 months—that I think they have rejuggled, recently, and brought it back. SM–3, I think, is still an issue for us, but I'll have to get back to you on that, sir.

[The information referred to follows:]

While the February 2008 budget justification for fiscal year 2009 slipped THAAD Batteries 3 and 4 fielding 1 year, the Missile Defense Agency made internal realignments which restored the $65 million in fiscal year 2009 to enable award of the THAAD Batteries 3&4 interceptor long lead contract as originally planned and avoids the delay and production gap for Batteries 3&4. Delivery of Batteries 3&4 will complete procurement of the 96 interceptors for the first 4 batteries. Further, the Agency is working with the Department to address the procurement of 2 more THAAD Batteries (5&6) with spares, for a total of 128 additional interceptors, consistent with the recommendations of the Joint Capabilities Mix Study conducted by the Joint Staff in association with the combatant commands.

In President's budget 2009, the SM–3 Block IB development schedule was slipped one year, causing a future missile buy to change from an SM–3 Block IB configuration to Block IA. However, the Agency is working with the Department to procure an additional 116 SM–3 Block IB missiles in accordance with the Joint Capabilities Mix Study, resulting in a total of 263 missiles procured.

Senator BILL NELSON. Okay. We put some specific language in last year's authorization bill about this, and it doesn't seem like the Department is paying attention to it. So, we'd like some answers.

Mr. VICKERS. Yes, sir. The goal of the program is to strike a balance between short- and medium-range threats, and long-range, and then near-term and longer-term, and we want to get as much capability as we can in the hands of the warfighters, as soon as possible.

Senator BILL NELSON. Let me tell you, those COCOMs want that THAAD, they want that SM–3, and they want those Patriots.

Mr. VICKERS. Yes, sir, and we need THAAD for southeastern Europe defense and NATO defense, as well, sir. Yes, indeed.

One point, if I could just add, sir, on our earlier discussion. It's very important to align OSD oversight with General Chilton's responsibilities. He is now moving, if he hasn't briefed you on this already, to broader deterrence plans against a wide range of actors, looking at nuclear, cyber, and space, as well, and it's important, I think, that oversight be aligned in any organizational design, whatever we would look at.

Senator BILL NELSON. Mr. D'Agostino, your agency seems to want to finance third-party financing, and you've worked it into your long-term plan. That's where a private party would build a building or a facility, and then lease it back to the Government. Now, the Office of Management and Budget (OMB) has some pretty strict rules about when and the circumstances that the Government can enter into that, as does DOE. The facility must have commercial value, and the arrangement has to be more economic to the Government than building the building itself and the facility. The NNSA contractor, in many of the proposals that have been discussed, would enter into the lease, not the Government. Why doesn't NNSA enter into the contract?

Mr. D'AGOSTINO. Actually, I'm not aware of that particular detail. I don't know if that's been completely determined, that it's the actual NNSA contractor. We do have an arrangement, right now, at Y–12, in that area, and you're correct, sir, that we are looking at this approach, see if it makes sense for two other sites that I'm aware of, off the top of my head. I'll look into that particular point. I'd like to take that one for the record, if I could.

[The information referred to follows:]

The NNSA's nuclear weapons complex contains many facilities that are very old and need to be replaced. Third-party financing is among the options NNSA considers for constructing facilities that, when NNSA no longer needs them, could be used by the private sector. Contractors have signed leases for third-party financed projects in the past because they are the primary tenants of the leased facilities. If the Department of Energy (DOE) selects a new contractor in the future, the lease can be assigned to the new contractor. If the contractor no longer needs the facility, it can terminate the lease and the developer would seek a new tenant. The National Nuclear Security Administration (NNSA) is considering whether it would be advantageous for NNSA to sign leases as to future third-party financed projects—e.g., for facilities in which NNSA, rather than a contractor, would be the primary tenant. Provided below is additional information on specific projects:

- To date, NNSA has completed one third-party financed project under the provisions of OMB Circular A–11. The Jack Case and New Hope Centers at Y–12 are two office buildings: the former is 412,700 ft.^{2} facility and the latter is 137,157 ft.^{2} and offers expanded meeting space. These Centers, occupied in July 2007, were constructed for $125 million, and leased to the

NNSA's M&O contractor, which signed a 5-year lease with three 5-year options.

• At the Los Alamos National Laboratory (LANL), NNSA is considering the construction of a 450,000 ft.^{2} modern science complex consisting of offices, light labs, and a self-sustaining infrastructure using third-party financing. The contractor is currently working, at their own financial risk, to develop a business case and acquisition strategy plan, which includes subcontractor selection which will be submitted to NNSA. The DOE acquisition process requires the Federal Acquisition Executive (AE) to make a decision, based on the Alternatives Analysis and recommended preferred alternative, if an alternatively financed project provides the best alternative for the government. This decision would not occur before December 2008.

• At Y–12 NNSA is seeking to replace its outdated Complex Command Center and is considering using third-party financing. The acquisition strategy for this potential construction project has not yet been determined.

Senator BILL NELSON. You can imagine what happens to the lease if the NNSA outside contractor is no longer the operator of the facility.

Mr. D'AGOSTINO. Right.

Senator BILL NELSON. Okay.

Mr. D'AGOSTINO. I think that's right. Yes, sir.

Senator BILL NELSON. All right.

Now, in many of the proposals, the land on which these proposed buildings are to be built is government land, behind the security fence, that would be sold to, or leased to, a developer. In the lease situation, the lease would contain the normal clause that the lease could be canceled at any time.

Mr. D'AGOSTINO. That's correct.

Senator BILL NELSON. If that's the case, what would happen to the building? Would it revert back to the NNSA?

Mr. D'AGOSTINO. I think, in the lease situation, the idea behind the lease is that, should the Government determine that it does not have the mission there, or determine—and essentially would want—maybe, whether it's changing mission or further consolidation or downsizing—we would have to determine what is in the best interest of the Government, return that building back to the NNSA or actually sell it off, in effect. So, there are probably a couple of different approaches, and I think it would probably be situation-dependent.

Senator BILL NELSON. Well, the other question that's begged is, does the building behind the DOE security fence have commercial value, and it could be leased by a private entity if either the lease or the building lease was canceled?

Mr. D'AGOSTINO. Right. If the determination has to get made before we'd even enter into this type of an agreement, recognizing where the building is. If it's determined that the Government doesn't have a need there before, the fenceline would have to change, clearly. It would most likely only happen in the situation where we'd be getting out of that mission completely in that area. Therefore, moving the fenceline wouldn't be a problem of having two different types of mission activities—one, a commercial one, closely located with—inside an enduring, long-term mission.

Senator BILL NELSON. Well, before you jump into this, I would suggest that you find out about the fiasco in the United States Air Force with regard to base housing on five Air Force bases, including Patrick Air Force Base, in Florida.

Mr. D'AGOSTINO. Okay.

Senator BILL NELSON. They are getting themselves into a situation where they turned it over to a contractor, in some cases with a lease, and as they come down their checklist, they can be in a situation where the builder, the lessee of the land who builds the base housing, would be in a situation that they could go out and rent that base housing to outside people, and it's within the security fence.

Mr. D'AGOSTINO. I'll look into that, sir.

Senator BILL NELSON. This is a real live one, right now with five Air Force bases, and the worst, egregious example of how the contractor has botched it up is Patrick Air Force Base. So, there's lessons learned. You all ought to pay attention to that before you start to jump into this.

Mr. D'AGOSTINO. Yes, sir.

Senator BILL NELSON. In some proposals, the developer would not be subject to Federal procurement or contracting requirements, or DOE orders. You have to look at that, and would that exemption extend to exempting the facility from the jurisdiction of the Defense Nuclear Safety Board? So what's wrong with the regular process of seeking funds for the Government to build a building?

Mr. D'AGOSTINO. My goal is to look at all avenues to satisfy the mission requirements in the most responsible way possible, which involves a combination of financial, programmatic, and the like. I have to make sure that these considerations are properly reflected in any decision that gets made to move down in that direction.

What's clear to me, when I look at our current nuclear weapons complex, is that I have something right now that is unwieldy, if you will, sir. It has built up over a period of 50 years. Many of these facilities are just right-after-World-War-II types of facilities, and the status quo of just maintaining what I have is not appropriate. So, I want to dramatically shift the footprint, and essentially reduce the footprint by about 9 million square feet, which will take us from 36 to 25 million square feet.

I've been very clear, not only to the contractors, but, more importantly, my direct-reports, that I want to make sure that all options are on the table. I just don't want to keep doing business like we used to do business, just continuing to do management and operating-type contracts in the past, and this is an element of that. I mean, I've been expansive on it from the standpoint of making sure we look at all options and to make sure that we meet the criteria, not only from OMB, but from Congress, as well, from the Public Works Committees, from the authorization committees, and from our own DOE regulations.

From my standpoint, A.J. Eggenberger, who's the Chairman of the Defense Board, and I talk, on I won't say—certainly not on a weekly basis, but talk on a basis where he understands about our large projects that we have coming out, and we try to work out and make sure that we don't—we're not compartmentalizing, if you will, Defense Board oversight, because that—in my view, it's a very good input for me, an independent input on whether or not we're doing the right thing, from a safety standpoint.

Senator BILL NELSON. Well, you just don't want to get yourself in a situation, in highly sensitive, secure areas, such as the DOE

that you suddenly have, because of lessees and lessors the access to secured areas by people that are not cleared.

Mr. D'AGOSTINO. Absolutely. Yes, sir. I'll take a look at the Patrick Air Force Base example, as well as relook at your question, sir, on how the lease payments are made, whether it's through the Department itself or through the contractor.

Senator BILL NELSON. Okay. Thank you all for your participation today.

The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

SAFETY AND SECURITY

1. Senator BILL NELSON. Mr. D'Agostino, some of the work in relation to a Reliable Replacement Warhead (RRW) is focused on increasing the safety and surety of nuclear weapons. Have the requirements been determined for just how inherently safe or secure a nuclear weapon should be?

Mr. D'AGOSTINO. Yes. There are safety standards and criteria against which nuclear weapon designs and operations are compared before the designs are accepted or the operations permitted. Nuclear weapons must incorporate design features that minimize the possibility of accidental and/or inadvertent nuclear detonation. The following are design requirements for nuclear weapons: 1) Normal Environment-prior to receipt of the enabling input signals and the arming signal, the probability of a premature nuclear detonation must not exceed one in a billion per nuclear weapon lifetime; 2) Abnormal Environment-prior to receipt of the enabling input signals, the probability of a premature nuclear detonation must not exceed one in a million per credible nuclear weapon accident or exposure to abnormal environments; and 3) One-Point Safety—the probability of achieving a nuclear yield greater than 4 pounds of TNT equivalent in the event of a one-point initiation of the weapon's high explosive must not exceed one in a million. However, our understanding of the risks involved and the threats present in our operational environment have changed over time. Therefore in accordance with Presidential guidelines, we continuously examine our designs and procedures to maximize their safety and security; however, there is not a set definition of an inherently safe or secure weapon.

A large part of the Department's effort to examine our designs and procedures is done in the Enhanced Surety subprogram of the Engineering Campaign. This subprogram develops and matures modern weapon safety and use-control technologies. All of the technologies being developed through this subprogram are targeted for the next insertion opportunity, into a weapon in the active stockpile. Included are advanced firing-sets and strong-links, surety sensors, power management, and advanced use-denial technologies. All of these technologies are technically feasible and are being matured on a pace intended to allow them to be chosen by the weapon system manager, with manageable cost risk, based on Department of Defense (DOD) requirements for the weapon system.

2. Senator BILL NELSON. Mr. D'Agostino, I ask this because in the past, specifically with respect to the W–88, one of the newest warheads in the inventory, there was a conscious decision not to use all available safety features. How do we, Congress, know that even if we fund the safety and surety work that it will be incorporated into any RRW or life extension program?

Mr. D'AGOSTINO. Even though the W88 is the newest nuclear weapon in the U.S. arsenal, it was still designed, developed, and produced during the Cold War. The W88 is an excellent illustration of the paradigm shift embodied in the RRW strategy. The Cold War paradigm was to optimize yield in the smallest possible package and then include safety to the greatest extent possible. The W88 is an extraordinary system, very effective while including some modern safety features. However, meeting the weight, volume, and material limitations imposed by the unique environment of Submarine Launched Ballistic Missiles during the Cold War constrained the number of surety features we were able to implement in that system. The end of the Cold War provided the flexibility to shift from systems optimized for yield and weight that include surety to systems optimized for surety yet are still sufficient to meet the current military need. The importance of taking advantage of this flexibility was punctuated by the events of September 11. We must continue to evolve

and advance our surety to stay ahead of a threat that is evolving in technical capability and intent.

The decision on the exact types and amounts of surety features to include will be based on the weapon platform, technology maturity, threat assessment, risk, cost, and benefit to the stockpile. The RRW strategy will allow for maximizing the inclusion of modern surety technologies, while life extension programs will be more constrained due to low margin, available space, and the need to minimize deviations from the existing nuclear test base. In all cases, the final selection will be an optimized set of tradeoffs that the Nuclear Weapons Council will agree to. We will provide you and your staff with updates on the design and development of any RRW or Life Extension Programs.

3. Senator BILL NELSON. Major General Webber and Admiral Johnson, would you like to comment on this?

General WEBBER. The security environment has changed dramatically from the Cold War when our current weapons were designed. At the time, the primary driver was the greatest yield within the allowable weight. Terrorism had not yet come to the forefront, and security was maintained with greater numbers of personnel rather than designed into the warhead. While we cannot comment on the trade-off decisions made for the W–88, the Air Force position is to increase the surety features of our weapons either in a RRW or Life Extension Program design. Our goal is to include as many surety features as possible while meeting our operational requirements.

Admiral JOHNSON. The maturity of the surety and safety technologies and level of risk in the weapons environment are design drivers in the creation of a new nuclear weapons system, with extra emphasis being placed on safety and surety. These surety and safety features typically require additional space and weight that can be more readily accommodated given the modifications incorporated into the RRW design.

CONTRACTING

4. Senator BILL NELSON. Mr. D'Agostino, the National Nuclear Security Administration (NNSA) transformation plan discussed the idea of being more DOD-like. In other words NNSA would establish requirements for an object and then the contractor would deliver the object from the contractor's facility using a contractor workforce. How far are you taking the DOD-like approach?

Mr. D'AGOSTINO. The NNSA is currently developing a contract strategy through an open, public process that is focused primarily on the three weapons production contracts that expire in 2010, but the strategy could also affect the other NNSA Management and Operating contracts. NNSA has issued 2 Requests for Information (RFI), received written input from industry and other interested parties, and conducted over 30 one-on-one meetings in March 2008 with RFI respondents to discuss their ideas in detail. Options being presented include obtaining nuclear production services and products from a contractor owned and contractor operated facility; and obtaining non-nuclear production products and services from a contractor owned and contractor operated facility. Either of these two options would move NNSA to a model similar to DOD contracts. There are other contracting options under consideration, and ideas contained in responses to the two RFIs, that could move NNSA closer to DOD-like contract structures.

5. Senator BILL NELSON. Mr. D'Agostino, would this be limited to having industry building some part of or all of a full-up nuclear weapon?

Mr. D'AGOSTINO. Since the inception of the nuclear weapons program, industry has been supplying materials, some weapons parts, and some components that are used in nuclear weapons. A substantial portion of the non-nuclear components are "outsourced" through the Kansas City Plant. In this regard, a significant portion of our contracting/subcontracting fits well into the DOD model asked about in the previous question. There is a substantial amount of nonrecurring and some recurring design and engineering work that enables series production or purchase of products. The ongoing surveillance work can identify issues with aging of materials that is difficult to define and purchase as a product. As technologies and environmental requirements change, there has been a substantial amount of work needed to requalify materials, processes, and components used in actual weapons and/or the production of weapons. This workload would also be very difficult to define and purchase as a product. Where we can, I believe we are doing so, even for sensitive materials that used to only be produced within federally-owned facilities.

There are critical aspects which are reserved to federally-owned sites, and these principally involve special nuclear materials and surety. What is critical to maintain within effective Federal control, is explicit weapon design, nuclear material manufacturing processes, surety (safety, security, and use control), and the assembly and system integration, testing, and quality acceptance processes necessary to qualify items for war reserve and other weapon program uses (such as in support of experiments and testing performed by the nuclear weapon design laboratories). I do not anticipate that we would ever purchase a full-up nuclear weapon commercially, but we already purchase a substantial amount of what goes into our weapons commercially and are evaluating ways to increase that amount where cost and security considerations permit.

6. Senator BILL NELSON. Mr. D'Agostino, how would you get competition?

Mr. D'AGOSTINO. A key element of our contract strategy is to identify actual or perceived barriers to competition, and to determine how best to mitigate those barriers to ensure a robust competition. Several of the more than 30 respondents to our 2 RFIs identified concerns regarding the potential for winning a NNSA contract competition as compared to the resources required to compete. However, on balance, we are very encouraged by the level of interest generated by our RFIs, particularly among contractors who have not traditionally competed for NNSA Management and Operating contracts. Moreover, the information obtained through the RFIs and one-on-one meetings with potential bidders should help us to develop contract solicitation documents and define an open acquisition process that ensures the desired robust competition.

NUCLEAR INCIDENTS AND ACCIDENTS

7. Senator BILL NELSON. Major General Webber, the Air Force nuclear community categorizes accidents and incidents involving nuclear weapons depending on the nature and severity of the accident and incident. The lowest level category is a "dull sword," followed by "bent spear," "broken arrow," "empty quiver," and "nuke flash." Has the Minot incident been categorized?

General WEBBER. [Deleted.]

8. Senator BILL NELSON. Major General Webber, it appears that there have been over 200 dull swords since 2001. How many dull swords have occurred since the Labor Day incident involving the unknowing movement of nuclear weapons from Minot to Barksdale?

General WEBBER. [Deleted.]

SCIENCE

9. Senator BILL NELSON. Mr. D'Agostino, maintaining premier science capabilities in the NNSA national laboratories is key to maintaining the stockpile in the future, recruiting and retaining the best and the brightest and carry out the many other national security-related work that the labs perform in addition to the nuclear weapons work. I am concerned that in the NNSA plans for the future complex there is too much focus on production and not enough emphasis on maintaining the science base. In some instances it seems that there is an assumption that the science can or should be maintained by entities other than NNSA. Are you sure that we are not diminishing science for the sake of budgets?

Mr. D'AGOSTINO. No, we are not sacrificing science for budgets. The science capabilities at the NNSA national laboratories continue to be world-leading. Our computational capabilities, experimental facilities and scientific staff have met the tremendous challenge of maintaining the safety, security, and reliability of the stockpile without recourse to underground nuclear tests. We look forward to even greater progress in stockpile science as the major new experimental tools become available in the next few years (e.g., National Ignition Facility and Dual Axis Radiographic Hydrodynamic Test Facility 2nd Axis). The next 10 years will see these tools exploited to solve many longstanding scientific questions important to our nuclear weapons designs. These facilities were major investments in the complex since 1992. During that same time, the infrastructure for production continued to age, and this coupled with increased demand for security, required that we invest now in some modernization in the production facilities, as we have for the past decade invested in Stockpile Stewardship Program tools. We continue to be committed to stockpile science but in a constrained budget, we will challenge the science program to operate at reduced funding while addressing issues in the stockpile.

PIT MANUFACTURING

10. Senator BILL NELSON. Mr. D'Agostino, the NNSA budget request makes several changes in the way the budget request for pit manufacturing is configured. The original pit budget line was established to bring visibility and discipline to process of manufacturing and certifying the W–88 pits. Will this reorganization of funding allow visibility to all aspects of the pit manufacturing process not only for W–88 pits, but also for any future pits?

Mr. D'AGOSTINO. The Pit Manufacturing and Certification Campaign was an important program that achieved success in reconstituting pit manufacturing within the nuclear weapons production complex (addressing a serious shortfall in production capability) and establishing a limited pit manufacturing capability of 10 pits per year. With the Campaign's objectives achieved, we have placed pit manufacturing and pit technology development under Directed Stockpile Work as an established capability supporting the stockpile. In making this placement, however, we still recognize its continuing importance by defining specific funding lines under Stockpile Services that ensures visibility and management consideration during budget preparation and implementation. Pit manufacturing also continues to be a separate area for management attention during Quarterly Program Reviews.

Pit certification, as a part of the Pit Manufacturing and Certification Campaign, also achieved the primary Campaign objective of assuring that the newly-manufactured pits were certified for use in the stockpile. Having achieved this goal, and with no clearly identified next-generation pit build, the pit certification funds were moved to the Science Campaign to continue work on the development and improvement of certification capabilities and techniques that are required to assure nuclear performance in weapon systems. These activities include a unique dynamic plutonium experiment program to improve plutonium material models that support our simulation capability, development of engineering testing and analysis to ensure that primaries can perform under stockpile to target conditions, and a universal baselining capability to generically assess the performance of any new or stockpiled weapon system. These efforts are synergistic with the elements of the ongoing Science Campaign, and can be managed more effectively within this structure. Once a new requirement for manufacture of a specific pit type is established, NNSA management will reconsider the need for any recombination of pit manufacturing and certification to ensure success of the mission.

RELIABLE REPLACEMENT WARHEAD

11. Senator BILL NELSON. Mr. D'Agostino, what is the scope of the work in support of an RRW concept supported in the NNSA budget? I ask this because last year in the fiscal year 2008 budget request there was funding for both a specific RRW design in the RRW line and also engineering and science work to support the RRW concept generally scattered throughout several budget lines.

Mr. D'AGOSTINO. Funding that specifically applies to the RRW is located within Directed Stockpile Work. $10 million is requested in fiscal year 2009 to enable maturation of the specific RRW design to address the issues raised by the JASON review. The funds are not sufficient to complete the RRW Phase 2A design study. Consistent with the fiscal year 2008 appropriations act, work on certification tools relevant to legacy and future systems continues, and is located within the campaigns.

12. Senator BILL NELSON. Admiral Johnson, the Navy included funding in its fiscal year 2009 budget request for the arming, firing, and fuzing system for the RRW–1. The full amount of this money is early to need given the actions of the Energy and Water appropriators in fiscal year 2008. What amount of this money can be usefully used, for what purpose, and how much is excess?

Admiral JOHNSON. The Navy placed fiscal year 2008 funding on hold when Congress zeroed funding for the NNSA in the Fiscal Year 2008 Energy and Water Authorization Bill. No Navy effort on the RRW is planned unless approved and funded by Congress and coordinated with NNSA. If approved and funded, the Navy will use $14 million to continue efforts to define requirements and architectures to support an integrated/adaptable Arming, Fuzing, and Firing (AF&F) including developing Navy/Air Force/U.K. requirements, investigating AF&F concepts, architectures and technologies needed to support those requirements and performing an analysis of adaptability. This work is critical to the next AF&F and should be applicable to Navy, Air Force or U.K. warheads. The fiscal year 2009 effort is contingent on congressional approval of the fiscal year 2008 plan.

BOMBERS

13. Senator BILL NELSON. General Chilton, the Air Force is looking at beginning to field a next generation bomber by 2018 and a more technologically advanced bomber by 2025. What are your key requirements for future long range strike platforms?

General CHILTON. Our bombers remain a valued element of our nuclear forces and are expected to remain so into the future. Bombers are uniquely useful in communicating measured concerns in response to other nation's activities as we seek to continue to deter the use of nuclear weapons in the future. In that regard, future bombers must be survivable against advanced threats and possess the range, endurance, and payload capability needed to deliver effects against multiple targets deep within hostile territory and far from their operating locations.

14. Senator BILL NELSON. General Chilton, after several years of debate and now a requirement that the Air Force maintains 76 B–52 bomber aircraft, the funding for the B–52 is on the Air Force unfunded priority list. What is your understanding as to how the 76 will be funded if Congress does not provide the additional funding?

General CHILTON. U.S. Strategic Command (STRATCOM) is aware of the funding challenges the Air Force faces in sustaining the 76 B–52Hs and understands the Air Force is working to resolve the issue.

STRATEGIC DETERRENCE

15. Senator BILL NELSON. General Chilton, in your statement you talked about the importance of bilateral dialogue as an element of deterrence. The bilateral and multilateral dialogue seems to be more difficult as our enemies are not really states per se, while States are competitors. Do you see a need to improve military dialogue with and among competitors?

General CHILTON. Yes, I do see a need to improve military dialogue with and among competitors. Although many state actors can now be considered competitors rather than adversaries, numerous state adversaries still exist. As your question suggests, today's complex strategic landscape increases our National security challenges. Just as our model for deterrence has evolved to keep up with these challenges, so has our realization of a need to broaden military dialogue-not just with our traditional competitors, but with those who are beginning to, or are likely to emerge.

The value of military dialogue with our competitors is based on the ability to build understanding of each others' intentions, and the ability to identify practical steps to improve bilateral and multilateral cooperation. Understanding each others' specific perceptions and respective doctrines goes a long way in ensuring our force postures are perceived in their proper context. The result is enhanced strategic stability.

16. Senator BILL NELSON. General Chilton, how would you go about improving and enlarging such military-to-military dialogue?

General CHILTON. We are improving and enlarging our military-to-military dialogue with competitors by expanding into additional areas beyond traditional nuclear dialogue. For example, in support of geographic combatant commands, I have emphasized international engagement on space. If this avenue of engagement begins to produce meaningful dialogue, then we'll move on to our cyberspace mission as the next area for expanded military-to-military dialogue with our competitors.

In line with new concepts of tailored deterrence, military-to-military dialogue must also be tailored. These relationships depend, obviously, on the nature of the relationship with the competitor or adversary. Our access to certain states and non-state actors is restricted by limited, and sometimes non-existent, diplomatic relationships. In these situations, our ability to improve and expand upon such military-to-military dialogue would depend on proxy relationships, both through allies and in some cases competitors.

While I am optimistic about the slow but steady military dialogue with our competitors, it is also important to note that despite a considerable investment in time and resources last year, many competitors have shown little interest in completing our scheduled dialogues. Therefore, we are reducing this year's overall number of events and refocusing our efforts on the quality and completion rate of the remaining dialogue opportunities.

MISSILE WARNING GAP

17. Senator BILL NELSON. General Chilton, do the current schedules for the space-based infrared satellite (SBIRS) geostationary (GEO) and high earth orbit (HEO) elements, assuming that there are four GEO satellites and four HEO sensors, avoid a missile warning gap?

General CHILTON. Barring unexpected problems with current on-orbit assets, the schedule for the four SBIRS GEO satellites, plus the two HEO sensors and their scheduled replacements, will avoid a missile warning gap.

18. Senator BILL NELSON. General Chilton, do you believe there may be a need for more SBIRS satellites or HEO sensors?

General CHILTON. The United States will need the capability to provide missile warning for the foreseeable future. At present, the program of record provides adequate coverage, but we will eventually need a follow-on capability.

OPERATIONALLY RESPONSIVE SPACE

19. Senator BILL NELSON. General Chilton, the Strategic Command sets the requirements for operationally responsive space (ORS). What are your key priority requirements and are there any areas where more good could be done?

General CHILTON. The key priority requirements for ORS are determined based upon the urgent needs as expressed by Joint Force Commanders (to include U.S. STRATCOM) and, in some circumstances, the needs of services or agencies. In general, the priority areas are battlefield awareness, communications and command and control. At this stage of the program it is important to establish common standards and interfaces to enable a timely responsive capability for the future.

NONPROLIFERATION AND COMBATING WEAPONS OF MASS DESTRUCTION

20. Senator BILL NELSON. General Chilton, the Strategic Command has the responsibility to coordinate capabilities of the regional commanders to combat weapons of mass destruction (WMD). What do you see as the technology challenges to the commanders and what should be the development priorities?

General CHILTON. Detection of Chemical and Biological Agents, and Nuclear Fissile material at standoff ranges is one of the greatest technological challenges to combating the proliferation of WMD. It is vitally important to increase detection ranges of WMD beyond the current passive detection capability in order to locate and challenge the movement of WMD before it reaches our shores.

21. Senator BILL NELSON. General Chilton, how does Strategic Command participate in developing research priorities?

General CHILTON. One of my responsibilities is development of requirements for CWMD on behalf of the Combatant Commanders. These requirements provide a foundation for Services and Combatant Support Agencies to focus research efforts and development of state-of-the-art technologies. As advocate for CWMD capabilities, we closely monitor the progress and military utility of this research to adjust priorities as needed. We focus efforts in documents such as the draft Joint Capabilities Document (JCD), our Integrated Priorities List (IPL) and the Counterproliferation Review Committee Report to Congress. We then advocate through various technology development forums such as exercises and experiments, Science and Technology Symposia and the Joint Capability Technology Demonstration (JCTD) process, and finally through oversight groups such as the Science Advisory Board and the Strategic Advisory Group.

DEFENSE SCIENCE BOARD RECOMMENDATIONS

22. Senator BILL NELSON. Major General Webber, the Defense Science Board (DSB) recommendations dealing with the Minot weapons transfer incident took the organizational structure of the Air Force to task. The DSB recommended that a single technical organization be created, headed by a major general who reports directly to the Air Force Chief of Staff, "that has full responsibility and accountability with the Air Force for, and only for, nuclear systems and procedures." What is the status of this recommendation?

General WEBBER. The Air Force continues to take its nuclear responsibilities seriously. With creation of the Air Force Nuclear Weapons Center (AFNWC) at Kirtland AFB in 2006, the Air Force consolidated most nuclear weapons responsibilities in

a single technical organization under the command of an Air Force Colonel reporting directly to the Vice Commander, Air Force Materiel Command. The AFNWC assumed further nuclear responsibilities when it incorporated the former Air Force Nuclear Weapons and Counterproliferation Agency in 2007. To address concerns of the Defense Science Board the Air Force has appointed a Brigadier General to command the AFNWC.

The AFNWC includes the 377th Air Base Wing, Kirtland AFB, NM and the 498th Armament Systems Wing. The 498th Armament Systems Wing includes the 896th and 898th Munitions Support Squadrons (MUNSS), the Oklahoma City Air Logistics Center (OC-ALC) Cruise Missile Product Group, and the 498th Nuclear Systems Support Group, Kirtland AFB, NM. The Intercontinental Ballistic Missile (ICBM) System Program Office (SPO) is scheduled to move into the AFNWC on 1 July 2008. When this occurs the AFNWC will encompass, in a single technical organization, all functions involved in providing end-to-end stockpile management for all of the Service's nuclear systems.

In addition to the AFNWC, a new organization was created on the Air Staff, the Directorate for Nuclear Operations, Plans and Requirements. The organization is headed by a major general and was created to support the field commander as well as work operational policy issues that drive the technical requirements.

23. Senator BILL NELSON. Major General Webber, the DSB recommended that the "Commander of Air Combat Command (COMACC) should ensure that 8th Air Force has the full resources, authority, and accountability for daily B–52 operations—nuclear and conventional." What is the status of this recommendation?

General WEBBER. COMACC directed his staff to review and rewrite Air Combat Command Pamphlet 38–158, titled "Manpower and Organization". This new version will clearly state the responsibilities of the Major Command and 8th Air Force. Headquarters U.S. Air Force is the authority for decisions on organizational responsibilities and corresponding resource adjustments. COMACC directed the stand-up of a focused Global Deterrence Force for B–52 and B–2 operations, dedicated to U.S. STRATCOM, emphasizing the nuclear mission. Standup is expected this July.

24. Senator BILL NELSON. Major General Webber, the DSB recommended that the "COMACC should direct that the B–52 initial training course at Barksdale and the B–52 Weapons School course include flight training in the nuclear mission." What is the status of this recommendation?

General WEBBER. Numerous administrative, academic, procedural, and technical changes were directed and implemented for the B–52 initial training course. Further changes are currently in coordination for formal approval by higher headquarters.

The following specific changes have been implemented:

1. Revised: B–52 Formal Training Unit (FTU) course syllabus incorporated commission and panel recommendations; revisions were approved by higher headquarters.
2. Added Event: FTU Day 1, Class 1. FTU commander personally briefs every B–52 student on the incident to include its causes, effects, and implications to the Nation's deterrent capability. This brief also includes results and recommendations of the panels and commissions.
3. Added Event: FTU Day 1, Class 1. FTU commander personally teaches every B–52 FTU student the nuclear Personnel Reliability Program academic training.
4. Added Event: FTU Day 2. Aircrew nuclear discipline academic class taught personally by the Second Bomb Wing Vice Commander to every B–52 FTU student.
5. Added Event: FTU simulator training. Added nuclear simulator mission for every B–52 FTU student.
6. Added Event: FTU flight training. Added nuclear flight for every B–52 FTU student emphasizing nuclear command and control procedures, nuclear procedures, and nuclear weapons.
7. Added Event: FTU mission training. Nuclear weapons academic qualification class (both missile and gravity).
8. Changed: All B–52 FTU instructors must maintain combat mission ready on all nuclear mission qualifications and currencies to include nuclear command and control testing, nuclear weapons qualifications, and nuclear alert qualifications.

The following proposed changes are in review:

1. Added Event: Communication equipment class.

2. Added Event: Additional nuclear simulator.
3. Added Event: Additional nuclear flight.
4. Added Event: B–52 instructor upgrade syllabus-academic class on instructing nuclear training, simulator on instructing nuclear items in the simulator, flight on instructing nuclear items in the aircraft.

The following specific changes have been made to the U.S. Air Force Weapons School (USAFWS) syllabus:

Nuclear Weapons Physics Lecture (Course PPP208E) Classroom, 2.5 hours

Presentation of the principles of nuclear weapons physics. The class will include the history of US nuclear weapons development and deployment, theory, construction, fuzing and firing, and safety and security features. Permissive action link (PAL)/coded switch system (CSS) concepts and operations instructions are also included in this class.

Nuclear Weapons Theory, Effects and Hazards Lecture (Course PPP210E) Classroom, 1.5 hours

Discussion of nuclear weapons effects and effects of bomber aircraft in proximity of a nuclear detonation (NUDET). Discussion will also include closed cockpit operations and flash blindness equipment, use and considerations.

B–52 Nuclear Weapons Inventory Lecture (Course SSS400E) Classroom, 2.0 hours

Detailed description and breakdown of all bomber deliverable nuclear bombs, missiles, and their warheads. The lesson will include operating procedures, delivery parameters, yields, and options.

B–52 Suspension and Release Avionics System for Nuclear Weapons Employment Lecture (Course AVS265E) Classroom, 1.0hour

Description, weapons installation, operation, applicability and limitations of B–52 nuclear weapons-associated suspension and release equipment.

B–52 Nuclear Weapons Preflight (Course AVS262E) Weapons Storage Area, 2.0 hours

Instruction from Weapons School instructors and munitions personnel plus students hands-on participation in nuclear weapons preflight. At the completion of this class, the student will have completed the requirements for 2nd Bomber Wing 'OGRE' and 5th Bomber Wing 'NEUTRON' training.

B–52 Nuclear Operations (WST—4 of 5 in syllabus)

Simulator type: Integrated B–52 WST.
Student/instructor ratio: 2:1 Pilot/Radar Navigator, 1:1 Electronic Warfare Officer.
Support: None.
Configuration: Mission 575, 12 × AGM–129, 8 × AGM–86B, 8 × B–61, 8 × B–83, 900 × chaff, 192 × flare, 140k fuel load. Mission duration: 4.0 hours.
Mission description: Instructs students on nuclear operations and malfunctions on all B–52 deliverable nuclear weapons.

Strategic Attack: Global Deterrence Strike-Nuclear (sortie 5 of 19 in syllabus)

Aircraft type: 2 × B–52H.
Student/instructor ratio: 2:1 Pilot/Radar Navigator, 1:1 Electronic Warfare Officer.
Support: U–TAC/EC range, 1 × EA platform, 2 × Red Air.
Configuration: Beyond Line Of Sight data link, Electronic Countermeasures Improvement, USAFWS Electronic Countermeasures tapes, 220k fuel load. Mission duration: 8.0 hours.
Integration: Red Air requirement may be filled by USAFWS.
Mission description: Instructs students how to employ AGM–86B, AGM–129, B–61, and B–83 nuclear weapons in a nuclear global deterrence strike requiring threat defense and package integration against both air- and ground-based threat systems. This mission emphasizes advanced planning and employment aspects of nuclear weapons in a simulated combat environment drawing from academics and student experience.

The B–52 Pilot, Navigator, and Electronic Warfare Officer Initial Qualification syllabi were rewritten to include nuclear employment training in addition to the integrated nuclear training simulator mission from previous syllabi. The FTU and contracted instructors started Class 08–03 under the new, nuclear added, syllabus 20 Feb 2008. The B–52 Weapons School Course was approved for implementation in December 2007. All syllabi listed below were rewritten, staffed and approved by Air Combat Command operations (A3) on the listed dates.

TRACK—NBR	TITLE	APPROVED—DATE
B52.03	B–52 Aircraft Commander Upgrade Course	15 Jan 08
B52.04	B–52 NAVIGATOR AND RADAR NAVIGATOR BASIC COURSE	08 Jan 08
B52.05	B–52 ELECTRONIC WARFARE OFFICER BASIC COURSE	09 Jan 08
B52.12	B–52 Pilot and Aircraft Commander Basic Course	08 Jan 08
B52.13	B–52 RADAR NAVIGATOR UPGRADE COURSE	09 Jan 08
WS.11	USAF WEAPONS INSTRUCTOR COURSE (WIC), B–52	19 Dec 07

25. Senator BILL NELSON. Major General Webber, the focus of the DSB report was on the general organization of the Air Force and the B–52. Have you or General Darnell, your boss, looked at the training, organization, and structure of the B–2 force to ensure that the same weaknesses do not exist there?

General WEBBER. Whiteman Air Force Base (AFB) and the B–2 enterprise from its inception considered the nuclear mission as the cornerstone of its training program. Beginning in Initial Qualification Training and continuing through all formal syllabi including B–2 Weapons School, the nuclear mission is emphasized and competency must be established before completion. The B–2 flight training tasking message also emphasizes the nuclear mission and ensures each crewmember maintains the highest level of competency.

Due to the unique requirements of operating with a small aircraft fleet size, the B–2 was forced to optimize for the nuclear mission at its inception. Every squadron including the Weapon School and Operational Test are located at Whiteman AFB. The two front-line Bomb Squadrons own all the aircraft and are properly manned for their nuclear mission requirements.

The results of the limited nuclear surety inspection in the fall of 2007 and the recent nuclear surety inspection (NSI) this June both support the argument that an effective organization and training concept of nuclear operations currently exists at Whiteman AFB. In fact, the recent June NSI was characterized by the Inspector General as "one of the strongest NSIs on record."

[Whereupon, at 12:10 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2009

TUESDAY, APRIL 1, 2008

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

BALLISTIC MISSILE DEFENSE PROGRAMS

The subcommittee met, pursuant to notice, at 2:46 p.m. in room SR–232A, Russell Senate Office Building, Senator Bill Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Bill Nelson, Levin, Pryor, Inhofe, and Sessions.

Majority staff members present: Madelyn R. Creedon, counsel; Richard W. Fieldhouse, professional staff member; and Peter K. Levine, general counsel.

Minority staff member present: Robert M. Soofer, professional staff member.

Staff assistants present: Kevin A. Cronin and Jessica L. Kingston.

Committee members' assistants present: Christopher Caple and Caroline Tess, assistants to Senator Bill Nelson; Jon Davey, assistant to Senator Bayh; M. Bradford Foley, assistant to Senator Pryor; and Todd Stiefler, assistant to Senator Sessions.

OPENING STATEMENT OF SENATOR BILL NELSON, CHAIRMAN

Senator BILL NELSON. Good afternoon.

Mr. YOUNG. Good afternoon.

Senator BILL NELSON. Each of your written statements will be put in the record, and Senator Sessions and I are dispensing with our opening statements so we can get right to the questions.

[The prepared statement of Senator Bill Nelson follows:]

PREPARED STATEMENT BY SENATOR BILL NELSON

The Subcommittee on Strategic Forces meets today to consider the ballistic missile defense programs of the Department of Defense, and the missile defense budget request for fiscal year 2009.

Today, I want to express my deep concern that the ballistic missile defense program is out of balance. With an annual budget of over $9 billion, the Missile Defense Agency (MDA) is simply not placing sufficient priority on near-term missile defense capabilities needed now by our regional combatant commanders to defend our forward-deployed forces, allies, and friends against existing short- and medium-range missiles.

This should be our very first missile defense priority. North Korea and Iran, to name just two nations, have many hundreds of such missiles today, and our combatant commanders do not have the capability to defend their forces, let alone other nations in their regions. This is not a hypothetical problem; these are real missiles that can reach our troops today. But the MDA has not planned or budgeted sufficient funds to provide the defensive capabilities we need, and MDA ought to know it.

Since 2006, the military has conducted a series of analyses called the Joint Capabilities Mix Study that looked at what our upper tier missile defense capabilities and needs were for our regional commands. Specifically, they were looking at the Aegis Ballistic Missile Defense system and its Standard Missile-3 (SM–3) interceptor and the Terminal High Altitude Area Defense (THAAD) system.

Last year this subcommittee was told that the Joint Capabilities Mix Study concluded that our military would need about twice as many SM–3 and THAAD interceptors as the MDA was planning to buy. It turns out that is the minimum level that we need. So, did the Department of Defense increase the number of interceptors it planned to buy? No.

Instead, it submitted a budget request for fiscal year 2009 that would delay THAAD Fire Units 3 and 4 by a year, and cause a production break of 18 months. It still plans to buy only 96 THAAD missiles and 147 SM–3 interceptors. That is simply not enough to do the job.

By comparison, the United Arab Emirates (UAE). which is a little smaller than the State of Maine, wants to buy 144 THAAD missiles from us, which would be 50 percent more than the Defense Department is currently planning to buy for our own military. The UAE would have twice as many THAAD interceptors per Fire Unit as our own military will have.

The MDA could easily plan for and buy many more of these systems for our own military, and could produce them at more economical rates, which would bring down the cost per missile and provide the capability sooner. But instead of making this investment, the MDA has been spending billions of dollars on far-term research and development programs that will not provide any operational capability for another decade.

One example of this misplaced spending is the Airborne Laser (ABL) technology demonstration program. The original estimate for the ABL program in 1996 was that it would cost $1 billion and take until 2001 to complete the demonstration. Instead, it has had a 500 percent cost increase, to $5 billion, and will not be completed until 2009 at the earliest, a delay of 8 years. This system, if it could be made to work, would not provide an operational capability for another decade. Given its many inherent problems, we don't know if it can be made to work, or whether it will be affordable, or survivable.

Last year, MDA asked for more than $500 million for ABL. Think of the real, near-term SM–3 and THAAD capability we could buy with half a billion dollars. Think of the defensive capability we could provide for our forward-based forces, and allies and friends who are within range today of hundreds of short- and medium-range missiles.

I believe the MDA should commit to fielding sufficient SM–3 and THAAD systems to meet the operational needs of our combatant commanders in a timely fashion. That means putting more money into these near-term systems, and less money into the far-term, high-risk systems that won't provide capability for another 10 years. I hope we can finally start making some progress on this front. We owe our military forces no less.

We have a number of other issues to consider at this hearing, including the fact that the Department of Defense failed to comply with a provision of the National Defense Authorization Act for Fiscal Year 2008. That law requires that, if the Department requests any long lead items for additional SM–3 interceptors or for THAAD Fire Units 3 and 4 in fiscal year 2009, it should request procurement funds, rather than research and development funds, for those systems. However, the Department did not comply with the law. Instead, it requested research and development funds for buying long lead items for additional SM–3 missiles. That is unacceptable; the Department should comply with the law.

These are just two of the important issues we will discuss at today's hearing. I appreciate the witnesses appearing before the subcommittee, and I look forward to their testimony.

STATEMENT OF SENATOR JEFF SESSIONS

[The prepared statement of Senator Sessions follows:]

PREPARED STATEMENT BY SENATOR JEFF SESSIONS

Mr. Chairman, I join with you in welcoming all our distinguished witnesses to this hearing on our missile defense programs. I note that while this is Secretary Young's first appearance before the subcommittee, it is most likely to be General Obering's last, as he has announced plans to retire by the end of the year.

May I just say, at the outset, that we owe a huge debt of gratitude to General Obering for having provided this Nation, our forces, and our allies a measure of protection against the ballistic missile threat. Indeed, before 2004, we had no missile defense capabilities, except for the Army's short-range Patriot system. Today, we have at the ready some two-dozen ground-based interceptors to protect our Homeland against long-range ballistic missiles, and a similar number of sea-based interceptors loaded on naval vessels capable of defending against short- and medium-range ballistic missile threats far from our shores.

General Obering, you and the men and women of the Missile Defense Agency (MDA) should be proud of your accomplishments. As you prepare for your retirement, you should take comfort in the knowledge that your performance in this last duty assignment brings much credit to an already distinguished military career. You will be sorely missed.

Secretary Young, it is good to have you here. Your views concerning Department oversight of the missile defense program are eagerly awaited. As is generally known, the MDA has been granted tremendous flexibility and freedom from the normal acquisition process.

This new acquisition approach was necessary to enable the Department to field missile defense capabilities in time to address the threat. Indeed, it has! I would be interested to learn from you whether this might not serve as a model for future acquisition programs.

General Campbell, as U.S. Strategic Command's lead for the integrated missile defense mission, the subcommittee will be interested to learn how well our missile defense programs are serving the needs of the warfighter. Important questions we would like you to address include: Are we fielding missile defense capabilities in numbers sufficient to pace the threat? Are we paying enough attention to the improvement of current capabilities to stay ahead of future threats? Where do we stand with respect to the transition of missile defense forces from MDA to the Services?

Dr. McQueary, it is good to have you again before this panel. As the Director of Operational Test and Evaluation, we look forward to your assessment of MDA's Integrated Test Plan, and on the operational effectiveness of our current missile defense systems. It would appear that your testimony is very similar to last year, in that while you asses the current missile defense systems to be capable of providing protection against the threats for which they are designed, additional operationally realistic testing is necessary to raise the level of confidence in that assessment.

Finally, Mr. Francis, we look forward to hearing the Government Accountability Office's recent recommendations with respect to the MDA.

Mr. Chairman, I thank the witnesses for their service to the country and look forward to the hearing.

STATEMENT OF HON. JOHN J. YOUNG, JR., UNDER SECRETARY OF DEFENSE, ACQUISITION, TECHNOLOGY, AND LOGISTICS, DEPARTMENT OF DEFENSE

[The prepared statement of Mr. Young follows:]

PREPARED STATEMENT BY HON. JOHN J. YOUNG, JR.

Good afternoon Senator Nelson, Senator Sessions, and members of the subcommittee. Thank you for the opportunity to appear before you today to discuss the fiscal year 2009 Department of Defense Ballistic Missile Defense Program and budget submission. I am pleased to update you on key issues facing the missile defense program and look forward to answering any questions you may have.

The Defense Department has made great progress on missile defense since the President in 2002 made the deployment of an initial defensive capability a national priority. Indeed, within 18 months of the President's direction, the Missile Defense Agency (MDA) fielded our Nation's first long-range hit-to-kill ballistic missile defense capability.

Moving with such urgency has required the MDA to operate with some flexibility in managing the Agency's portfolio of programs. The MDA has already fielded a limited capability to defeat a limited ballistic missile threat from rogue nations. I be-

lieve it is vital to the security of our Nation that we continue work to close system performance gaps and develop new technology to keep pace with the threat.

To close these gaps, the MDA will need to continue to use spiral-development and capability-based acquisition, allowing it to exploit technological opportunities and place greater capability in the warfighters' hands.

Capability-based acquisition permits early deployment of limited capabilities that can be enhanced over time. This approach also allows requirements and standards to be added as we understand their impact on cost, schedule, and performance. This approach can help the program remain relevant to the threat and technologically current while at the same time providing maximum industry design trade space to deliver militarily useful, best-value capability. The primary goal is to add capabilities with demonstrated military utility, rather than to meet rigid requirements typically defined several years before any capability can be fielded.

Capability-based acquisition hinges on knowledge-based, decisionmaking. To reduce risk and ensure program stability, MDA uses knowledge-point decisionmaking to drive investment decisions. Knowledge points are tied to the achievement of specific technical or performance requirements and allow MDA to develop new and advanced capabilities without having to make a long-term financial commitment. Failure to meet knowledge points could result in the slowing or even discontinuation of a program activity.

The Department continues to exercise oversight of the MDA's development and deployment efforts. The Director of the MDA reports directly to me on missile defense matters, and we meet periodically to discuss program issues.

I plan to conduct regularly Program Execution Reviews for all MDA programs. These reviews will provide me and other senior Department officials timely and in-depth program execution updates. Among other things, these reviews will compare actual results against schedule, budget, and performance goals and baselines, and describe any earned value cost variances.

In addition, the Department of Defense has established a Missile Defense Executive Board (MDEB) that makes recommendations to me and the MDA Director and oversees implementation of the Agency's strategic policies and plans, program priorities, and investment options. Senior principals from the Office of the Secretary of Defense (OSD) staff, the Services, the Department's independent test community, the Joint Staff, and appropriate outside agencies sit on the board, which meets every 2 months to provide oversight and guidance.

One issue currently on the MDEB agenda is the transition and transfer of Ballistic Missile Defense System (BMDS) elements once they reach technical maturity. In 2002 the Department of Defense directed MDA to focus on developing, testing, and fielding near-term capabilities; the military departments would be responsible for long-term procurement and operation and support activities of transferred BMDS elements. With the successful fielding of BMDS elements in 2004, the Department looked for ways to facilitate transition and transfer planning. We developed a master BMDS Transition and Transfer Plan to document agreements between the MDA and the military departments. My office updates the Transition and Transfer Plan annually in conjunction with MDA and the military departments. We have also identified a lead Service for most BMDS elements.

As the missile defense system has gained technical maturity, it became clear to me, the Director of the MDA, and other Department officials that effective transition and transfer planning is the key to successful operation and support of the BMDS. The MDEB is currently evaluating proposals to adjust the process in a manner that will "normalize" the transition and transfer process and ensure optimal system operations. The MDEB is also considering a revised BMDS program planning process which will provide the opportunity for the military departments and OSD to influence BMDS budget formulation and resource allocation using all appropriations in a defense-wide account. To complement this process, we are developing guidelines to specify military department and MDA responsibilities in preparation for, during, and after transition and transfer of BMDS elements. The Department plans to brief this committee in more detail once we have settled on a new path forward.

I continue to be encouraged by the close interaction among MDA, the Director, Operational Test and Evaluation, the combatant commanders, and the Operational Test Agencies within the Services. Together they have developed an approach to ensure increasingly complex end-to-end tests of the system. The fact that the Director of the MDA and the Director, Operational Test and Evaluation jointly approve the Integrated Master Test Plan demonstrates to me the high level of cooperation between these organizations. Indeed, today you will find personnel from the Department's independent test community embedded in the management offices of the missile defense elements.

I believe the close working relationship between MDA and the test community has also contributed to recent test successes. Last year alone MDA executed successfully a long-range ground-based intercept, six SM–3 intercepts of separating and unitary targets, and three Terminal High Altitude Area Defense (THAAD) intercepts of unitary targets. Each test included elements of operational realism and demonstrated to the warfighter the capabilities of the BMDS.

While attending to environmental and safety concerns, MDA's future flight tests will continue to be increasingly realistic in operational terms. When appropriate to the test objectives and consistent with MDA's overall test campaign, each test will build on the knowledge gained from previous tests and add increasingly challenging objectives with the goal of devising scenarios that test elements of the system from end to end. This test approach increases knowledge and minimizes artificiality.

The Government Accountability Office (GAO) continues to be actively engaged in reviewing the Ballistic Missile Defense Program. GAO conducted eight audits of the missile defense program in fiscal year 2007. To further increase transparency, beginning in fiscal year 2008, MDA agreed to provide GAO with quarterly summaries that include integrated baseline review schedules (most recent and projected), percent complete, 6 month cost performance index, fiscal year cost variance, and cumulative cost variance. This information will be summarized annually in the BMDS Selected Acquisition Report for Congress.

Like many members of this committee, I believe we need to field additional ballistic missile defense assets in the near-term. System elements like Aegis Ballistic Missile Defense and the THAAD could provide our combatant commanders as well as our friends and allies a significant defensive capability in just a few years. I am working with General Obering to achieve this goal through the Department's programming and budgeting process.

At the same time, we must keep pace with the threat by equipping the warfighters with advanced BMDS capabilities. In the near future, we will require advanced discrimination, persistent sensor coverage, maneuverable interceptors, multiple volume capability, and a robust inventory. I believe that keeping pace with the threat while continuing to deliver effective capabilities requires an approach that balances near-term fielding and far-term development.

The President's budget for fiscal year 2009 reflects the priorities set by the President and was developed by the Secretary of Defense and his most senior military and civilian advisors. The budget emphasizes the need to prepare for an uncertain and unpredictable future. We must maximize our capabilities gained from our limited defense dollars.

Toward that goal, the Department is requesting $10.4 billion in fiscal year 2009 for continued development of a multi-layered system to protect the United States, its forces, and its allies from ballistic missile attack. $9.3 billion of that request supports the work of the MDA. The budgeted funds will pay the cost of fielding near-term missile assets, operating and sustaining these assets, and conducting a missile defense test program. A robust research and development program is also needed to keep pace with the advancing threat.

I note that the National Defense Authorization Act for Fiscal Year 2008 required the Department of Defense to transition from research, development, test, and evaluation-only budget requests for ballistic missile defense activities to requests with appropriate amounts in each appropriations title. For the fiscal year 2009 President's budget submission, the Department identified the operations and sustainment costs for each BMDS element and requested military construction funds for the European Site, the European Midcourse Radar and one forward-based radar. The fiscal year 2009 President's budget did not include procurement funding for specified BMDS elements, but the Department will review this issue in preparation of the fiscal year 2010 President's budget.

We are grateful for the support of Congress, which has helped make fielding missile defense a reality. As we increase the effectiveness and reliability of the system, congressional approval of the President's request for missile defense funding will be essential. Cooperation between the Department and Congress on missile defense issues is one of the main reasons this program has been so successful over the last several years. I look forward to continuing that cooperation.

Thank you for this opportunity to testify before the subcommittee. I look forward to answering any questions you might have.

STATEMENT OF LT. GEN. HENRY A. OBERING III, USAF, DIRECTOR, MISSILE DEFENSE AGENCY

[The prepared statement of General Obering follows:]

PREPARED STATEMENT BY LT. GEN. HENRY A. OBERING III, USAF

Good afternoon, Mr. Chairman, Senator Sessions, distinguished members of the subcommittee. Thank you for this opportunity to discuss the Department of Defense's Fiscal Year 2009 Missile Defense Program and budget. As Director of the Missile Defense Agency (MDA), I have the privilege of leading an outstanding group of men and women who are working hard every day to develop, test, and field an integrated, layered Ballistic Missile Defense System (BMDS) to defend the United States, our deployed forces, and our allies and friends against ballistic missiles of all ranges in all phases of their flight. I want to thank this committee for the support we have received for this critical defense program.

We are requesting $9.3 billion in fiscal year 2009 for missile defense. Roughly 75 percent of this request, or $7 billion, will be allocated to the near-term development and fielding of missile defense capabilities. Of this amount, $715 million is for sustaining the capabilities we already have in the field today. I also want to highlight that, as has been the pattern for several years now, we will be spending about $2 billion of the funding in fiscal year 2009 (more than 20 percent of the missile defense budget) on test activities.

The BMDS is daily becoming more integrated, robust, and global. The BMDS already includes fielded assets operated by Air Force, Army, and Navy units under the integrated control of combatant commanders. Our current, limited homeland defense against long-range ballistic missiles will soon be bolstered by additional interceptors in Alaska and the upgrade of an existing radar in Greenland to protect against enemy launches from the Middle East.

The defense of deployed forces, allies, and friends against short- to medium-range ballistic missiles in one region/theater will be buttressed by additional Standard Missile-3 (SM–3) interceptors, more Aegis BMD engagement-capable warships, 2 Terminal High Altitude Area Defense (THAAD) fire units, and up to 100 modified sea-based terminal interceptors. Tying these assets together will be a global command, control, battle management and communications capability.

Recent flight tests are confirming technological progress and operational effectiveness for short-, medium-, and long-range defensive capabilities. Since February 2007, MDA and the military Services have executed a successful long-range ground-based intercept, six sea-based intercepts of separating and unitary targets, and two THAAD intercepts of unitary targets. In the near future, MDA's capability development program is expected to yield enhanced capabilities to discriminate between enemy warheads and countermeasures and options for "multiple kill" capabilities to meet future challenges.

To demonstrate the long-range BMDS capability, for example, we conducted an integrated flight test last September involving a realistic target launched from Alaska and tracked by the operational upgraded early warning radar in northern California. An Aegis ship and the sea-based X-band (SBX) radar in the North Pacific tracked the target as well. The target was successfully destroyed by a Ground-Based Interceptor (GBI) launched from an operationally configured silo in central California. The data needed to calculate a fire control solution for the interceptor was provided by the operational system and the operational command and control, battle management and communications system was employed by the warfighting commanders. Overall, this single test included numerous components separated by thousands of miles and managed by four executing organizations within the MDA.

As missile defense capabilities expand worldwide, international cooperation with allies and friends is dramatically increasing. Assuming we obtain agreements with Poland and the Czech Republic and obtain congressional approval to proceed, MDA intends to begin site construction for additional long-range interceptors and a fixed-site radar in Europe to defend allies and deployed forces in Europe and expand the U.S. Homeland defense against limited Iranian long-range threats. Also, we have undertaken substantive cooperative efforts with European, Middle Eastern, and Asian nations. With the purchase of Aegis BMD and Patriot Advanced Capability-3 assets, and with our fielding of a transportable X-band radar at Shariki, Japan, is in the process of fielding a multilayered system interoperable with the U.S. system. Further, with MDA's support, the Department of Defense participated with Israel to develop an Israeli missile defense architecture that can meet threats expected in the next decade. We also held meetings with senior Russian officials and technical experts to discuss both threat perceptions and missile defense cooperation, including the potential for partnering with Russia in a joint regional architecture.

Mr. Chairman, one last point before I continue. In February the Department of Defense called on our country's missile defenses to destroy a large tank of toxic fuel onboard an out-of-control U.S. satellite about to reenter the Earth's atmosphere. The uncertainty of when and where the satellite would reenter, and the near certainty

that the fuel tank would survive reentry and possibly break up on Earth, drove the urgency of this mission. Using an extensively modified SM–3 interceptor and a modified Aegis Weapon System onboard the U.S.S. *Lake Erie*, the Navy successfully destroyed the tank. The Department undertook this operation, carefully choosing an intercept altitude that would not add to the debris currently in orbit, to protect against the possible risk to life that a natural reentry of the satellite could have posed. After engagement, the toxic hydrazine dissipated in space, and, by now, most of the debris from the satellite body has burned up in the Earth's atmosphere.

This was a very successful joint mission involving the Navy, U.S. Strategic Command, the MDA, the National Aeronautics and Space Administration, the National Reconnaissance Office, and other national security offices. MDA engineers worked closely with the Navy to modify the interceptor and the Aegis weapon system for this one-time engagement. This was a case where the missile defense system was unexpectedly pushed into service and performed exceptionally well. While this stands as an example of what the Nation received for its investment in missile defense, I want to be clear that it does not represent an operational anti-satellite capability. The time and level of technical expertise it took to plan and orchestrate this mission, the split-second fragility of the once-per-day shot opportunities, and the relatively low altitude of the satellite's decaying orbit did not approach the responsive and robust capability that would be needed to attack enemy space assets in wartime.

THREAT UPDATE

To lay the foundation for our budget request, let me review why missile defense is so critically needed. There remains intense interest in several foreign countries to develop ballistic missile capabilities. In fact, there were over 120 foreign ballistic missile launches in 2007, significantly exceeding what we observed in previous years. This comes on the heels of a very active 2006, during which time both North Korea and Iran demonstrated an ability to orchestrate campaigns involving multiple and simultaneous launches using missiles of different ranges. Currently, North Korea has hundreds of deployable short- and medium-range ballistic missiles and is developing a new intermediate-range ballistic missile and a new short-range, solid-propellant ballistic missile, which it test-launched in June 2007. Iran has the largest force of ballistic missiles in the Middle East (several hundred short- and medium-range ballistic missiles), and its highly publicized missile exercise training has enabled Iranian ballistic missile forces to hone wartime skills and new tactics.

North Korea's ballistic missile development and export activities remain especially troubling. Pyongyang continues to press forward with the development of a nuclear-capable ICBM. While the firing of the Taepo Dong 2 in July 2006, launched together with six shorter-range ballistic missiles, failed shortly after launch, North Korean engineers probably learned enough to make modifications, not only to its long-range ballistic missiles, but also to its shorter-range systems. North Korea's advances in missile system development, particularly its development of new, solid fuel intermediate-range and short-range ballistic missiles, could allow it to deploy a more accurate, mobile, and responsive force. North Korea's nuclear weapons program makes these advances even more troubling to our allies and the commanders of our forces in that region.[1]

In addition to its uranium enrichment activity, Iran continues to pursue newer and longer-range missile systems and advanced warhead designs. Iran is developing an extended-range version of the Shahab-3 that could strike our allies and friends in the Middle East and Europe as well as our deployed forces. It is developing a new Ashura medium-range ballistic missile capable of reaching Israel and U.S. bases in Eastern Europe.[2] Iranian public statements also indicate that its solid-propellant technology is maturing; with its significantly faster launch sequence, this new missile is an improvement over the liquid-fuel Shahab-3.[3] Iran has reportedly

[1] Oral Statement by the Director of the Defense Intelligence Agency, Lieutenant General Michael D. Maples to the Senate Select Committee on Intelligence Annual Threat Assessment Hearing, 5 Feb 2008 http://www.dia.mil/publicaffairs/Testimonies/Statement29.pdf; Current and Projected National Security Threats to the United States, Lieutenant General Michael D. Maples, U.S. Army Director, Defense Intelligence Agency, Statement for the Record, Senate Armed Services Committee, 27 February 2007 http://www.dia.mil/publicaffairs/Testimonies/statement28.html.

[2] Statement of Lieutenant General Michael D. Maples, 5 February 2008.

[3] Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 January to 31 December 2005, Central Intelligence Agency, http://dni.gov/reports/CDA percent2011–14–2006.pdf .

bought a new intermediate-range ballistic missile (IRBM) under development by North Korea;[4] this underscores the urgent need to work with our allies in the North Atlantic Treaty Organization (NATO) to field and integrate long-range missile defenses in Europe. Moreover, Iran's development of a space launch vehicle using technologies and designs from its ballistic missiles means Iran could have an ICBM capable of reaching the United States by 2015.[5]

Syria is working to improve its ballistic missile capabilities and production infrastructure. Today Syria is capable of striking targets in Israel and Turkey, our southern NATO partner, using rockets and ballistic missiles. Syria can produce longer-range Scud variant missiles using considerable foreign assistance from countries such as North Korea and Iran.[6] So our vigilance must extend well out into the future, when the threats we face today have grown and new threats may have emerged.

NEW MISSILE DEFENSE PROGRAM STRUCTURE

We have established a new block structure to organize our program of work and present our budget. The Agency has made this change to address concerns about transparency, accountability, and oversight and to better communicate to Congress and other key stakeholders. The new approach has several key tenets:

- Blocks will be based on fielded missile defense capabilities that address particular threats and represent a discrete program of work—not on biennial time periods.
- When MDA believes a firm commitment can be made to Congress, the Agency will establish schedule, budget, and performance baselines for a block. Block schedule, budget, and performance variances will be reported.
- Once baselines are defined, work cannot be moved from one block to another.

Based on the above tenets, MDA has currently defined five blocks (see figure 1). Blocks 1.0, 3.0, and 4.0 deliver capabilities for long-range defenses, while Blocks 2.0 and 5.0 deliver capabilities to address the short- and medium/intermediate-range threats.

[4] Statement of Lieutenant General Michael D. Maples, 5 February 2008.

[5] Current and Projected National Security Threats to the United States, Vice Admiral Lowell E. Jacoby, U.S. Navy Director, Defense Intelligence Agency Statement For the Record Senate Armed Services Committee, 17 March 2005 http://www.dia.mil/publicaffairs/Testimonies/statement17.html

[6] Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 January to 31 December 2005, Central Intelligence Agency.

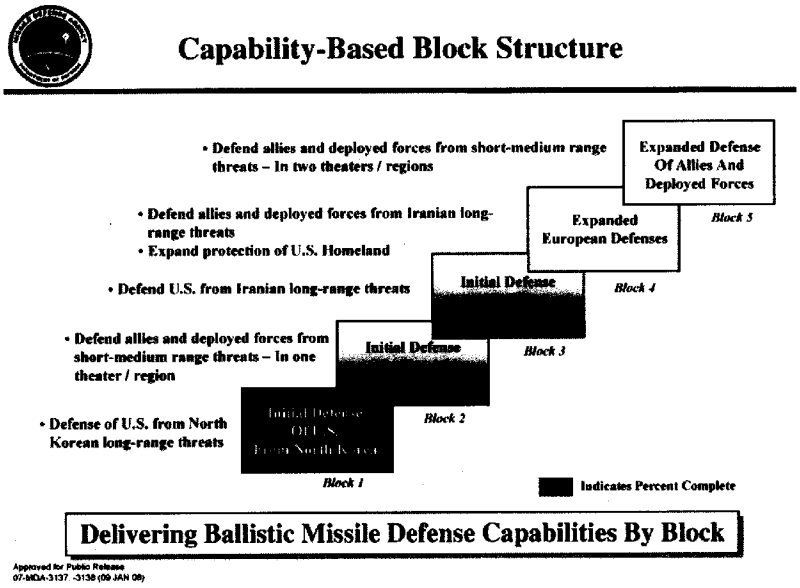


Figure 1: Capability-Based Block Structure

Future blocks (Block 6.0, etc.) will be added when significant new capabilities are expected to be fielded based on technological maturity, affordability, and need. For example, a new Block 6.0 might include enhanced defense of the United States against complex countermeasures, drawing on volume kill capabilities from the multiple kill vehicle (MKV) program, improved discrimination capabilities on our integrated sensor, command and fire control network as well as upgraded hardware and software on our weapon systems.

MDA's budget is organized through the period of the Future Years Defense Program based on the new block structure. Also, program funding that does not fit into Blocks 1.0 through 5.0 is assigned to four general categories:

- Capability Development—technologies such as the Airborne Laser (ABL), MKV, Kinetic Energy Interceptor (KEI), Far-Term Sea Based Terminal, Project Hercules, and the Space Tracking and Surveillance System (STSS), which address future challenges and uncertainties
- Sustainment—operations and support of weapon systems, sensors, and command and fire control components
- Mission Area Investment—activities that support multiple efforts and cannot be reasonably assigned to a specific block or capability development program (e.g., intelligence and security; modeling and simulation; systems engineering and testing cores; safety, and mission assurance)
- MDA Operations—activities that support the Agency, such as Management Headquarters and Base Realignment and Closure (BRAC)

HIGHLIGHTS OF BUDGET SUBMISSION FOR FISCAL YEAR 2009

Our priorities in the fiscal year 2009 budget submission include near-term development, fielding, integration, and sustainment of Blocks 1.0 through 5.0; increasingly robust testing; and a knowledge-based Capability Development program.

Block 1.0

We are nearing completion of the work in Block 1.0. We are requesting $59 million for fiscal year 2009, mostly to conduct additional system ground and flight tests to support a final Block 1.0 capability declaration.

This past year we saw an unprecedented pace of fielding of an integrated missile defense capability, much of it related to Block 1.0. In 2007 we emplaced 10 additional GBIs, for a total of 24 interceptors in missile fields at Fort Greely, AK, and

Vandenberg Air Force Base, CA. In 2008 we plan to increase interceptor inventories up to a total of 30 at the 2 sites. By the end of 2008, we will complete work installing the Long-Range Surveillance and Track (LRS&T) capability on 18 Aegis BMD ships. These ships will contribute to long-range defense by passing early detection, cueing, and tracking data across communications lines into BMDS communication and battle manager nodes located at Fort Greely and in Colorado Springs.

This past year we transitioned the transportable forward-based X-band radar at Shariki Air Base, Japan, from the interim site to a permanent location. This radar provides precise early detection and tracking to increase the probability we will destroy any lethal target launched by North Korea. The SBX completed crew training and testing off the coast of Hawaii and transited to the North Pacific to conduct a cold weather shakedown off Adak, AK, where it will be homeported in 2009. The SBX participated in system flight tests this past year, including the September 28 long-range intercept test and the December 17 engagement of a medium-range separating target at sea by our ally, Japan. This summer the radar will again participate in a long-range intercept test.

In 2007 we completed the fielding of Command, Control, Battle Management, and Communications (C2BMC) infrastructure to improve our ability to operate with Japan and receive direct feed from the Space-based Infrared System. We moved communications equipment and shelters to support the forward based X-band radar at Shariki and installed a second server suite at U.S. Pacific Command. We also began fielding enhanced C2BMC displays and improvements to our communications capabilities. The Parallel Staging Network we installed at U.S. Strategic, Northern, and Pacific Commands as part of the Concurrent Test, Training, and Operations (CTTO) capability, will be completed this year. Without impeding the operational readiness of the system, CTTO allows the warfighter to conduct training and the MDA to continue with spiral upgrades, testing, and development.

By 2009 we plan to install additional planning and situational awareness capabilities to facilitate executive decisionmaking in the European Command. C2BMC capabilities also provide our senior government leadership situational awareness of hostile ballistic missile activities and updates on the performance of the BMDS.

Block 2.0

Since 2002 we have expanded and improved terminal and midcourse defenses to defeat short- and medium-range threats from land and sea. We are requesting about $1.3 billion for fiscal year 2009 for Block 2.0 fielding, development, and integration. This block represents the foundation of the capabilities required to protect forces we deploy abroad and our allies and friends, initially in a single region or theater of combat.

We began fielding SM–3 interceptors in 2004. Block 2.0 comprises 71 SM–3 Block I and IA interceptors (we will have 38 in inventory by the end of 2008). To date, we have converted 12 Aegis BMD LRS&T ships to engagement-capable ships. By year's end, we will have 18 Aegis BMD ships—15 destroyers and 3 cruisers—all of which will have surveillance and track as well as engagement capabilities. For the past 3 years, the Navy and MDA have collaborated on plans for a Sea-Based Terminal defensive layer. We are upgrading the Aegis BMD weapon system, and the Navy is upgrading the SM–2 Block IV missile, the goal being to deploy up to 100 interceptors to provide a near-term terminal engagement capability on 18 Aegis BMD ships beginning in 2009.

We are working closely with the Army to begin developing and fielding by 2009 two THAAD fire units, with the plan to deliver them by 2010 and 2011. THAAD is uniquely designed to intercept targets both inside and outside the Earth's atmosphere. Consisting of 48 interceptors and the associated radars and C2BMC, THAAD will provide transportable terminal protection from short- to medium-range ballistic missiles for our troops and our allies.

Block 3.0

We are requesting about $1.7 billion for fiscal year 2009 to expand the defense of the United States to include limited Iranian long-range threats. Block 3.0 builds on the foundation established by Block 1.0. Block 3.0 provides 14 additional GBIs above what we plan to deploy by 2008, along with 2 key radars needed for protection of the United States—the upgraded early warning radars at Fylingdales in the United Kingdom and at Thule in Greenland.

This past year we completed operational testing of the Royal Air Force Fylingdales radar and made the radar available to the warfighter for emergency situations. In 2007 we began upgrades to the Thule radar and will continue to integrate it into the system by 2009. Together with the early warning radars in California, Alaska, and the United Kingdom, the Thule radar will ensure coverage of

the United States against threats from the Middle East. In the Pacific theater, we will continue to enhance additional forward-based X-band radar capabilities in Japan and at other operating locations to meet warfighter needs.

Block 3.0 also provides capabilities to defeat more sophisticated midcourse countermeasures. We are pursuing two parallel and complimentary approaches to counter complex countermeasures: first, more sophisticated sensors and algorithms to discriminate the threat reentry vehicle in the presence of countermeasures; and second, a multiple kill capability to intercept the objects identified by the discrimination systems as potential threat reentry vehicles. Block 3.0 will focus on the first of these approaches. It includes upgrades to the GBIs, sensors, and the C2BMC system. The full implementation of this approach will be conducted in phases, with the first phase referred to as "Near-Term Discrimination" and the second phase as "Improved Discrimination and System Track."

Block 4.0

We are requesting about $720 million for fiscal year 2009 for Block 4.0 fielding, development, and integration. Block 4.0 fields sensors, interceptors, and the C2BMC infrastructure needed to improve protection of the United States and, for the first time, extend coverage to all European NATO allies vulnerable to long-range ballistic missile attack from Iran. This block focuses on deployment of the midcourse X-band radar, currently located at the Kwajalein test site, to the Czech Republic and the establishment of an interceptor field in Poland, pending agreements with both governments. By devaluing Iran's longer-range missile force, European missile defenses could help dissuade the Iranian government from further investing in ballistic missiles and deter it from using those weapons in a conflict. We believe that the long-range defense assets we are planning to deploy to Central Europe offer the most effective capability for defeating this threat.

The European Midcourse Radar would complement sensor assets deployed in the United Kingdom and Greenland and provide critical midcourse tracking data on threats launched out of the Middle East. The radar also would operate synergistically with the planned forward-based transportable X-band radar, jointly providing early threat detection and discrimination of the reentry vehicles.

An European Interceptor Site will consist of up to 10 interceptors, the two-stage configuration of our flight-proven three-stage GBI. A two-stage interceptor has less burn time than the three-stage version, which allows it to operate within the shorter engagement timelines expected. Nearly all of the components used in the two-stage interceptor are identical to those already tested and fielded in the three-stage interceptor, which means modifications required to design, develop, and produce a two-stage variant are minimal. Nor are such modifications unprecedented. In fact, the first 10 Ground-based Midcourse Defense integrated flight tests, conducted between January 1997 and December 2002, successfully utilized a two-stage variant of the three-stage Minuteman missile. As we do with all system elements and components, we have planned a rigorous qualification, integration, ground and flight testing program for the two-stage interceptor.

Several countries in southern Europe do not face threats from Iranian long-range missiles. Yet these same countries are vulnerable to the shorter-range ballistic missiles currently fielded by Iran and Syria. Mobile system sensors for Aegis BMD, THAAD, and Patriot are designed to be augmented by other sensors, like the European Midcourse Radar, and their interceptors are designed to engage slower short- to medium-range ballistic missiles systems. Together with other NATO missile defense assets, these missile defense forces will protect European countries vulnerable to short- and medium-range ballistic missiles when integrated into the NATO command and control structure.

Block 5.0

We are requesting $835 million for Block 5.0 for fiscal year 2009. This block builds on Block 2.0 to expand the defense of allies and deployed U.S. forces from short- to intermediate-range ballistic missile threats in two theaters. Block 5.0 will increase the number of SM–3 and THAAD interceptors and improve the performance of the Aegis BMD Weapons System and the SM–3 interceptor.

The SM–3 Block IB interceptor, a critical Block 5.0 development effort, will have major modifications to include a much improved seeker and a Throttleable Divert and Attitude Control System (TDACS). When combined with processing upgrades to the Aegis BMD Weapons System, the more capable Block IB interceptor will more readily distinguish between threat reentry vehicles and countermeasures. The Block IB expands the battle space and enables more effective and reliable engagements of more diverse and longer-range ballistic missiles. This year we look forward to

completing design and testing for the two-color seeker and TDACS and commencing the element integration of the SM–3 Block IB missile in 2009.

Block 5.0 includes delivery of 23 SM–3 Block IA interceptors, 53 SM–3 Block IB interceptors, 2 additional THAAD fire units with an additional 48 interceptors, 1 X-band transportable radar for forward deployment, and the associated C2BMC support.

Development/Operational Testing

Testing under operationally realistic conditions is an important part of maturing the BMDS in all five blocks. We have been fielding test assets in operational configurations in order to conduct increasingly complex and end-to-end tests of the system. Our testing to date has given us confidence in the BMDS's basic design, hit-to-kill effectiveness, and operational capability. While the system is developmental, it is available today to our leadership to meet real world threats.

Our flight tests are increasing in operational realism, limited only by environmental and safety concerns. Each system test builds on knowledge gained from previous tests and adds increasingly challenging objectives. The Director, Operational Test and Evaluation, the Operational Test Agencies, and the warfighting community are very active in all phases of test planning, execution, and post-test analysis. Using criteria established by the warfighter and the Agency's system engineers, all ground and flight tests provide data that we and the operational test community use to anchor our models and simulations and verify system functionality and operational effectiveness.

In 2007 we conducted many system ground and flight tests. Our flight test program for Ground-Based Midcourse Defense, Aegis BMD, and THAAD confirmed technological progress for short-, medium-, and long-range defensive capabilities. Last year we executed successfully a long-range ground-based intercept, six SM–3 intercepts of separating and unitary targets, and three THAAD intercepts of unitary targets. As of today, we have demonstrated hit-to-kill in 34 of 42 attempts since 2001. Last year alone we successfully intercepted the targets in 10 of 10 attempts.

After a legacy target failure in May 2007, we successfully completed Ground-based Midcourse Defense Flight Test-03a on September 28, 2007. In this test, an operationally configured GBI launched from Vandenberg Air Force Base engaged a threat representative intermediate-range target fired from Kodiak Island, AK, using sensor information from the operational upgraded early warning radar at Beale Air Force Base, CA. Trained crews manning fire control consoles reacted within a specified window under limited-notice launch conditions. This test leveraged fielded hardware and fire control software as well as operational communications, tracking, and reporting paths. The Exoatmospheric Kill Vehicle successfully collided with the target near the predicted point of impact, destroying it. This was our most operationally realistic, end-to-end test of the long-range defenses to date. Though they were not official participants of the test, the SBX and an Aegis BMD ship using its onboard SPY–1 radar also tracked the target and gathered data for post-test analysis.

We also had enormous success with our integrated ground tests, which involve the operational long-range defense elements and employ the actual operational hardware. We test the system end-to-end by simulating engagements. These ground tests, conducted in a lab environment and in the field, involve the wider missile defense system community, to include the National Military Command Center, the Operational Test Agencies, and U.S. Northern Command. They teach us a great deal and give us confidence to move forward with our intercept tests. The most comprehensive to date, these tests demonstrated the ability of the system to execute multiple, simultaneous engagements using operational networks and communications and fielded system elements in different combinations. The warfighter also was able to evaluate tactics, techniques, and procedures. In 2008 and 2009 we will continue our integrated ground test campaigns.

We completed five sea-based intercept tests in 2007. In all Aegis BMD tests, we do not notify the ship's crew of the target launch time, forcing crew members to react to a dynamic situation. This past year we successfully used Aegis BMD cruisers and destroyers to engage threat-representative short-range ballistic missiles and medium-range separating targets. We conducted a test with the U.S. Navy involving simultaneous engagements of a short-range ballistic missile and a hostile air target, demonstrating an ability to engage a ballistic missile threat as the ship conducts self-defense operations. In November we simulated a raid attack on an Aegis BMD cruiser using two short-range ballistic missiles. The cruiser destroyed both targets.

The December 2007 test off the coast of Kauai in Hawaii marked the first time an allied Navy ship successfully intercepted a ballistic missile target with the Aegis BMD midcourse engagement capability. The SM–3 successfully intercepted the medium-range separating target in space, verifying the engagement capability of the

upgraded Japanese destroyer. It also marked a major milestone in the growing missile defense cooperative relationship between Japan and the United States.

THAAD completed three intercept flight tests against threat-representative short-range unitary targets in the atmosphere and in space. In addition, the THAAD radar and fire control participated in two Aegis BMD flight tests to demonstrate THAAD-Aegis interoperability. These initial THAAD intercept tests at the Pacific Missile Range Facility in Hawaii demonstrated integrated operation of the system, including radar, launcher, fire control equipment and procedures, and the ability of the interceptor to detect, track, and destroy the target. Soldiers of the 6th Air Defense Artillery Brigade stationed at Fort Bliss, TX, operated all THAAD equipment during the tests, which contributed to operational realism.

In 2007 the MDA conducted 25 major tests and successfully met our primary test objectives in 18 of 20 flight tests. In doing so, we used the test ranges available to us today to maximum capacity. These totals include three Patriot tests, two Arrow tests, and the U.S.-Japan cooperative test. Our test plans for 2008 and 2009 will continue to use more complex and realistic scenarios for system-level flight tests and demonstrate interceptor capabilities against more stressing targets.

In 2008 we are planning two system-level long-range intercept tests, and two more in 2009, all of which will push the edge of the envelope in testing complexity. The tests in 2008 will involve targets launched from Kodiak, AK, and missile defense assets separated by thousands of miles. We are expanding the number of sensors available to cue the system and engage targets. In our next long-range test, we will involve the early warning radar at Beale and the forward-based X-band radar, temporarily sited at Juneau, AK. This test also will demonstrate integration of the SBX into the sensor support system. The intermediate-range target will have countermeasures. Later in 2008 Ground-based Midcourse Defense will attempt to defeat a longer-range threat-representative target and demonstrate the ability of the SBX to send tracking and discrimination data through Ground-based Midcourse Defense Fire Control and Communications to the Exoatmospheric Kill Vehicle prior to engagement.

We plan three Aegis BMD intercept tests in 2008 and 2009. In 2008 we will demonstrate an intercept of a unitary, short-range ballistic missile target in the terminal phase of flight using a SM–2 Block IV interceptor. Later this year we will conduct the second Japanese intercept test against a medium-range target warhead. In 2009 we will conduct an intercept flight test against a medium-range target to demonstrate an expanded battle space.

The first test of THAAD this year will involve engagement of a separating target low in the atmosphere. In the fall, we plan to demonstrate THAAD's salvo-launch capability against a separating target. In late spring 2009 THAAD will engage a complex separating target in space. In 2009 we will increase test complexity by demonstrating THAAD's ability to destroy two separating targets in the atmosphere.

In addition to our system flight- and ground-test campaigns, the MDA will continue to participate in Patriot combined developmental/operational tests as well as Air Force Glory Trip flight tests.

Knowledge-Based Capability Development

The proliferation of ballistic missile technologies and systems means we will face unexpected and more challenging threats in the future. We are requesting about $2.5 billion in fiscal year 2009 for capability development work to deliver advanced capabilities that will help ensure America's BMDS remains effective and reliable and a major element in our national defense strategy well into this century.

Destroying ballistic missiles in boost phase will deprive the adversary of opportunities to deploy in midcourse multiple reentry vehicles, submunitions, and countermeasures, thereby reducing the number of missiles and reentry vehicles having to be countered by our midcourse and terminal defenses. Success in the boost phase will increase the probability we will be successful in defeating an attack in the other defensive phases. As part of this layered defense strategy, we are developing the ABL and KEIs.

ABL is being developed to destroy ballistic missiles of all ranges. In 2007 the ABL program met all of our knowledge point expectations and cleared the way for the installation of the high-power laser on the aircraft by the end of 2008. We completed in-flight atmospheric compensation demonstrations and conducted low power systems integration testing, successfully demonstrating ABL's ability to detect, track, target, and engage non-cooperative airborne targets. Next we will integrate the high power systems and gear up for a series of flight tests leading to a full demonstration and lethal shoot-down in 2009 of a threat-representative boosting target.

The KEI program will provide mobile capabilities to intercept ballistic missiles in the boost, ascent, or midcourse phases of flight. This multi-platform, multi-payload,

rapidly deployable capability could not only extend the reach of the missile defense system, but it also will add another defense layer. In 2007 we completed hypersonic wind tunnel testing of the booster and successfully conducted static firings of the first- and second-stage motors. This year we are focusing on preparations for the 2009 flight test of the KEI booster, which, if successful, will demonstrate we are ready to proceed to intercept testing and integration into the system.

We are pursuing parallel and complementary efforts to counter complex countermeasures. Project Hercules is developing a series of algorithms to exploit physical phenomenology associated with threat reentry vehicles to counter on-the-horizon advanced threats and counter-countermeasures for employment in system sensors, kill vehicles, and C2BMC. The algorithms will improve sensor and weapon element tracking and discrimination via data integration and multi-sensor fusion data integration.

In the years ahead we expect our adversaries to have midcourse countermeasures. The MKV program is developing a payload for integration on midcourse interceptors to address complex countermeasures by identifying and destroying all lethal objects in a cluster using a single interceptor. This past year we delivered the initial models and simulation framework for testing sophisticated battle management algorithms and developed the liquid fuel divert and attitude control system.

Our strategy is to manage all future kill vehicle development under a single program office and acquire MKV payloads using a parallel path approach with two payload providers pursuing different technologies and designs. This strategy will allow us to better leverage industry experience and talent. The MKV approach leverages commonality and modularity of kill vehicle components on various land- and sea-based interceptors, to include KEIs, GBIs, and a Block IIB version of the SM–3. The goal is to demonstrate a multiple kill capability in 2011 through a series of component development and test events.

We are undertaking significant upgrades to the BMD Signal Processor in the Aegis BMD weapons system. Through our cooperative program with Japan, we are upgrading the SM–3 Block I interceptor with the SM–3 Block II to engage longer-range ballistic missiles. This faster interceptor will feature an advanced kinetic warhead with increased seeker sensitivity and divert capability. We also will implement upgrades to the Aegis BMD Weapons System. The first flight test is scheduled for 2012. The Far-Term Sea-Based Terminal program will expand upon the near-term capability provided by the SM–2 Block IV blast-fragmentation interceptor by engaging longer-range threats. This year and next we will define weapons system requirements as we work toward initial fielding as early as 2015.

We are developing the STSS to enable worldwide acquisition and tracking of threat missiles. Sensors on STSS satellites will provide fire control data for engagements of threat reentry vehicles and, when combined with radar data, will provide improved threat object discrimination. In 2008 we will deliver two demonstration satellites scheduled for launch later in the year and a common ground station. We plan to use both targets of opportunity and dedicated targets to demonstrate STSS capabilities from lift-off through midcourse to reentry. The knowledge gained from these demonstrations will guide our decisions on the development of a follow-on space sensor constellation.

I believe the performance of the BMDS could be greatly enhanced someday by an integrated, space-based interceptor layer. Space systems could provide on-demand, near global access to ballistic missile threats, minimizing limitations imposed by geography, absence of strategic warning, and the politics of international basing rights. I would like to begin concept analysis and preparation for small-scale experiments. These experiments would provide real data to answer a number of technical questions and help the leadership make a more informed decision about adding this capability.

We have had to restructure some development activities and cancel others as a result of reductions in our fiscal year 2008 budget. Reductions in funding for the European Site Initiative, STSS, ABL, and MKV programs will result in some schedule delays. Cuts in the system engineering work, including modeling and simulations, undermine our ability to develop and field an integrated system, which requires a collaborative effort by MDA and our industry partners that cuts across many disciplines and specialties. The ability to do this cross-cutting engineering work will become increasingly important as we move, for example, towards developing common kill vehicles and common interceptors.

I remain deeply concerned about the future threat environment, and consequently believe each one of these efforts is critical to maintaining our defenses in the uncertain years ahead.

SETBACKS IN 2007

With our unprecedented success in 2007 came several setbacks. We experienced a target failure in our first attempt for FTG–03 as mentioned earlier. While this was only the second complete target failure in 42 flight tests, it was a signal that we needed to revamp our target program, which is underway. We are at a critical juncture in the target program transitioning from the legacy booster motors to the more modern Flexible Target Family, and I intend to make this a high priority in 2008.

In addition, we are investigating a nozzle failure that occurred in the second static firing of the KEI second stage. While investigation is underway, we plan to execute the first booster flight in 2009.

We also experienced some cost growth in the THAAD, Aegis, and GMD programs which is being addressed within the overall missile defense portfolio. The THAAD cost growth was due to test delays, additional insensitive munitions testing, and its deployment to the Juniper Cobra 09 exercise in Israel. Aegis cost growth was generated from extended work on the SM–3 Third Stage Rocket Motor and the Divert and Attitude Control System. This work also delays the delivery of the Block 1B interceptors by 1 year. GMD cost growth was due to the modifications required for the two-stage version, the additional missile field in Alaska, and repair of the water damage silos.

RETAINING INTEGRATED DECISION AUTHORITY

I would now like to turn to a topic very near and dear to me. I urge the committee to continue its support of the integrated decision authority that the MDA Director has been given for the missile defense portfolio. Working with the U.S. Strategic Command Commander, I have the ability to propose the evolution of the missile defense system based on all relevant requirements, acquisition, and budget information. This authority was necessary in light of the President's 2002 directive to begin deployment in 2004 of a set of missile defense capabilities that would serve as a starting point for improved and expanded missile defense capabilities later.

I present to you two telling quotes from the 2006 Defense Acquisition Performance Assessment (DAPA) report chartered by the Department.

> "[T]he budget, acquisition, and requirements processes are not connected organizationally at any level below the Deputy Secretary of Defense. This induces instability and erodes accountability. Segregation of requirements, budget and acquisition processes create barriers to efficient program execution."
>
> "Acquisition programs need to deliver timely products. Our assessment is that the culture of the Department is to strive initially for the 100 percent solution in the first article delivered to the field. Further, the "Conspiracy of Hope" causes the Department to consistently underestimate what it would cost to get the 100 percent solution. Therefore, products take tens of years to deliver and cost far more than originally estimated."

Well, the DAPA report could have cited the one place in the Defense Department below the Deputy Secretary where requirements, acquisition, and budget authority comes together—the MDA. This authority has given me the trade space to make a balanced recommendation to the Deputy Secretary that has paid dividends for defense of our Homeland, deployed forces, allies, and friends.

MDA has fielded an initial capability consisting of 24 GBIs; 17 Aegis BMD warships capable of long-range surveillance and tracking, of which 12 are also capable of missile intercepts; 23 Standard Missile-3 interceptors for Aegis BMD warships; 18 SM–2 Block IV interceptors; an upgraded Cobra Dane radar; 2 upgraded early warning radars; a transportable X-band radar; a command and control, battle management, and communications capability, and a SBX. None of this capability existed as recently as June 2004. This rapid fielding would never have been possible unless I had the integrated decision authority over requirements, acquisition, and budget. I think it is fair to say that this capability would have taken two to three times longer to field under standard Department practices—if not the "tens of years" cited by DAPA.

Should this integrated decision authority be continued now that we have successfully met the President's injunction to quickly field an initial capability where no capability had previously existed? I would make four key points in favor of retaining this authority.

First, the Director of MDA is in the best position to know the program's progress and challenges. This does not mean that I make decisions in a vacuum. We work closely with the Intelligence Community, the warfighter, and the Services on the

threat, capability needs, and available resources. In addition to the external oversight from your committee and others in Congress and, of course, the Government Accountability Office, I also receive significant Department-level oversight from Under Secretary AT&L, the Office of the Secretary of Defense Comptroller, and the Missile Defense Executive Board. However, it does mean that I have a degree of control and trade space that is not available to the managers of other major defense acquisition programs.

Second, because the ballistic missile threat is always evolving, we need to be as agile as possible in getting the latest capabilities to the warfighter. The integrated requirements, acquisition, and budget authority granted MDA's Director inevitably enables us to deliver a capability more quickly to meet the evolving missile threat.

Third, while some see MDA's flexibilities as undeserved special treatment, others view MDA's integrated decision authority as, in effect, a "test lab" for the Under Secretary of Defense AT&L to examine alternative, creative approaches to acquiring joint capabilities.

Fourth, ballistic missile defense is and always will be the quintessential joint program. No one Service could easily or naturally take responsibility for developing, testing, integrating, and fielding the BMDS. The trade space offered me as portfolio manager of the entire BMD program is considerably wider than it would be if MDA were wedded to one Service or merely an advocate within the Office of the Secretary or joint staff who is trying to negotiate with a myriad of individual program managers protecting their own turf.

On a personal level, I take my stewardship responsibilities very seriously. I will not be in this position forever, and I know how vitally important it is to put my successor in the best position to give the warfighter the capabilities needed to negate the threats to our Homeland, deployed forces, allies, and friends. The integrated decision authority granted me as MDA Director does just that, and I urge your continued support.

ORGANIZATIONAL REENGINEERING

MDA's reengineering goal is to transform the organization into a single, integrated high-performance team capable of sustaining its development and test successes and maximizing its efficiency and effectiveness in acquiring, fielding, and supporting an integrated, operational BMDS. To accomplish this goal, I have established policies and defined responsibilities for providing qualified matrix support to the program directors/managers (PD/PM) responsible for delivering BMDS capabilities to the combatant commanders (COCOMs). Matrixing is an organizational concept that consolidates skills and resources under a functional manager who, in turn, allocates persons and resources among executing organizations needing these skills. Matrixed support includes such functions as engineering, contracts, business/financial management, cost estimating, acquisition management, logistics, test, safety quality and mission assurance, security, administrative services, information assurance, and international affairs. The matrix management process aims to strengthen PD/PM capabilities by assuring their accessibility to all expertise available to MDA; increasing accountability for quality of functional staff work; and allocating personnel resources according to the Agency's needs.

MDA has established the following objectives to focus the reengineering efforts:

- Implement a full matrix management construct to strengthen functional responsibilities at both the BMDS and element level of program execution;
- Establish key new or restructured organizations and centers to strengthen the implementation of an integrated system;
- Establish key knowledge centers to focus MDA resources on and within critical mission technical areas;[7]
- Complete an organizational alignment assessment to improve agency efficiency and effectiveness through elimination of redundancy of functions and infrastructure, multiple layers of management and noncritical functions, and a verification that resources are aligned with MDA priorities; and
- Relocate MDA offices from the National Capital Region (NCR) to Huntsville and selected other locations to realize the benefits of a centralized control/decentralized execution strategy, facilitate leveraging all resources available in MDA and propagate better cross-flow of expertise and information.

[7] Knowledge centers for Interceptors, C2BMC, and Sensors were established in January 2008. Centers for Space and Directed Energy will be established later in 2008.

BASE REALIGNMENT AND CLOSURE

The 2005 Defense BRAC Commission approved recommendations directing the realignment of several MDA directorates from the NCR to government facilities at Fort Belvoir, VA, and the Redstone Arsenal in Huntsville, AL. Specifically, a Headquarters Command Center for MDA will be located at Fort Belvoir, while most other MDA functions will be realigned to Redstone Arsenal. The transfer of government and contractor personnel from the NCR is already in progress; by the end of 2008, we will have transitioned some 1,100 personnel positions to the Arsenal. Also, construction will start in fiscal year 2008 on additional facilities to be opened in two phases in fiscal year 2010 and fiscal year 2011. Construction of the MDA Headquarters Command Center is also scheduled to begin in late fiscal year 2008, with occupancy in fiscal year 2010.

MISSILE DEFENSE AGENCY ENGINEERING AND SUPPORT SERVICES

Consistent with the Agency's reengineering, MDA has undertaken the task of improving how it procures contractor support services (CSS). The objectives of the change are to improve oversight, enable matrix management so the Agency can benefit more from cross-flow of information among different offices, enhance efficiency and transparency, and more accurately account for our cost of doing business. I have determined that the best path forward is to develop a new Agency-wide procurement; the designation for this procurement is Missile Defense Agency Engineering and Support Services (MiDAESS).

We currently receive contractor support through a variety of different avenues, such as contracts, other government agencies, and General Services Administration orders. Over the next few years, the MiDAESS procurement will allow us to consolidate the CSS into a more efficient procurement, focused on the primary areas of technical, administrative, financial, and other support that our agency requires.

Beginning in March 2007, we began discussions with our industry partners regarding MiDAESS. Throughout 2007, MDA has received industry feedback and continues to refine the details of how competition and contracting within MiDAESS will function. We plan to begin initial contract awards under MiDAESS in 2008.

CLOSING

Mr. Chairman and members of the subcommittee, in closing, I again want to thank you for your strong support of our program. Since 2002 we have achieved dramatic program efficiencies and effectiveness because we have been able to consolidate missile defense expertise and integrate all missile defense elements into a single, synergistic system. We have made tremendous progress deploying missile defenses to protect our Homeland, our troops deployed and our allies and friends. I also believe we have the right program in place to address more advanced threats we may face in the future.

Our investment in missile defense is significant, but our expenditures would pale in comparison to the overwhelming price this Nation could pay from a single missile impacting America or one of our allies. We need your continued support to carry on the tough engineering and integration task of developing and enhancing worldwide ballistic missile defenses.

This concludes my statement. I look forward to your questions.

STATEMENT OF LTG KEVIN T. CAMPBELL, USA, COMMANDING GENERAL, UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND

[The prepared statement of General Campbell follows:]

PREPARED STATEMENT BY LTG KEVIN T. CAMPBELL, USA

INTRODUCTION

Chairman Nelson, Ranking Member Sessions, and members of the subcommittee, thank you for your ongoing support of our military and for the opportunity to appear again before this panel. As I shared last year, I do believe that this committee is a strong supporter of the Army and the missile defense community. This is especially important as we continue to field missile defense capabilities and to continue development of future capabilities for the Nation and our allies. Along with those testifying today, I am an advocate for a strong global missile defense capability.

The committee is no doubt familiar with my duties and responsibilities as the Army's senior commander for space and missile defense as well as my position as

the Commander of the Joint Functional Component Command for Integrated Missile Defense, a part of the U.S. Strategic Command (USSTRATCOM). In this role, I serve as the joint user representative working closely with the Missile Defense Agency (MDA), other Services, and combatant commanders to ensure that our national goals of developing, testing, and deploying an integrated missile defense system are met in an operationally sound configuration.

Mr. Chairman, please rest assured that America's Army stands on point to defend our Nation against an intercontinental ballistic missile attack. Our soldiers continue to be trained and ready to operate the Ground-based Midcourse Defense (GMD) Element of the Ballistic Missile Defense System (BMDS) at Fort Greely, AK, Vandenburg Air Force Base, CA, and the 100th GMD Brigade's Missile Defense Element at Schriever Air Force Base, CO. These soldiers, as part of the joint team, continue to serve as our Nation's first line of defense against any launch of an intercontinental ballistic missile toward our shores. I am proud to represent them along with the other members of the Army and joint integrated missile defense community.

UNITED STATES STRATEGIC COMMAND JOINT FUNCTIONAL COMPONENT COMMAND FOR INTEGRATED MISSILE DEFENSE: PLANNING, INTEGRATING, AND COORDINATING MISSILE DEFENSE

The Joint Functional Component Command for Integrated Missile Defense (JFCC–IMD), USSTRATCOM's global missile defense integrating element, has been operational for 3 years. The JFCC–IMD continues to be manned by very capable Army, Navy, Air Force, Marine Corps, and civilian personnel.

USSTRATCOM, through the JFCC–IMD, continues to aggressively execute its mission to globally plan, integrate, and coordinate missile defense operations. Through a deliberate training and exercise program, the JFCC–IMD has improved our collective ability to defend this Nation. While the organization is still maturing, JFCC–IMD continues to lead the Department's transformation toward more robust integrated missile defense capabilities. The soldiers, sailors, airmen, marines, and civilians of this joint warfighting organization execute our mission to plan, integrate, and coordinate global missile defense operations and support by operationalizing new capabilities from MDA, developing global missile defense plans in collaboration with the geographical combatant commanders, and conducting cross-geographical combatant commander exercises to eliminate seams and gaps in order to maintain a strong defense against advancing threats. In summary, JFCC–IMD continues to build operational competence and warfighter confidence in the execution of our mission.

Continued Ballistic Missile Defense System Progress

This past year has been another year of operational achievement for integrated missile defense. Since the last time I addressed this committee, the Global BMDS has gone from test bed operations to a system configured to support continuous defensive operations. Whether a test bed with a residual operational capability, or an operational system that supports research and development activities, it is understood that our efforts and decisions must be entirely focused along two lines—operational capability and spiral development of the BMDS. We balance both fielding of near-term and development of long-term capabilities to meet the evolving threat to the Homeland. This balance cannot be achieved without comprehensive dialogue between MDA, the Services, and the warfighters—dialogue that is ongoing today and dialogue that must continue in the future.

We are continuing to expand the current ballistic missile defense operational configuration. This past year, the early warning radar at Fylingdales Royal Air Force Base was upgraded to perform the missile defense mission. This radar is a key element of the BMDS for providing the initial limited defense capabilities to counter the emerging ballistic missile threat from Southwest Asia. The radar will also continue to perform its traditional role as an early warning radar. The addition of this radar marks the beginning of the integration of BMDS capabilities across five combatant commands to counter simultaneous ballistic missile threats from two ends of the globe. We expect the warfighting capability provided by such integration of platforms, doctrine, and personnel to continue to grow in the coming years to address emerging threats.

Continued Warfighter Contributions to BMDS Development

As warfighters, we continue to participate in key BMDS tests to build confidence in the system's capabilities and provide input to future capabilities. For example, the 100th Missile Defense Brigade provided a trained and certified crew in support of a successful GMD flight test on September 28, 2007. Their support started with

participation in pre-mission training conducted in both Huntsville, AL, and at their GMD Fire Control consoles at the Missile Defense Element at Schriever Air Force Base, CO. The crew provided critical expertise that enhanced system performance, assisting the engineers with validation of pre-mission parameters. These pre-mission events culminated with the conduct of the flight test, where the crew provided the Human-In-Control actions necessary for a successful launch and intercept. The brigade will also support the upcoming GMD flight test. For this flight test, the AN/TPY–2 Forward Based X-Band and Sea Based X-band radars will be integrated into the GMD system to validate their operational utility and to provide data for anchoring our modeling and simulation efforts.

Since last year's testimony to this committee, we successfully intercepted ballistic missiles at low and high altitudes; in midcourse and terminal phases; and in endo- and exoatmospheric environments with our long-range ground-based interceptor, the Terminal High Altitude Area Defense (THAAD), and several Aegis Standard Missile-3s. We supported an international BMD partner with a successful exoatmospheric intercept from a Japanese Maritime Self Defense Force Destroyer. Conducting these system level flight and ground tests required the use of operational assets, the same assets that would be used to defend this Nation and our allies against a possible rogue state missile attack. JFCC–IMD worked closely with the combatant commanders and MDA to coordinate the availability of these assets to ensure sustained operational readiness during the conduct of the system level tests.

The JFCC–IMD was able to balance the requirements of both operations and tests. This period of robust achievements underscored the warfighter's requirement to expedite development and deployment of a concurrent testing, training, and operations (CTTO) capability. We have made strides but we still have a ways to go. CTTO will permit developers and operators to maintain an operational capability of the BMDS while simultaneously developing, testing, or training on the system. Absent a mature CTTO capability, JFCC–IMD aggressively conducts an asset management process to ensure the highest level of operational readiness during the conduct of materiel development and tests.

Continued Advancements in System Capability

JFCC–IMD, in partnership with MDA and the Services, has integrated additional missile defense sensors and shooters to enhance theater and strategic mission capabilities. We have institutionalized the Operational Readiness and Acceptance process to deliberately activate capabilities by baselining the known capabilities and limitations. Through this process, activation criteria, which are critical to establishing and maintaining capabilities, are clearly defined to ensure sustainable means are provided to the warfighter.

We continue to refine our processes to ensure the warfighters' desired operational capabilities are considered by the materiel developer. Since I last appeared, the Warfighter Involvement Process (WIP) has matured significantly. Warfighter inputs and subsequent changes to the overall BMDS of systems started slowly but are steadily increasing in effectiveness. After 2 years of operator-generated input, we are now seeing changes incorporated in the BMDS. More significantly, capability requests are being reflected in USSTRATCOM's Prioritized Capability List submissions and in MDA's corresponding Achievable Capabilities List.

A success story in the WIP is our partnership with MDA, the Services, and the combatant commanders in the expansion of the BMD capability into the European theater. In my role as the JFCC–IMD Commander, I have held discussions with the European Command to build stronger partnerships with our Allies should our Government conclude agreements for hosting a midcourse radar and interceptor site in Europe. If approved, the expansion of the BMDS into Europe will greatly increase the security of the United States as well as provide a measure of protection to our forward deployed forces and European allies that currently does not exist.

Looking forward, we are engaged with the Department to balance the missile defense portfolio to ensure we are addressing both the threats of today and tomorrow. With more than 20 countries, several of which have an adversarial relationship with the United States, now possessing ballistic missile capability and technology, the threat to the United States and our allies is growing. The missile defense investment portfolio must address the warfighter needs for the near-term threats from these countries while developing new technologies to deter potential adversaries from their continued investment in ballistic missile technologies.

Taking Care of our Warfighters

If we receive approval to proceed with a European capability, we need to ensure we provide quality facilities and services to our soldiers. If built, the European capa-

bility will most certainly be an enduring mission. The mission support infrastructure (barracks and morale and welfare facilities) is just as important to mission success as the hardware the soldiers will operate. We believe that the mission support facilities "outside the wire" are an integral part of the overall system. The investment in mission support infrastructure contributes immensely to the overall reliability of the system and the cost represents a very low percentage of the overall system construction and fielding cost.

We should continue to work to improve the quality of life at our missile defense garrison at Fort Greely, AK. Soldiers in the 49th Missile Defense Battalion of the Alaska Army National Guard continue to defend the United States from ballistic missile attack from the remoteness of Fort Greely, AK. They continue to do so in an outstanding manner, without complaint, in an environment with infrastructure that does not meet current standards. While the Army is taking proactive steps to improve the quality of life at Fort Greely, the isolation of this remote location cannot be overstated. On the positive front, the Army recently awarded a contract to privatize the family housing at Fort Greely—soldiers and their families should start to realize significant housing improvements in the near future. Also, the Army is currently planning to replace an existing substandard fire station with one that will provide adequate coverage for Fort Greely's population and infrastructure. Challenges still remain as there is very limited support in the local community with respect to medical and dental care, special education needs, higher education opportunities, restaurant establishments, and other services that the vast majority of us take for granted. For example, the nearest medical specialist is over 2 hours away. This is very problematic, especially when one considers the extreme weather during the winter months. Our soldiers and their families deserve more—we need to provide the adequate facilities and the services they need. The Army will continue to address these challenges to ensure better living conditions are realized for our soldiers and their families.

Army Infrastructure Contributions

The Army also provides key test range assets for BMDS research and development. In addition to providing other vital Department capabilities, these unique facilities continue to serve as key BMDS enhancers for MDA. The United States Army Kwajalein Atoll/Reagan Test Site (USAKA/RTS) in the Republic of the Marshall Islands has been instrumental in the development and testing of the GMD system. USAKA/RTS will continue to serve as a significant test bed for future BMDS technology development. Also, within the BMDS arena, the High Energy Laser Systems Test Facility on White Sands Missile Range, NM, is serving as a key lethality test bed for MDA's Airborne Laser Program. We ask for your continued support to ensure these vital testing ranges are postured to perform necessary BMDS testing.

AIR AND MISSILE DEFENSE—AN OVERVIEW OF THE FISCAL YEAR 2009 ARMY BUDGET SUBMISSION

In addition to deploying the BMDS, MDA, the Services, and the combatant commanders continue to focus on improving theater air and missile defense capabilities. GMD and Theater Air and Missile Defense Systems are vital for the protection of our Homeland, deployed forces, friends, and allies. Air and missile defense is a key component in support of the Army's core competency of providing relevant and ready land power to combatant commanders.

As the Secretary and Chief of Staff of the Army have previously testified, the Army is stretched after years of operating at war. To relieve the stress on the force, the Army is embarking on a path to restore balance. The Army's plan centers on four imperatives—sustain, prepare, reset, and transform. As we have seen with other Army combat capabilities, the requirement for air and missile defense units continues to grow, stretching the force. Operation Iraqi Freedom consumes significant quantities of our key missile defense capabilities, leaving other worldwide commitments underresourced.

Already well underway, the Army has created composite air and missile defense battalions to transform the Air Defense Artillery into a more responsive and agile organization. These battalions address capability gaps, permitting us to defeat cruise missiles and unmanned aerial vehicles while maintaining our ability to defend critical assets from the ballistic missile threat. Composite air and missile defense battalions will capitalize on the synergies of two previously separate disciplines—short-range air and missile defense and high-to-medium altitude air and missile defense. Additionally, the Army has pooled air defense artillery battalions at the theater-level to provide air and missile defense protection based on the situation and mission requirements. This pooling concept supports the Army's effort to

move to modular designs that allow force tailoring of units better sized to meet the combatant commander's needs.

With that as a brief background, let me now focus on the Army's fiscal year 2009 budget submission for air and missile defense systems. The recently submitted President's budget includes approximately $2.23 billion with which the Army proposes to execute current Army air and missile defense responsibilities and focus on future development and enhancements of both terminal phase and short-range air and missile defense systems. In short, the Army is continuing major efforts to improve the ability to provide warning, acquire, track, intercept, and destroy theater air and missile threats.

Army Integrated Air and Missile Defense (IAMD) System of Systems (SoS)

In order to enhance its ability to destroy theater air and missile threats, the Army is continuing to transform its air and missile defense force from its traditional system-centric architecture to an integrated, component-based, IAMD SoS. The Army IAMD SoS Program provides full, network-centric, plug-and-flight integration of existing and future air and missile defense systems and enables their full technical, functional, and procedural integration into the joint IAMD arena. This modularization of air and missile defense capabilities will allow Joint Force Commanders to scale and tailor air and missile defense components functioning interdependently to deliver operational capabilities not achievable by the individual elements of the system. Given the diversified air and missile threat set and the limited resources to address the threat, development of IAMD SoS is the Army's top air and missile defense priority.

In addition to the IAMD SoS interdependent capabilities, the Army's air defense community has initiated plans to meet the future challenges and demands, taking steps to sustain, prepare, reset, and transform our forces and equipment. These plans entail three main component areas of the Army's air and missile defense construct—terminal phase ballistic missile defense, cruise missile defense, and force protection.

Terminal Phase Ballistic Missile Defenses

The Patriot/Medium Extended Air Defense System (MEADS) capability is designed to counter theater ballistic missile threats in their terminal phase in addition to cruise missiles and other air-breathing threats. Combining these systems with the soon to be deployed THAAD system brings an unprecedented level of protection against missile attacks to deployed U.S. forces, friends, and allies well into the future.

Patriot/Patriot Advanced Capability-3 (PAC–3) Overview

Patriot is the world's only battle proven theater AMD system and will be a key AMD element for the next two decades, providing combatant commanders with modular, scalable, mission-tailored capabilities to greatly enhance operational force protection in support of the joint team. The Patriot is the Nation's only deployed, land-based, short-to-medium range BMDS capability.

The Army recognized that the Patriot force was heavily stressed and therefore developed a strategy to Grow-the-Force through a combination of pure-fleeting the existing Patriot force to PAC–3 capability and standing up two additional PAC–3 battalions. This strategy will increase our capacity to handle today's threat and alleviate logistical and training challenges of maintaining two separate Patriot configurations. Pure-fleeting of the Patriot force with PAC–3 will allow for improved capability and higher lethality against the Theater Ballistic Missile (TBM) and non-TBM threat as well as enable commonality across all Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities domains in the Patriot force. Also, the additional two battalions of Patriot PAC–3 capability will meet the growing demands of the combatant commanders to provide global AMD against the entire threat set. Fiscal year 2007 reprogramming actions and fiscal year 2008 funding initiated this strategy—funding in the amount of $492.8 million in the fiscal year 2009 budget request will complete these initiatives and continue Patriot modifications.

Last year, my statement addressed the ongoing Patriot fixes to operational deficiencies that were deemed necessary as a result of friendly fire incidents. The Army has taken steps to address lessons learned and correct the deficiencies. Based on the current fielding schedule, all Operation Iraqi Freedom fixes will be completed during fiscal year 2009.

Medium Extended Air Defense System Overview

A top Army priority system for defense against short- and medium-range tactical ballistic missiles and air breathing threats, the MEADS will be an integral part of

the Army Integrated AMD SOS and capable of operating within a joint and coalition operational environment. The system will provide wide-area protection at strategic, operational, and tactical levels.

MEADS, a cooperative development program with Germany and Italy, will provide a lighter, more deployable, maneuverable, lethal, network-centric AMD capability. The program also includes development of the PAC–3 Missile Segment Enhancement (MSE) as the objective tri-national MEADS missile. The PAC–3 MSE is currently under development and will be integrated into the MEADS program. The MSE missile will provide a more agile and lethal interceptor that expands the engagement envelope of this system. The fiscal year 2009 budget request includes funding for MSE initial production facilities—production of the MSE is scheduled to begin in 2010. Fielding of MEADS is scheduled to begin in 2015 and be completed by 2028. We are confident that this path will provide our forces, allies, friends, and our Nation with the most capable air and missile defense system possible.

Terminal High Attitude Area Defense System Overview

The Department of Defense is committed to fielding an advanced capability to defend against tactical ballistic missiles as soon as possible. THAAD is designed to provide a layered theater ballistic missile defense in support of the short- and medium-range ballistic missile threat. MDA is funding and manufacturing four THAAD batteries for the Army in an accelerated fielding that will commence in 2009. THAAD capabilities will begin to transfer to the Army in 2009. Synchronization between the Army and MDA is crucial in both the development and funding areas in order to ensure that the transition delivers a supportable warfighting system.

To fully optimize the performance of the Patriot, MEADS, and THAAD defense systems, effective personnel training and development is essential. The United States Army Fires Center of Excellence at Fort Sill, OK, will provide our Nation with the best trained, organized, and equipped Air Defense Artillery leaders and units in response to current operational needs and future force warfighting concepts.

Joint Tactical Ground Station

Joint Tactical Ground Station (JTAGS) is a transportable information processing system that receives and processes in-theater, direct down-linked data from Defense Support Program satellites. JTAGS provides our commanders with early warning of ballistic missile attack and essential information to defeat TBMs. The system disseminates warning, alerting, and cueing information on TBMs, and other tactical events of interest throughout the theater using existing communications networks. JTAGS determines the TBM source by identifying missile launch point and time and provides an estimation of impact point and time. Since the system is located in-theater, it reduces the possibility of single-point-failure in long-haul communication systems and is responsive to the theater commander. JTAGS also fulfills the in-theater role of USSTRATCOM's Theater Event System (TES). It is imperative that JTAGS be funded to integrate and evolve to use the next generation of Space Based Infrared System sensors. This will significantly enhance warning accuracy and timeliness while improving all aspects of theater missile defense. We request your continued support of this essential capability.

Cruise Missile Defense

Our adversaries understand the value of cruise missiles. They are inherently very difficult targets to detect, engage, and destroy, and when armed with a weapon of mass destruction warhead, the effects from a cruise missile are catastrophic. The Army's Cruise Missile Defense Program is an integral element of the joint cruise missile defense architecture. We are also working closely with the joint community to assure development of doctrine that synchronizes our military's full capabilities against the cruise missile threat. Critical Army components of the joint cruise missile defense architecture are provided by the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System, the Surface-Launched Advanced Medium Range Air-to-Air Missile, and the Patriot MSE missile. These systems are on schedule to provide an initial operational capability by 2012. Additionally, these systems will be networked within the IAMD SoS architecture, have an integrated fire control capability, and operate within a common command and control system. Initial operational capability is planned for 2014.

Force Protection

In the conduct of Operation Iraqi Freedom, insurgents continue to pose serious dangers by employing indirect-fire tactics of quick-attack, low-trajectory, urban-terrain-masked rocket, artillery, and mortar (RAM) strikes against U.S. forward operating bases in Iraq. To combat this threat, the Army developed a Counter-Rocket,

Artillery, Mortar (C–RAM) capability—an integrated set of capabilities to provide warning and intercept of RAM threats. The primary mission of the C–RAM project is to develop, procure, field, and maintain a capability that can detect RAM launches; warn the defended area with sufficient time for personnel to take cover; intercept rounds in flight, thus preventing damage to ground forces or facilities; and enhance response to and defeat of enemy forces. C–RAM utilizes a SOS approach and is comprised of a combination of multi-service fielded and non-developmental item sensors, command and control elements, and a modified U.S. Navy intercept system. The system utilizes a low cost commercial off-the-shelf warning system and a wireless local area network. Advances in the C–RAM capability will continue with funding that is requested in the fiscal year 2009 budget submit.

Efforts are also underway to use the benefits of directed energy to potentially counter the RAM threat. Developmental work by joint entities within the Department is producing results that are promising. Within the next few years, through the Army's High Energy Laser Technology Demonstration Program, we are very hopeful we will produce a mobile solid state laser weapon system that will serve as a complementary resource to the present and future kinetic energy capability in countering RAM projectiles. Your continued support in this area will ensure we advance indirect fire protection capabilities.

CONCLUSION

Mr. Chairman, the Army is a member of the joint team fighting an adaptive enemy in a persistent conflict while transforming to meet future threats. We have responsibility for GMD, THAAD, Patriot, and MEADS and will continue developing and fielding an integrated missile defense for our Nation, deployed forces, friends, and allies. USSTRATCOM, through the JFCC–IMD, will continue to develop a joint BMDS capability to protect our Nation, deployed forces, friends, and allies. The fiscal year 2009 budget proposal supports the transformation of the Army's air, space, and missile defense force to support the Army's future force, the Joint Integrated AMD System, and our global BMDS. We will continue to work with MDA, the Services, and component commanders to define the characteristics of the emerging air, space, and missile defense force and determine how it can best support the warfighter and our Nation.

I appreciate having the opportunity to speak on these important matters and look forward to addressing any questions you or the other committee members may have.

STATEMENT OF DR. CHARLES E. McQUEARY, DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

[The prepared statement of Dr. McQueary follows:]

PREPARED STATEMENT BY DR. CHARLES E. MCQUEARY

Mr. Chairman, Senator Sessions, distinguished members of the subcommittee, good afternoon. I am pleased to have this opportunity to speak to you about the testing of the Ballistic Missile Defense System (BMDS). I will cover five areas.

First, I will give you my current assessment of the capability of the BMDS.

Second, I will discuss the factor that limited my ability to provide a thorough assessment as required by the National Defense Authorization Act for Fiscal Year 2006.

Third, I will discuss the sufficiency and adequacy of the BMDS test and evaluation program during the past year.

Fourth, I will provide a review of the implementation of the Director, Operational Test and Evaluation (DOT&E) recommendations made to the Missile Defense Agency (MDA).

Finally, I will describe how the MDA is a pathfinder for the implementation of section 231 language from the National Defense Authorization Act for Fiscal Year 2007.

FIRST: MY ASSESSMENT

As General Obering has already pointed out, the MDA had a good year of testing in 2007.

Patriot demonstrated that it generally meets its operational requirements with some limitations for specific threat missiles. Aegis Ballistic Missile Defense demonstrated the capability to detect, track, and engage short- and medium-range ballistic missile targets in the midcourse phase with Standard Missile-3 missiles. Al-

though Ground-based Midcourse Defense is still developmental in nature, it demonstrated to some degree many of the functions required for system effectiveness.

As a result, I can state that the BMDS has a limited capability to defend against simple, ballistic missile threats launched from North Korea toward the United States.

SECOND: THE LIMITATION

Mr. Chairman, as I told this committee last year, I was particularly concerned that verified, validated, and accredited models and simulations would not be available to help me complete my assessment of BMDS capability. My concern was well-founded.

Because of the same concern, General Obering diverted MDA resources to meet our mutual modeling and simulation requirements. He had his team create an ensemble of models and simulations, called Performance Assessment 07, to replicate system-level BMDS performance. Unfortunately, the effort and changes required were too great for the time available to accomplish them. Although many MDA element models are well along toward verification and validation, integrating them into a system-level BMDS performance model that can be verified, validated, and accredited did not happen and will not happen quickly.

Between the Performance Assessment 07 and the fiscal year 2007 ground test program, the BMDS Operational Test Agency Team attempted to accredit 33 models and simulations to support my assessment. The team was able to partially accredit, with caveats, only five of theses models. From this attempt, however, the MDA learned many valuable lessons about adequate and effective verification and validation that it can apply to this continuing effort. It will be some time before these models are ready and sufficient flight test data exists to anchor them so they can be properly verified, validated, and accredited for use.

THIRD: THE TEST PROGRAM

The pace and content of the MDA test program are proper for the developmental nature and maturity level of the various elements that constitute the BMDS. Although some would like to test more frequently, General Obering's deliberate approach to test-analyze-fix-test is warranted for this highly complex system. Analysis of large volumes of test data, frequently measured in terabytes, is an important step in this process that cannot be short-changed. It is very important to understand the results of one complex test before proceeding to the next test. I strongly support his approach.

Unfortunately, the slower test pace results in limited test data for use in verifying, validating, and accrediting models and simulations. As I discussed previously, this has impacted my ability to characterization BMDS performance.

Target availability, reliability, and performance have also been factors frustrating the flight test program and impacting test adequacy. During the 18 month period concluding December 31, 2007, MDA suffered 4 target failures during 20 flight tests conducted by various elements of the BMDS. These failures not only impacted critical data collection, but also forced changes to flight test schedules.

To be fair, the MDA is not alone in this experience with a target program. Targets are a Department-wide problem impacting ground, sea, and air programs, both for acquisition and training. The targets we need to adequately test the systems we are acquiring are nearly as sophisticated and costly as the threats they are trying to replicate and the weapons we are developing to counter them.

On a positive note, my office and the BMDS Operational Test Agency Team are active participants in the MDA's test planning and execution processes. The MDA implements many of our recommendations into the combined developmental and operational test program. Every ground and flight test includes both developmental and operational test objectives. As a group, we attempt to maximize operational realism in each test without impacting developmental objectives. In lieu of independent operational testing, this has been a valuable and effective approach to give warfighters time to operate the system and test their tactics, techniques, and procedures.

FOURTH: THE RECOMMENDATIONS

Mr. Chairman, in your invitation to address the committee, you asked me to provide an assessment of the MDA's implementation of DOT&E recommendations made to the Agency. I will do that now.

There were 26 recommendations in the fiscal year 2005 annual report. Four recommendations are still open, and the MDA is acting on each of them. Two involve

ongoing data collection, one involves the future test schedule, and one deals with the test planning process.

There were 15 new recommendations in the fiscal year 2006 annual report. Six of these recommendations remain open; all are being worked by the MDA. Four involve demonstrations of specific capabilities during actual intercept tests, one involves Information Assurance, and one involves targets.

There are five new recommendations in the fiscal year 2007 annual report. All are still open and being actively worked by the MDA. One involves targets, one involves ongoing data collection, one is scheduled for completion during the next Ground-based Midcourse Defense flight test this summer, one involves modeling and simulation, and one requires a review of previously completed testing.

The year-by-year reduction in the number of recommendations made by DOT&E is indicative of the progress the MDA is making in the BMDS developmental test program.

I only advise the MDA on its developmental test program. General Obering and his staff recognize the value of our suggestions and recommendations. A more capable BMDS is our mutual goal. I am satisfied with the MDA's response to the recommendations in our annual reports.

FINALLY: THE PATHFINDER

On December 22, 2007, Under Secretary John Young and I signed a revision to Department of Defense Test and Evaluation Policy. The new policy was a response to the requirement in the National Defense Authorization Act for Fiscal Year 2007, to review and reaffirm or modify test and evaluation policy as appropriate.

This new policy made developmental testing (DT) and operational testing (OT) integrated and seamless throughout the system life cycle.

Although we didn't have the MDA in mind when we developed this policy, the MDA is a model for this approach today as it develops, tests, and fields the BMDS. Several years ago, General Obering created a combined test force that embeds the operational test organization with his developmental test organization while maintaining the operational test organization's independence. This has worked well. As a result, the MDA has been able to transition to combined DT/OT as early as possible during the development and acquisition of the BMDS. As BMDS weapons elements mature, combined DT/OT test objectives are moving from a developmental emphasis to an operational emphasis.

The MDA is a pathfinder for demonstrating integrated and seamless DT and OT in the department. The warfighters are, and will continue to be, the clear beneficiaries of this new policy.

IN CONCLUSION

The MDA experienced another good year with its ground and flight test programs. Hit-to-kill is no longer a technological uncertainty; it is a reality, being successfully demonstrated many times over the past few years. The challenge now is to demonstrate hit-to-kill in more complex target scenes that include not only target deployment artifacts but countermeasures as well. General Obering has this in his future test plans.

Individual element successes indicate their growing capabilities. Integrated ground testing of the BMDS continues to demonstrate that the warfighters understand and can operate the system confidently and effectively. There is still a long way to go, but the MDA's disciplined and principled approach to flight and ground tests is continuing to pay real dividends.

This concludes my remarks and I welcome your questions.

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

[The prepared statement of Mr. Francis follows:]

PREPARED STATEMENT BY PAUL FRANCIS

Mr. Chairman and members of the subcommittee: I am pleased to be here today to discuss the Missile Defense Agency's (MDA) strategy for acquiring a Ballistic Missile Defense System (BMDS) and its progress in fielding Block 2006—its second increment of capability.

MDA has been charged with developing and fielding the BMDS, a system 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. In fulfilling this charge, MDA placed an initial set of missile defense components in the field in December 2005. These components are collectively referred to as Block 2004. Recently, MDA delivered its second increment of capability—Block 2006—which includes additional components as well as performance enhancements.

The National Defense Authorization Acts for Fiscal Years 2002 and 2006 mandated that we prepare annual assessments of MDA's ongoing cost, schedule, testing, and performance progress. In March 2008, we issued our report covering MDA's progress toward achieving Block 2006 goals during fiscal year 2007 as well as its efforts to improve transparency, accountability, and oversight. My statement today will focus on the issues covered in that report. We conducted this performance audit from May 2007 to March 2008 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.

SUMMARY

During Block 2006, MDA fielded additional and new assets, enhanced the capability of some existing assets, and achieved most test objectives. In short, MDA increased BMDS capability. However, MDA did not meet the goals it originally set for the block. Ultimately, MDA fielded fewer assets, increased costs by about $1 billion, and conducted fewer tests. Even with the cost increase, MDA deferred work to keep Block 2006 costs from increasing further, as some contractors overran their fiscal year 2007 budgets. We could not determine the full cost of the block as deferred work is no longer counted as part of the block. Further, several BMDS contractors plan work in such a way that could result in MDA incurring costs that are not yet recognized. We could not assess attainment of another MDA goal: the overall performance of fielded assets as an integrated BMDS. This is because: (1) there have not been enough flight tests to validate the models and simulations that are used to predict system-level performance, (2) the reliability of some interceptors could be affected by problematic parts that have not been replaced yet, and (3) tests done to date do not provide enough information for the Department of Defense's (DOD) operational test and evaluation director to fully determine if the BMDS is suitable and effective for battle.

MDA has been given unprecedented funding and decisionmaking flexibility that has expedited the fielding of assets but also lessened the transparency and accountability provided for oversight. In the past year, MDA has taken significant actions to improve oversight. First, MDA has adopted a new block approach that offers several improvements—unit costs for selected assets will now be tracked and work will no longer be deferred from one block to another. Second, DOD has established an executive board to review and make recommendations on MDA's acquisition strategy, plans, and funding that could play a more significant role than its predecessor. Third, Congress directed that MDA begin using procurement funds to purchase certain assets, which generally means they must be fully paid for in the year they are bought. Previously, using research and development funding, MDA could pay for assets over several years, making it difficult to determine their cost. Some oversight concerns remain, however. For example, although MDA plans to do so, it has not yet estimated the total cost of any block, therefore it cannot have block costs independently verified, as is done for other major programs. While the new executive board promises to be more substantive than the previous Missile Defense Support Group, it will not have the information—such as on cost estimates and operational testing—to provide the oversight the Defense Acquisition Board provides on other major programs. The new board, like its predecessor, does not have approval authority. The executive board also faces the unique challenge of evaluating technology development efforts that range from $2 billion to about $5 billion a year—efforts that normally do not have a firm cost, schedule, and performance baseline.

We have previously made recommendations to improve oversight in the areas that MDA has recently taken action. In March 2008, we also made recommendations to build on the actions already taken to further improve the transparency of block costs and oversight of the BMDS program. These included having MDA develop a full cost estimate for each block of BMDS capability with verification of that estimate, and examine ways to develop a baseline or some other standard against which the progress of technology programs may be assessed. We also recommended that MDA and the Director of Operational Test and Evaluation agree on criteria and incorporate corresponding scope into developmental tests that will allow a determina-

tion of whether a block of BMDS capability is suitable and effective for fielding. DOD concurred with having MDA develop block cost estimates and obtaining independent verification of those estimates. DOD partially concurred with the recommendations regarding examining ways to measure the progress of technology programs and adding scope to developmental tests.

BACKGROUND

Funded at $8 billion to nearly $10 billion annually, MDA's BMDS is the largest research development program in DOD's budget. Since the 1980s, DOD has spent more that $100 billion to develop and field the BMDS and it estimates that continued development and fielding will require an additional $50 billion between fiscal years 2008 and 2013.

Since 2002, MDA has worked to fulfill its mission through its development and fielding of a diverse collection of land-, air-, sea-, and space-based assets. These assets are developed and fielded through nine BMDS elements and include the Airborne Laser (ABL); Aegis Ballistic Missile Defense (Aegis BMD); BMDS Sensors; Command, Control, Battle Management, and Communications (C^2BMC); Ground-based Midcourse Defense (GMD); Kinetic Energy Interceptors (KEI); Multiple Kill Vehicles (MKV); Space Tracking and Surveillance System (STSS); and Terminal High Altitude Area Defense (THAAD).[1]

To develop a system capable of carrying out its mission, MDA, until December 2007, executed an acquisition strategy in which the development of missile defense capabilities was organized in 2-year increments known as blocks. Each block was intended to provide capabilities that enhanced the development and overall performance of the BMDS. The first 2-year block, known as Block 2004, fielded a limited initial capability that included early versions of the GMD, Aegis BMD, Patriot Advanced Capability-3, and C^2BMC elements. The agency's second 2-year block—Block 2006—culminated on December 31, 2007, and fielded additional BMDS assets. This block also provided improved GMD interceptors, enhanced Aegis BMD missiles, upgraded Aegis BMD ships, a Forward-Based X-Band-Transportable radar, and enhancements to C^2BMC software. In December 2007, MDA's Director approved a new block construct that will be the basis for all future development and fielding, which I will discuss in more detail shortly.

To assess progress during Block 2006, we examined the accomplishments of nine BMDS elements that MDA is developing and fielding. Our work included examining documents such as Program Execution Reviews, test plans and reports, production plans, and Contract Performance Reports. We also interviewed officials within each element program office and within MDA functional directorates. In addition, we discussed each element's test program and its results with DOD's Office of the Director, Operational Test and Evaluation. Regarding transparency, accountability, and oversight, we held discussions with officials in MDA's Directorate of Business Operations to determine whether its new block structure improved accountability and transparency of the BMDS. In addition, we reviewed pertinent sections of the U.S. Code to compare MDA's current level of accountability with Federal acquisition laws. We also interviewed officials from the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics and DOD's Joint Staff to discuss the oversight role of the new Missile Defense Executive Board (MDEB). Additionally, we reviewed the MDEB charter to identify the oversight responsibility of the board.

FIELDED CAPABILITY INCREASED, BUT LESS THAN PLANNED AT HIGHER COST

MDA made progress in developing and fielding the BMDS during 2007. Additional assets were fielded and/or upgraded, several tests met planned objectives, and other development activities were conducted. On the other hand, fewer assets were fielded than originally planned, some tests were delayed, and the cost of the block increased by approximately $1 billion. To stay within the revised budget despite increasing contractor costs, MDA deferred some budgeted work to future blocks. Such deferrals, coupled with a planning methodology too often used by some contractors that could obscure cost reporting, prevent us from determining the full cost of Block 2006. MDA was able to meet most test objectives despite delays in several elements' test schedules. Neither we nor DOD could evaluate the aggregate performance of fielded assets because flight testing to date has not generated sufficient data. An evaluation of aggregate performance would also have to consider that: (1) some parts in fielded interceptors identified as potentially problematic have not been replaced yet, and (2)

[1] The BMDS also includes a 10th element, Patriot Advanced Capability-3 which has been transferred to the Army for production, operation, and sustainment. This report does not evaluate Patriot because its initial development is complete and is now being managed by the Army.

tests done to date do not provide enough information for DOD's independent test organization to fully determine if the BMDS is suitable and effective for battle.

Fielding of Assets and Cost

During Block 2006, MDA increased its inventory of BMDS assets while enhancing the system's performance. It fielded 14 additional Ground-Based Interceptors, 12 Aegis BMD missiles designed to engage more advanced threats, 4 new Aegis BMD destroyers, 1 new Aegis BMD cruiser, and 8 Web browsers and 1 software suite for C²BMC. In addition, MDA upgraded half of its Aegis BMD ship fleet, successfully conducted four Aegis BMD and two GMD intercept tests, and completed a number of ground tests to demonstrate the capability of BMDS components.

MDA was unable to deliver all assets originally planned for Block 2006.[2] The Sensors element was the only Block 2006 element to meet all of its original goals set in March 2005 while the remaining elements—GMD, Aegis BMD, C²BMC—did not meet all of their original quantity goals. Sensors delivered a second Forward-Based X-Band Radar, Transportable (FBX–T) in January 2007 while the GMD element fielded 14 of the 15 Ground-Based Interceptors originally planned during Block 2006. Last year, we reported that MDA delayed the partial upgrade of the Thule early warning radar—one of GMD's original goals—until a full upgrade could be accomplished. Additionally, the Aegis BMD element delivered 4 additional destroyers and 1 new cruiser as originally planned, but delivered 12 of the 19 SM–3 missiles planned for the block. C²BMC did not deliver two of the three software suites originally planned for Block 2006, but did provide the needed capability less expensively through Web browsers and other techniques.

The work MDA completed for Block 2006 cost more than planned. In March 2007, we reported that MDA's cost goal for Block 2006 increased by approximately $1 billion because of greater than expected GMD operations and sustainment costs and technical problems. If the contractors continue to perform as they did in fiscal year 2007, we estimate that at completion, the cumulative overrun in the contracts could be between about $1.3 billion and $1.9 billion. To stay within its revised budget, MDA deferred some work it expected to accomplish during the block. When work is deferred, its costs are no longer accounted for in the original block. In other words, if work planned and budgeted for Block 2006 was deferred to Block 2008, that work would be counted as a Block 2008 cost. Because MDA did not track the cost of the deferred work, the agency could not make an adjustment that would have matched the cost with the correct block. Consequently, we were unable to determine the full cost of Block 2006.

Another reason why it is difficult to determine the actual cost of Block 2006 is a planning methodology too often employed by some MDA prime contractors that can obscure the full cost of work. Contractors typically divide the total work of a contract into small efforts in order to define them more clearly and to ensure proper oversight. Work may be planned into categories including: (1) level of effort—work that contains tasks of a general or supportive nature and does not produce a definite end product; and (2) discrete—work that has a definable end product or event. When work is discrete, delivery of the end product provides a sound basis for determining actual contractor performance. When discrete work is instead planned as level of effort, the contractor's performance becomes less transparent because work is considered complete when the time planned for it has expired, whether or not the intended product has been completed. Earned value management does not recognize such variances in completing scheduled work and to the extent more work has to be done to complete the product, additional costs could be incurred that are not yet recognized.[3] Many of MDA's prime contractors plan a large percentage of their work as level of effort. MDA officials agree that its contractors have improperly planned discrete work as level of effort, and are taking steps to remedy the situation.

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[2] In March 2006, MDA made reductions to its block 2006 goals. It was able in nearly all instances to meet or exceed these revised goals. Two elements—GMD and C²BMC—were able to exceed their revised fielding goals. In addition, the Aegis BMD element was able to meet its revised block goals for one of its two components. The program upgraded all planned ships, but fielded three fewer Aegis BMD Standard Missile-3s (SM–3) than planned because the missiles were delayed into 2008 to accommodate an unanticipated requirement to deliver three missiles to Japan.

[3] Earned Value Management (EVM) is a program management tool that integrates the technical, cost, and schedule parameters of a contract. During the planning phase, an integrated baseline is developed by time phasing budget resources for defined work. As work is performed and measured against the baseline, the corresponding budget value is "earned." Using this earned value metric; cost and schedule variances can be determined and analyzed. EVM is program management that provides significant benefits to both the Government and the contractor.

We also observed that while several contractors had difficulty with controlling costs, during fiscal year 2007, MDA awarded approximately 95 percent or $606 million of available award fee to its prime contractors. In particular, contractors developing the ABL and Aegis BMD Weapon System were rated as performing very well in the cost and/or program management elements and received commensurate fees, even though earned value management data showed that their cost and schedule performance was declining. Although DOD guidance discourages the use of earned value performance metrics in award fee criteria, MDA includes this—one of many factors for consideration in rating contractors' performance—in several of its award fee plans. The agency recognizes that there is not always a good link between its intentions for award fees and the amount of fee being earned by its contractors. In an effort to rectify this problem, the agency has begun to revise its award fee policy to align agency practices more closely with DOD's current policy that better links performance with award fees.

Testing and Performance of Fielded Capability

Most test objectives were achieved during 2007, although several BMDS programs experienced setbacks in their test schedules. The MKV, KEI, and Sensors elements were able to execute all scheduled activities as planned. The Aegis BMD, THAAD, ABL, STSS, and C^2BMC elements experienced test delays, but all were able to achieve their primary test objectives. GMD successfully completed an intercept with an operationally representative interceptor and a radar characterization test. A second intercept test employing the Sea-Based X-Band (SBX) radar has been delayed because a target malfunction delayed the execution of the first intercept test. The SBX capability is important as it is a primary sensor to be used to engage ballistic missiles in the midcourse phase of flight. As of yet, this capability has not been verified through flight testing.

As we reported in March 2007, MDA altered its original Block 2006 performance goals commensurate with the agency's reductions in the delivery of fielded assets.[4] For several reasons, information is not sufficient to assess whether MDA achieved its revised performance goals. First, MDA uses a combination of simulations and flight tests to determine whether performance goals are met. However, too few flight tests have been completed to ensure the accuracy of the models and simulations predictions. Second, confidence in the performance of the BMDS is reduced because of unresolved technical and quality issues in the GMD element. For example, the GMD element has experienced the same anomaly during each of its flight tests since 2001. This anomaly has not yet prevented the program from achieving any of its primary test objectives, but to date neither its source nor solution has been clearly identified. Program officials plan to continue their assessment of test data to determine the anomaly's root cause. The performance of some fielded GMD assets is also questionable because they contain parts identified by auditors in MDA's Office of Quality, Safety, and Mission Assurance as less reliable or inappropriate for use in space that have not yet been replaced. MDA has begun to replace the questionable parts in the manufacturing process and to purchase the parts for retrofit into fielded interceptors. However, it will not complete the retrofit effort until 2012.

Finally, tests of the GMD element have been of a developmental nature, and have not included target suite dynamic features and intercept geometries representative of the operational environment in which GMD will perform its mission. MDA has added operational test objectives to its developmental test program, but many of the objectives are aimed at proving that military personnel can operate the equipment. Up until 2007, the lack of data limited the operational test and evaluation Director's annual BMDS assessment to commenting on aspects of tests that were operationally realistic and recommending other tests to characterize system effectiveness and suitability. In 2007, tests allowed a partial assessment of the BMDS' effectiveness, suitability, and survivability. According to the Office of the Director of Operational Test and Evaluation: (1) further testing that incorporates realistic operational objectives; and (2) verification, validation, and accreditation of models and simulations

[4] GAO, Defense Acquisitions: Missile Defense Acquisition Strategy Generates Results but Delivers Less at a Higher Cost, GAO–07–387 (Washington, DC: March 15, 2007). BMDS performance goals included a numerical goal for the probability of a successful BMDS engagement, a defined area from which the BMDS would prevent an enemy from launching a ballistic missile, and a defined area that the BMDS would protect from ballistic missile attacks. GMD assets is also questionable because they contain parts identified by auditors in MDA's Office of Quality, Safety, and Mission Assurance as less reliable or inappropriate for use in space that have not yet been replaced. MDA has begun to replace the questionable parts in the manufacturing process and to purchase the parts for retrofit into fielded interceptors. However, it will not complete the retrofit effort until 2012.

will be needed before the performance, suitability, and survivability of the BMDS can be fully characterized.

KEY STEPS TAKEN TO ENHANCE BMDS OVERSIGHT, BUT MORE CAN BE DONE

Since its initiation in 2002, MDA has been given a significant amount of flexibility. While this flexibility allows agile decisionmaking, it lessens the transparency of MDA's acquisition processes, making it difficult to conduct oversight and hold the agency accountable for its planned outcomes and costs. As we reported in March 2007, MDA operates with considerable autonomy to change goals and plans, which makes it difficult to reconcile outcomes with original expectations and to determine the actual cost of each block and of individual operational assets. In the past year, MDA has begun implementing two initiatives—a new block construct and a new executive board—to improve transparency, accountability, and oversight. These initiatives represent improvements over current practices, although we see additional improvements MDA can make. In addition, Congress has directed that MDA begin buying certain assets with procurement funds like other programs, which should promote accountability for and transparency of the BMDS.

New Block Structure Offers Improvements, but Does Not Resolve All Issues

In 2007, MDA redefined its block construct to better communicate its plans and goals to Congress. The agency's new construct is based on fielding capabilities that address particular threats as opposed to the previous biennial time periods. MDA's new block construct makes many positive changes. These include establishing unit cost for selected block assets, incorporating into a block only those elements or components that will be fielded during the block, and abandoning the practice of deferring work from block to block.

These changes should improve the transparency of the BMDS program and make MDA more accountable for the investment being made in missile defense. For example, the actual cost of each block can be tracked because MDA will no longer defer work planned for one block, along with its cost, to a future block. In addition, MDA plans to develop unit costs for selected BMDS assets—such as THAAD interceptors—so that the cost of those assets can be monitored. In addition, the agency plans to request an independent verification of these unit costs and report significant cost growth to Congress. However, MDA has not yet determined all of the assets that will report a unit cost or how much a unit cost must increase before it is reported to Congress.

Although improvements are inherent in MDA's proposed block construct, the new construct does not resolve all transparency and accountability issues. For example, MDA has not yet estimated the full cost of a block. According to its fiscal year 2009 budget submission, MDA does not initially plan to develop a full cost estimate for any BMDS block. Instead, when a firm commitment can be made to Congress for a block of capability, MDA will develop a budget baseline for the block. This budget will include anticipated funding for each block activity that is planned for the 6 years included in DOD's Future Years Defense Plan.[5] Once baselined, if the budget for a block changes, MDA plans to report and explain those variations to Congress. At some future date, MDA does expect to develop a full cost estimate for each committed block and is in discussions with DOD's Cost Analysis Improvement Group on having the group verify each estimate; but documents do not yet include a timeline for estimating block cost or having that estimate verified. Other DOD programs are required to provide the full cost estimate of developing and producing their weapon systems before system development and demonstration can begin. Until the full cost of each block is known, it will be difficult for decisionmakers to compare the value of investing in each block to the value of investing in other DOD programs or to determine whether a block is affordable over the long term.

Another issue yet to be addressed is whether the concurrent development and fielding of BMDS assets will continue. Fully developing an asset and demonstrating its capability prior to production increases the likelihood that the product will perform as designed and can be produced at the cost estimated. To field an initial capability quickly, MDA accepted the risk of concurrent development and fielding during Block 2004. It continued to do so during Block 2006 as it fielded assets before they were fully tested. For example, by the end of Block 2004, the agency realized that the performance of some Ground-Based Interceptors could be degraded because the

[5] There are five blocks included in the new block construct—1.0, 2.0, 3.0, 4.0, and 5.0. MDA expects to initially develop budget baselines and report variances to this baseline for Blocks 1.0, 2.0, and a portion of 3.0.

interceptors included inappropriate or potentially unreliable parts.[6] As noted earlier, MDA has begun the process of retrofitting these interceptors, but work will not be completed until 2012. Meanwhile, there is a risk that some interceptors might not perform as designed. MDA has not addressed whether it will accept similar performance risks under its new block construct or whether it will fully develop and demonstrate all elements/components prior to fielding.

MDA has not addressed whether it will transfer assets produced during a block to a military service for production and operation at the block's completion. Officials representing multiple DOD organizations recognize that transfer criteria are neither complete nor clear given the BMDS's complexity. Without clear transfer criteria, MDA has transferred the management of only one element—the Patriot Advanced Capability-3—to the military for production and operation. For other elements, MDA and the military Services have been negotiating the transition of responsibilities for the sustainment of fielded elements—a task that has proven to be timeconsuming. Although MDA documents show that under its new block construct the agency should be ready to deliver BMDS components that are fully mission-capable, MDA officials could not tell us whether at the end of a block MDA's Director will recommend when management of components, including production responsibilities, will be transferred to the military.

New Executive Board Offers Improved, but Not Full, Oversight

Oversight improvement initiatives are also underway for MDA. In March 2007, the Deputy Secretary of Defense established a MDEB to recommend and oversee implementation of strategic policies and plans, program priorities, and investment options for protecting the United States and its allies from missile attacks. The MDEB is also to replace existing groups and structures, such as the Missile Defense Support Group.

The MDEB appears to be vested with more authority than its predecessor, the Missile Defense Support Group. When the Support Group was chartered in 2002, it was to provide constructive advice to MDA's Director. However, the Director was not required to follow the advice of the group. According to a DOD official, although the Support Group met many times initially, it did not meet after June 2005. This led to the formation of the MDEB. Its mission is to review and make recommendations on MDA's comprehensive acquisition strategy to the Deputy Secretary of Defense. It is also to provide the Under Secretary of Defense (Acquisition, Technology, and Logistics) with a recommended strategic program plan and a feasible funding strategy based on business case analysis that considers the best approach to fielding integrated missile defense capabilities in support of joint MDA and warfighter objectives. The MDEB will be assisted by four standing committees. These committees, which are chaired by senior-level officials from the Office of the Secretary of Defense and the Joint Staff, could play an important oversight role as they are expected to make recommendations to the MDEB, which in turn, will recommend courses of action to the Under Secretary of Defense and the Director, MDA as appropriate.

Although the MDEB is expected to exercise some oversight of MDA, it will not have all the information normally available to DOD oversight bodies. For other major defense acquisition programs, the Defense Acquisition Board has access to critical information because before a program can enter the System Development and Demonstration phase of the acquisition cycle, statute requires that certain information be developed.[7] However, in 2002, the Secretary of Defense deferred application of DOD policy to BMDS that, among other things, requires major defense programs to obtain approval before advancing from one phase of the acquisition cycle to another. Because MDA does not yet follow this cycle, and has not yet entered System Development and Demonstration, it has not triggered certain statutes requiring the development of information that the Defense Acquisition Board uses to inform its decisions. For example, most major defense acquisition programs are required by statute to obtain an independent verification of life-cycle cost estimates prior to beginning system development and demonstration, and/or production and deployment. Independent life-cycle cost estimates provide confidence that a program is executable within estimated cost. Although MDA plans to develop unit cost for selected block assets and to request that DOD's Cost Analysis Improvement Group verify the unit costs, the agency does not initially plan to develop a block cost estimate and therefore, cannot seek an independent verification of that cost. Although MDA will not be required to obtain an independent verification of block costs when

[6] See GAO, Defense Acquisitions: Missile Defense Agency Fields Initial Capability but Falls Short of Original Goals, GAO–06327 (Washington, DC: Mar. 15, 2006).

[7] The Defense Acquisition Board advises the Under Secretary of Defense for Acquisition, Technology, and Logistics on critical acquisition decisions.

they are estimated, MDA officials told us that they have initiated discussions with the Cost Analysis Improvement Group on independent verifications of block cost estimates.

Statute also requires an independent verification of a system's suitability for and effectiveness on the battlefield through operational testing before a program can proceed beyond low-rate initial production.[8] After testing is completed, the Director for Operational Test and Evaluation assesses whether the test was adequate to support an evaluation of the system's suitability and effectiveness for the battlefield, whether the test showed the system to be acceptable, and whether any limitations in suitability and effectiveness were noted. However, a comparable assessment of the BMDS assets being fielded will not be available to the MDEB. As noted earlier, the limited amount of testing completed, which has been primarily developmental in nature, and the lack of verified, validated, and accredited models and simulations prevent the Director of Operational Test and Evaluation from fully assessing the effectiveness, suitability, and survivability of the BMDS in annual assessments.

MDA will also make some decisions without needing approval from the MDEB or any higher level DOD official. Although the charter of the MDEB includes making recommendations to MDA and the Under Secretary of Defense (Acquisition, Technology, and Logistics) on investment options, program priorities, and MDA's strategy for developing and fielding an operational missile defense capability, the MDEB will not necessarily have the opportunity to review and recommend changes to BMDS blocks. MDA documents show that the agency plans to continue to define each block of development without requiring input from the MDEB. According to a briefing on the business rules and processes for MDA's new block structure, the decision to initiate a new block of BMDS capability will be made by MDA's Director. Also cost, schedule, and performance parameters will be established by MDA when technologies that the block depends upon are mature, a credible cost estimate can be developed, funding is available, and the threat is both imminent and severe. The Director will inform the MDEB as well as Congress when a new block is initiated, but he will not seek the approval of either.

Finally, there will be parts of the BMDS program that the MDEB will have difficulty overseeing because of the nature of the work being performed. MDA plans to place any program that is developing technology in a category known as Capability Development. These programs, such as ABL, KEI, and MKV, will not have a firm cost, schedule, or performance baseline. This is generally true for technology development programs in DOD because they are in a period of discovery, which makes schedule and cost difficult to estimate. Yet, the scale of the technology development in BMDS is unusually large, ranging from $2 billion to about $5 billion a year—eventually comprising nearly half of MDA's budget by fiscal year 2012. The MDEB will have access to the budgets planned for these programs over the next 5 or 6 years, each program's focus, and whether the technology is meeting short-term key events or knowledge points. But without some kind of baseline for matching progress with cost, the MDEB will not know how much more time or money will be needed to complete technology maturation. MDA's experience with the ABL program provides a good example of the difficulty in estimating the cost and schedule of technology development. In 1996, the ABL program believed that all ABL technology could be demonstrated by 2001 at a cost of about $1 billion. However, MDA now projects that this technology will not be demonstrated until 2009 and its cost has grown to over $5 billion.

MDA Directed to Use Procurement Funding

In an effort to further improve the transparency of MDA's acquisition processes, Congress has directed that MDA's budget materials delineate between funds needed for research, development, test, and evaluation; procurement; operations and maintenance; and military construction.[9] Congress gave MDA the flexibility to field certain assets using research, development, test, and evaluation funding which allowed MDA to fund the purchase of assets over multiple years. Congress recently restricted MDA's authority and required MDA to purchase certain assets with procurement funds. Using procurement funds will mean that MDA will be required to

[8] 10 U.S.C. § 2399 requires completion of initial operational test and evaluation of a weapon system before a program can proceed beyond low-rate initial production. According to DOD policy, low-rate initial production is intended to result in completion of manufacturing development in order to ensure adequate and efficient manufacturing capability and to produce the minimum quantity necessary to provide production or production-representative articles for operational test and evaluation, establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational (and live-fire, where applicable) testing.

[9] The National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110–181, § 223.

ensure that assets are fully funded in the year of their purchase, rather than incrementally funded over several years. Additionally, our analysis of MDA data shows that incremental funding is usually more expensive than full-funding, in part, because inflation decreases the buying power of the dollar each year. For example, after reviewing MDA's incremental funding plan for THAAD fire units and Aegis BMD missiles, we analyzed the effect of fully funding these assets and found that the agency could save about $125 million by fully funding their purchase and purchasing them in an economical manner. In the National Defense Authorization Act for Fiscal Year 2008, Congress directed that MDA request procurement funding and advanced procurement funding for long lead items in its fiscal year 2009 budget including funding for THAAD fire units and Aegis BMD SM–3 missiles. MDA did not request such funding because it slipped the schedule for procuring THAAD fire units 3 and 4 by 1 year and because the National Defense Authorization Act for Fiscal Year 2008 was not signed in time to allow MDA to adjust its budget request for SM–3 missiles. However, in MDA's fiscal year 2010 budget submittal, the agency intends to incorporate a detailed plan of action and milestones to transition from incremental funding to full funding beginning in fiscal year 2010 and for all fiscal years thereafter.

ACTIONS RECOMMENDED IN OUR RECENT REPORT

In our March 2008 report, we made several recommendations to build on efforts to further improve the transparency, accountability, and oversight of the missile defense program. Specifically, we recommended that the Secretary of Defense direct:

- MDA to develop a full cost for each block and request an independent verification of that cost;
- MDA to clarify the criteria that it will use for reporting unit cost variances to Congress;
- MDA to examine a contractor's planning efforts when 20 percent or more of a contract's work is proposed as level of effort;
- MDA to investigate ways of developing a baseline or some other standard against which the progress of technology programs may be assessed; and
- MDA and the Director of Operational Test and Evaluation to agree on criteria and incorporate corresponding scope into developmental tests that will allow a determination of whether a block of BMDS capability is suitable and effective for fielding.

DOD concurred with the first three recommendations. DOD partially concurred with the remaining two recommendations to investigate ways of developing a baseline or some other standard against which the progress of technology programs may be assessed and to agree on criteria and incorporate corresponding scope into developmental tests. DOD stated that MDA already uses key knowledge points, technology levels, and engineering readiness levels to assess the progress of technology programs and that it will continue to investigate other ways of making such assessments. DOD also noted that MDA's mission is to work with the warfighter, rather than Director of Operational Test and Evaluation, to determine that the BMDS is ready for fielding. However, DOD stated that MDA will continue to work with operational testers to strengthen the testing of BMDS suitability and effectiveness. We believe that DOD and Congress would benefit from understanding the remaining cost and time needed to complete a technology program, important information that MDA's methods do not yet provide. Since BMDS testing will continue to serve both developmental and operational purposes, its scope should be sufficient to enable the Director of Operational Test and Evaluation to evaluate the system's operational effectiveness, suitability, and survivability.

Mr. Chairman, this concludes my statement. I would be pleased to respond to any questions you or members of the subcommittee may have.

CONTACT AND STAFF ACKNOWLEDGMENTS

For questions about this statement, please contact me at (202) 512–4841 or Francisp@gao.gov. Individuals making key contributions to this statement include David Best, Assistant Director; LaTonya D. Miller; Steven B. Stern; Meredith Allen Kimmett; Kenneth E. Patton; and Alyssa Weir.

Senator BILL NELSON. As a courtesy, I want to call on my colleague, the ranking member, Senator Sessions.

Senator SESSIONS. Thank you. Thank you, Senator Nelson. That is nice of you, as always. I guess we would thank each of you for your service to our country.

I know in some ways it sounds like a lot of money we are spending on missile defense. But at $10 billion out of a $500 billion defense budget, that is not really very much, and it does provide, both at the tactical level and strategic level, protections that are exceedingly important to us as a Nation.

So I guess I won't make much more of a statement than that and to say that the budget is tight. I believe that we can accomplish our goals with the President's budget, but it is not a fat budget, that is for sure. There are a lot of things we are not going to be able to do that we would like to do if we had more money.

Secretary Young, the Missile Defense Agency (MDA) has been granted integrated decision authority over requirements, acquisition, and budget for the missile defense program. This authority was necessary in order to begin deployment of our missile defense capabilities by 2004, and it appears to have been successful. It was a spiral system, or whatever we want to call it, that gave a certain amount of flexibility.

It is likely that had we not had that flexibility, personally, I am inclined to believe that we would not be as far along as we are. Have you had a chance to look at that, or form an opinion about this different type of development program, and do you think it has any benefit as a model in any other acquisition situations?

Mr. YOUNG. Senator, I certainly do. I have looked at it, to some degree, and I believe elements of it are highly relevant to our other programs. In particular, across the board, I am already advocating that program managers take greater responsibility for engaging the requirements community when the requirements bar gets put much higher than the money available or the schedule available because we can't promise to deliver to those kinds of schedules.

So I think MDA, especially in the confines you outlined of an urgent need to get capability out there, had the ability to make those trades efficiently and get capability fielded. Across the board, we need better ability to make some of those trades to get the best value for the taxpayer.

Senator SESSIONS. General Obering, just briefly, based on your tenure now in this position and your previous experience, how do you evaluate this acquisition process that we established, I guess, 8 or 10 years ago for the MDA program?

General OBERING. Senator, I would say it has been very, very successful for us. There has been this approach in which, first of all, we are able to trade off requirements and funding and acquisition options to be able to maximize the fielding and to be able to react to real-world situations like we have experienced in the past. So I am a very strong advocate for this type of approach.

When you combine that with the single color of money that we have enjoyed over the years in research, development, test, and evaluation, that gives you a very quick reaction capability to be able to meet those emerging situations. I think that has been one of the reasons why we have been able to produce, almost at an unmatched fashion within the department, on the scale that we have been able to do.

Senator SESSIONS. It presents some risk, and it has some dangers. But I think with regard to this immature situation we started with, it has allowed us to move along rapidly.

Secretary Young, today's Washington Post reports that the Government Accountability Office (GAO) has found 95 major Department of Defense (DOD) systems that have exceeded their original budgets by a total of $295 billion and are delivered almost 2 years late on average. Is this correct?

Mr. Francis of GAO testifies today that MDA has increased cost over projections by $1 billion, as some overran their fiscal year 2007 budgets. How would you compare, if you are able, MDA's performance on major acquisitions with the other areas of the DOD, and what is your fundamental response to this disturbing report?

Mr. YOUNG. I certainly agree with the concerns. I haven't had a chance to review all the details of the report. I think the report documents some of the things that we have been through before I came into the office. There were six programs that went through the Nunn-McCurdy process and had cost growth, and there were programs before that.

I recently decided a program that is probably a part of that list, the C–5, where we actually made a decision instead of spending $14 billion and recognizing the cost growth, we scaled back the program, made sure we met the requirements, and saved the taxpayers about $10 billion.

So we are going through and attacking these programs individually, trying to put more discipline in the process. I need to become more familiar with the details of the report, so I can't yet say the numbers are accurate. But there have certainly been a number of programs that have exceeded their schedule.

In regards to MDA, it highlights the issue you asked about, where many of these programs have these problems because they had very strenuous requirements, and in some cases, probably amazingly, we actually changed and increased the requirements as we went into the execution of the program. MDA has had the benefit of not making those in general, in my view, bad choices and trying to be pragmatic about fielding an incremental capability as fast as possible and then working to upgrade that capability as money and time and technology support such upgrades.

Senator SESSIONS. General Obering, do you want to briefly comment on your perception on what this report indicates?

General OBERING. Yes, sir. I think that, again, echoing what Secretary Young says, the flexibilities that we have allowed and the way that we are able to really, really scrub down the requirements and also to make the trades has allowed us to stay in fairly reasonable good shape with respect to our cost variances.

Senator SESSIONS. Well, looking at this, maybe you can correct me, I guess, but your figure is less than some of the other major procurement agencies—at least being over. Would you say that is true?

General OBERING. Yes, sir. Overall in our portfolio, by our calculations, we are about 5 percent to 6 percent variance, and that reflects, by the way, a combination of increases in scope. For example, if you recall when the North Koreans went on alert in the summer of 2006, one of the lessons learned from that is there was an additional missile field that was requested at Fort Greely, AK, and also an additional interceptor to be placed on alert, an operational silo at Vandenberg Air Force Base.

So we get scope changes as part of those cost calculations. So that is not only just cost growth, per se, it is also increased capability. So I feel like we are very much, I think, on the good side of that equation.

Senator SESSIONS. Mr. Francis, thank you for your analysis. Do you have anything to add in addition or summary without repeating your written testimony or any thoughts you have on that subject?

Mr. FRANCIS. Yes, Senator Sessions. The report that you had referred to is something that we do every year. We look at about 70 programs, and we keep that data year in and year out.

As I was saying to Mr. Young before the hearing, I think one of the main findings is that the programs that get in trouble, which are a lot of them, are ones that are not abiding by the types of policies that I think Mr. Young is trying to get enforced.

It is hard to compare the cost figures on missile defense with other programs because the other programs are baselined against a total, and they generally run 10 to 15 years out. So missile defense, in a number of ways, is a level of effort program, and scope can move in and out, as General Obering said. So some scope can increase, and some scope can decrease.

But just taking that $1 billion, that is 5 percent over 2 years, or 2.5 percent a year. But Mr. Young will be certifying programs with a 25 percent cost breach, but that is because they last 10 years. So it is a little hard to get it apples-to-apples, but I think the billion dollars is something to be concerned about.

Senator SESSIONS. Do you feel like some of the goals he has for procurement represent progress and could help eliminate some of these overruns?

Mr. FRANCIS. Yes, I think one of the fundamental things we have found is that many programs get started before they are ready, and a lot of that analysis that we have done has been at the behest of this committee, benchmarking best practices. In discussions with Mr. Young's office, I know there are a lot of things he is trying to do to get programs on a much sounder footing before they hit that first big milestone, which is the Milestone B decision.

Senator SESSIONS. Well, Mr. Young, I would take that as a pretty good compliment from GAO because they are a tough watchdog. They don't mind being critical when it is necessary. But it is my impression that you are seeking to have a tough, strong approach to cost to keep us within our budgets.

Mr. YOUNG. I do appreciate the kind comments. It is still results that I have to put on the table. One of those, I think, and one we would highlight that I think MDA has tried to take advantage of on their own, is prototyping and to make sure you do initial prototyping and develop your technology readiness before you move forward with a product.

Now, if you are urgently fielding, you may move that prototype more quickly to the field. But across the board in the department, one thing we have to do, I think GAO has rightly pointed out, is better mature technology through prototyping. Congress has actually helped here because you have given me law. I would rather be running my business, but where necessary, if you all tell us things that are useful, it probably helps.

You have directed that we not move things through Milestone B without them being at technology readiness level 6. I think that is a helpful standard for Congress to ask us to hold to.

Senator SESSIONS. All right.

Senator BILL NELSON. Senator Inhofe.

Senator INHOFE. Thank you, Mr. Chairman.

I will make this brief. I had three questions to ask, and one has already been answered, and I was just told I have someone in my office.

General, we talk about where we are, and we constantly update this. We are still naked in the boost phase. Now I would like to have you tell us, so we can keep that alive, I know there are a lot of people that are saying this isn't going to be necessary. Then, of course, the big target is the Airborne Laser (ABL).

I would like to have you say, first of all, why this boost-phase capability is significant and then, second, why it is necessary to go ahead and continue with the funding of the ABL through next year?

Senator INHOFE. Through the shoot-down that will be next year?

General OBERING. Yes, sir. Well, first of all, the boost phase is—in a layered defense is extremely important. First of all, if you stop and think about it, when you are waiting until the terminal phase, you are only able to defend a fairly small footprint from a threat missile. In the mid-course phase, that defended area expands.

But if you can shoot a missile down in the boost phase, you are basically defending the entire world from that missile, number one. Number two, you are forcing the shoot-down relatively close to the origin of the launch of that missile. So, oftentimes, the shoot down is over the country's territory that actually launched the missile. Number three, it really helps in dealing with the complex countermeasure or decoy issue that comes up once you get into the mid-course phase and then into the terminal phase. So, for those reasons, it is a very advantageous capability.

Now to your point with respect to ABL, first of all, we have two programs in the boost phase. The ABL continues to be our primary boost-phase defense capability, and the Kinetic Energy Interceptor (KEI) was a backup to that in case the ABL did not prove to be successful.

Where we are on the ABL is we have completed the low-power systems flight testing. We did that last year. It was very successful. So between that and the high-energy laser firings that we accomplished over 70 of in a 747 fuselage at Edwards Air Force Base, we have now demonstrated all of the key technical capabilities to be able to shoot down the missile.

We have now put the six laser modules onboard the aircraft, the high-energy laser modules. We are in the process of completing the installations for the three lasers that are on that aircraft—the tracking laser, the atmospheric compensation, and then the big megawatt-class high-energy laser. At the end of this year, we should be firing out of the aircraft on the ground, and we should be going through our checks and our fire control loops and that type of thing, get back in the air early next year for the shoot-down.

Senator INHOFE. When next year?

General OBERING. In the summer is what we are shooting for right now for the shoot-down. We think it is important to do that because, number one, we have learned a tremendous amount throughout this. It is the largest directed-energy weapon in the department, and we have really focused the entire directed-energy community in this country on this program.

Senator INHOFE. Okay. That is a very good explanation, and I would encourage you to talk about this because that program is being attacked by even a lot of people who are very strong supporters because there is just a lack of an understanding of it.

Now, lastly, let me just mention to you that on December 2, 2007, I had a chance to meet with the leaders and the negotiators in Poland as well as the Czech President, Vaclav Klaus, who is one of my favorite presidents anywhere in the world. Then yesterday afternoon, I was in Stuttgart with the European Command and General Catto had all of his people in there.

I am very interested in the progress that is being made right now. You have two things with two countries. Of course, the radar with the Czech Republic and the missiles in Poland. I got the impression yesterday that between December 2 and yesterday, there hasn't really been anything that I can identify as progress.

Now they aren't opposed to it. I know the president of the Czech Republic isn't. But there is a lot of misinformation floating around that is creating a little bit of a problem. Then I got the impression also, as far as Poland is concerned, that they just want to be sure that there is a lot of money out there for them. Am I wrong?

General OBERING. First of all, sir, you are wrong in one aspect. That is, there has been tremendous progress since December. In fact, we have, for the most part, completed negotiations with the Czechs in a positive way. We are down to some of the final wording in the agreement. So I expect that to conclude here in the very near future in a very successful signing agreement.

With the Polish negotiations, we were set back somewhat when the new government came in, and of course, as any new government has a right to do, they wanted to assess the situation where they were. We have now regained some of the momentum that was lost as a result of the change in government, and we have been back under negotiations with our Polish counterparts.

Senator INHOFE. Do you think you are in the position now that you were before the change took place in Poland?

General OBERING. I think we are close, sir. I think that we have now gotten down to the specifics on what are the steps ahead with respect to help with the modernization of their defenses and what kind of help that may mean and in a discussion with that, and try to separate that somewhat from the missile defense agreement that we think is so critically important from a timing perspective as well.

Senator INHOFE. My thinking was this, that yes, I understand that a lot of progress has been made in the Czech Republic. But until you get both of them, it doesn't do any good to reach an agreement with one without the other.

General OBERING. Well, sir. Actually, we fully intend to get agreements with both nations. The radar itself is a tremendous capability in terms of the ability of that radar to feed data into any

missile defense system. That could be a North Atlantic Treaty Organization (NATO)-deployed capability or sea-based capability.

Senator INHOFE. In the location?

General OBERING. That would be a tremendous benefit to the overall NATO missile defense architecture. So while we certainly are on track to get both agreements, even just the radar would be tremendous progress.

Senator INHOFE. Okay. Well, that is good to hear because I didn't hear that yesterday in Stuttgart. It was kind of the impression that you have to get them both in order to make this thing work. But it does make sense if that radar could be used to deploy other systems, then that is better than not having anything.

General OBERING. Yes, sir. But just to make it crystal clear, we need both the interceptors and the radar to provide the long-range coverage for the protection of Europe. What I was referring to is any future shorter-range coverages that NATO may deploy.

Senator INHOFE. I understand. Thank you very much.

Senator BILL NELSON. All right. The big chairman has just come in.

As a courtesy to my colleagues, Senator Levin, I am deferring to you all before I get into my questions. So let me call on you.

Senator LEVIN. Well, thank you, Mr. Chairman.

I just had a few questions, and I don't know whether our witnesses had opening statements or not.

Senator BILL NELSON. No, we went straight to questions.

Senator LEVIN. Straight to questions.

Senator BILL NELSON. Everything has been entered into the record.

Senator LEVIN. I appreciate your yielding to me, Mr. Chairman. Let me just ask a few questions.

First, Secretary Young, you are supposed to be our acquisition czar for the entire DOD. Do you have final acquisition authority over the programs of the MDA? If not, is that because of law, or is that because of administrative decision?

Mr. YOUNG. Under the current policy—I have authority, as you rightly said, over the programs. Under the current construct, the service acquisition executive exercises authority over programs that have been delegated to them at certain levels, and in this case, most of the milestone and contracting decisions, MDA is currently exercising to move forward with the capability, the urgent capability deployment.

Senator LEVIN. Well, do you have the same acquisition authority over the MDA as you do over the other components?

Mr. YOUNG. I think, theoretically, I do. But right now, we are not exercising MDA programs with milestones, whereas with the other Services for the largest programs, I personally approve the milestones. But there are also many programs in the Services that are not of such a size that I approve the milestones or Service level.

Senator LEVIN. Do you treat acquisition in the MDA differently than other acquisition in the Defense Department?

Mr. YOUNG. Yes, we definitely treat that program differently.

Senator LEVIN. Why is that? Is that law, or is that an administrative decision?

Mr. YOUNG. I don't think it is law. I think I would say it is an administrative decision made some years, a few years, ago to try to urgently deploy capability and let that program be managed, if you will, as a portfolio in an effort to expeditiously field capability. Some of those authorities were delegated to the MDA organization and the director.

Senator LEVIN. Has there been any discussion about changing that so they are treated like other acquisition programs?

Mr. YOUNG. I think there have been discussions before my time, and even now, I wouldn't say that specific issue is being discussed yet. More so we are looking to improve the department as a whole on oversight. Because as more capabilities are delivered by MDA, the Services have growing roles in operating those capabilities.

We established a Missile Defense Executive Board (MDEB) that has met four times in my tenure to begin to discuss MDA programs, their status, their execution, and then the transition of those capabilities. We are taking at least a first step in better visibility and collaboration on the MDA programs execution.

Senator LEVIN. Will you review the relationship of your office to MDA for this subcommittee?

Mr. YOUNG. Yes, sir.

Senator LEVIN. Get back to us with any recommendations to change that so that you deal with them on the acquisition end the same way you do with all other acquisition programs.

Mr. YOUNG. I would be happy to do that.

[The information referred to follows:]

The Director, Missile Defense Agency (MDA) reports directly to me organizationally. In accordance with a memorandum signed by Secretary Rumsfeld, MDA was delegated certain authorities and flexibilities in order to pursue the urgent objective of fielding missile defense capability. Within the constraints of this memorandum, I have a set of responsibilities to conduct oversight of MDA. Under this memorandum, the authorities that I have to perform oversight of the Ballistic Missile Defense System are not equivalent to the oversight authorities I have for other acquisition programs.

Senator LEVIN. Of course, you would involve the other folks who are at the table in that. You are not going to do that unilaterally. But would you set that in motion?

Mr. YOUNG. Yes, sir.

Senator LEVIN. Just on the question of the new block structure that you have, you are going to be reporting variances, as I understand it, from the eventual schedule, cost, and performance baselines in reports that are classified. That is your current plan for your new block structure. I am wondering whether or not you cannot make it possible to report those also in an unclassified form?

I have asked you, General Obering.

General OBERING. Sir, we would not have any trouble reporting any schedule and cost variances unclassified. Performance variances, depending on the level of the performance, reporting may be classified.

Senator LEVIN. Can you then include that in your block structure planning?

General OBERING. Yes, sir.

Senator LEVIN. You will give us all of the cost, schedule, and as many performance variables as you can?

General OBERING. Yes, sir.

Senator LEVIN. Now, one other question. You have not yet set the schedule, cost, and performance baselines, as I understand it. Is that correct? I am not sure. I guess, General, I will look at you for that.

General OBERING. Yes, sir. We had cost, schedule, and performance that we were tracking in our old block structure. What we have gone to now with the new block structure is we have set the cost and we have allocated the budget. We are in the process of doing integrated baseline reviews for each one of these blocks, so that will be forthcoming.

Senator LEVIN. Then when do you expect those baselines would be available?

General OBERING. This year.

Senator LEVIN. This year? So it could be many months before those are available?

General OBERING. We want to make sure that we do it correctly.

Senator LEVIN. Would you agree, General—and I will ask also Secretary Young this question. I think both of you have testified before to this, but I want to make sure that you understand that for many of us this is a very significant point. Would you agree that our missile defense systems need to be operationally effective, suitable, survivable, and affordable? Secretary Young?

Mr. YOUNG. I certainly would.

Senator LEVIN. General Obering?

General OBERING. Yes, sir.

Senator LEVIN. Thank you. Thank you, Mr. Chairman.

Senator BILL NELSON. Okay. Senator Sessions.

Senator SESSIONS. I would follow up on Senator Inhofe's question about the situation with regard to Poland and the Czech Republic. In the course of our deliberations in any bills that we pass—General Obering, I know you have met with the Czechs and know you have met with the Poles on many occasions. Is it important that what this Congress passes demonstrates that we are committed to this program if and when they approve it?

In other words, can we afford just to say, well, they haven't completed all the negotiations with them yet, so we are going to put no money up? Would that have an adverse effect on the willingness of our allies to make their commitments that we need from them?

General OBERING. Sir, in my opinion, last year when Congress indicated that they were going to withhold the $85 million of the $310 million request pending the agreements with these nations, that sent the message, I think, to our partners and our allies that as an incentive to try to move on with getting these agreements.

If we do not fund the program this year, I think that sends a different message, which is lack of support. That is very different, and I don't think we want to send that message. I think, as I said, there is an urgency about this with respect to the threat, and there has also been such great progress, with respect to our allies on this, and in the NATO context as well. I think that would send a very, very wrong signal to, not only our seriousness in this, but also the role of U.S. leadership in the overall missile defense area.

Senator SESSIONS. This week, the President is meeting with NATO leaders. What is the message we are hearing from NATO

with regard to their view of sites, the radar and ballistic missile site in Europe?

General OBERING. Sir, I think that there are a couple of facets to that. Number one, I believe that there is a recognition that the threat is there, and it has to be addressed, and it is growing and maturing. Number two, I think that—and there will be, I am sure, more details coming this week. But I think that there is a growing recognition that NATO needs to do something about this within the NATO context, within their active-layer theater missile defense plan and move on with that program.

I think that there is a growing recognition that the U.S. proposal could be integrated as we move ahead in the future with NATO. So I don't know the specific wording that will come out, but I think it will be along those lines.

Senator SESSIONS. But overall, the NATO leadership seemed to understand and made quite clear, and Mr. Sarkozy of France was quite clear, that there is a threat that Europeans know they need to deal with.

General OBERING. Yes, sir. Also the Secretary General of NATO has been very vocal and very forceful, I think, in his description of the NATO position in missile defense and very positive about that.

Senator SESSIONS. General Obering, your budget request for fiscal year 2009 includes $10 million for a space test-bed to begin a concept analysis in preparation for certain small-scale experiments. As I understand it, the purpose of this is to provide data that could help us make more informed decisions about the utility and feasibility of a space-based interceptor capability. Give us some more insight into your reason for that request and how it would be used.

General OBERING. Sir, I wish that I could tell you in the next 20 years what the missile threats to the United States will be, and I wish the Intelligence Community could see that with a crystal ball, but they can't. So, I think it is very prudent that out of a $9.3 billion request, that we allocate at least $10 million to maintaining our options with respect to the future, and that future, in terms of flexibility of not knowing which axis the threat may come from, is in space, and there are things that we need to understand about that. There was a lot of work done in a space-based layer back in the 1980s on the Strategic Defense Initiative program. But a lot of that was brought to a halt in the early 1990s. We haven't done anything significant since then with respect to this. Then if we look out to the future, we need to make sure that we keep our options open.

We believe that there will be a debate about this, obviously, as the Nation proceeds. But we would like to be able to inform that debate with some type of technical understanding of what is doable and what is not.

We like to use knowledge points, as Secretary Young referred to, in a prototyping context, we call them knowledge points. We think it is important to establish some of the knowledge points that we may need in the future for space-based capabilities. As you say, it is a very, very, very modest request, but we think it is important to keep our options open.

If I may, one last example? Many describe this as "we don't need to be spending money for futuristic capabilities." I would look back-

wards and say if we had made the same statements in the mid-1990s about the Ground-Based Mid-Course Defense (GMD) System that we fielded, beginning in 2004, we would not have had a system to activate when the North Koreans launched their missiles in the summer of 2006, and we would not have been able to give the President an option other than preemption or retaliation had that been a threat.

I think we have to be very careful about maintaining a balance. We already are fielding and developing for fielding in the near term about 75 percent of our budget. Only about 25 percent is allocated to future capabilities such as the space test bed.

Senator SESSIONS. Well, you are right. We have emphasized actually deploying systems that we have developed in work because we need the Terminal High Altitude Area Defense (THAAD) and the Patriot Advanced Capability-3 (PAC–3), and this budget that we talk about is not all ballistic missile defense. It is not all national missile defense. Huge amounts of it are SM–3s on ships, THAADs, and Patriots that protect our soldiers in theaters that could be hostile and dangerous from missile attack, just essential parts of the Nation's defense.

I think a $10 million request is legitimate to explore what options might exist out there and, as you said, help inform us if we were ever to want to move forward with something in that area.

Mr. Chairman, I will turn it back to you.

Senator BILL NELSON. Thank you, Senator Sessions.

Well, speaking of THAAD, General Obering, it is a high priority. You want flexibility. Why did you propose a budget request that would delay the delivery of THAAD interceptors by a year and result in a production gap of 18 months?

General OBERING. Sir, part of what I do in my job as the acquisition executive for the missile defense programs is to make sure that we are holding contractors accountable and that we are holding our programs accountable. Now in the case of THAAD, we had good performance with respect to our test program. They are now four for four in terms of their intercept testing, but there was cost growth associated with the program that was unacceptable.

We had worked with the contractors to take a look at the cost growth and begin to get those under control because we did not want to have a very successful program that became unaffordable in terms of the per-missile cost. The initial attempts at that by the contractor were not successful. So we zeroed out that portion of what we call the award fee incentive for them in cost management in the program. We got their attention, and they began reducing that cost growth to a very acceptable level.

In the meantime, though, that generated a bill that had to be paid within the portfolio. Now the initial blush at that was they were going to have to delay the delivery of fire units 3 and 4. We went back and scrubbed that very hard and said, "wait a minute, do we have to do that? Why don't we go ahead and look at other places that are not as much value added to the program?" They did that. So now we do not have a delay in the delivery of those fire units.

To answer your question very directly—I don't want to reward unhelpful behavior, but at the same time, I want to maintain a priority on the program.

Senator BILL NELSON. All right. Can you boil that down then to a simple answer to the question, why did you propose the budget request for the delay and a production gap of 18 months?

General OBERING. At the time, we were trying to see how we could reduce the cost, and we had not finished that. Now we have done that, and we don't believe that there will be a delay in those fire units.

Senator BILL NELSON. Wasn't it that the staff of this committee objected to the delay in February that you decided to change your plans for the 2009 funds to avoid the delay?

General OBERING. Sir, we were working that back in November, actually. So we were continually trying to address these cost growths.

Senator BILL NELSON. So the fix is now planned for fiscal year 2009?

General OBERING. Yes, sir.

Senator BILL NELSON. But that is money that we will have to appropriate in the future, a fix for 2009.

All right. Secretary Young, are you committed to ensuring that our combatant commanders have sufficient inventory of THAAD and SM–3 interceptors to meet the requirements of their operational plans?

Mr. YOUNG. Certainly, sir. Our job is to at least receive the requirements. Unless there is a cost or a technology issue, we try to meet them. I know there is a new joint capability mix study, which you are probably aware of, that General Obering's organization is digesting and seeking to address because they have, indeed, indicated they may need greater inventory.

I would tell you that MDA is balancing those demands amongst the other demands and also doing a very good thing, and that is making sure we pick the right sets of integrated capability. It may not just be THAAD, but SM–3 and THAAD that they need to address the theater threat.

Senator BILL NELSON. So the answer is yes?

Mr. YOUNG. Yes, sir.

Senator BILL NELSON. General Campbell?

General CAMPBELL. Yes, sir. We are committed to working with the combatant commanders (COCOMs) to give them what they need, and it is our understanding that MDA is going to adjust their budget submission so that they can meet those demands we have identified in the study. That study is going to be briefed to your staffs this Friday. It is a classified study.

Senator BILL NELSON. So the answer is yes?

General CAMPBELL. Yes.

Senator BILL NELSON. I can tell you that we hear from the COCOMs, and they want this system. General Obering, same question.

General OBERING. Yes, sir. In fact, my initial mission is to do development and initial fielding, and then it is up to the Strategic Command (STRATCOM), the COCOMs, working within the department as to what the force structure sizes are that we need to go

to address. The joint capability mix number two study outlined the increases in numbers for both THAAD and Aegis SM–3s, and we do intend to address that in our Program Objectives Memorandum-10 (POM–10) submission to be able to get to the numbers that they have recommended.

That means that we will go in and make adjustments within our development program to be able to meet that, but that is our intent.

Senator BILL NELSON. Okay. Well, speaking of the SM–3 Block 1A interceptors, the authorization for fiscal year 2008 required that any funds in the budget for fiscal year 2009 for long-lead procurement of additional Standard Missile-3 (SM–3) Block 1A interceptors should be procurement funds. But that is not what happened.

This has been discussed between Congress and your agency, and the department has not complied with that requirement of procurement funds. Instead, the budget request seeks research and development funds for the long-lead of the additional SM–3 interceptors. So why is your budget at variance with the law?

General OBERING. Well, sir, first of all, the law was passed after the budget had been finalized for 2009. We attempted because we understood the direction it was headed—to try to structure the budget for procurement, but we were not able to do so within the Department because of the timing I just talked about.

Now if Congress appropriates, obviously, in the procurement appropriations, we will execute those. But we have to work within the department's context. We don't do this directly with Congress.

Senator BILL NELSON. Secretary Young, what do you think about this?

Mr. YOUNG. I think we need to comply with the law, where you ask us to, and certainly for POM–10, MDA is committed to looking to comply with the law. I am not sure about the timelines for building the 2009 budget and whether we could have made those changes given the timing of the passage of the authorization act.

Senator BILL NELSON. Well, let me ask both of you, do you agree that the 2009 funds for the long-lead SM–3 and THAAD interceptors should come from procurement funds?

General OBERING. Sir, like I said, we will execute whatever is appropriated with respect to those interceptors.

Senator BILL NELSON. Well, what the law says is that it should come from procurement funds.

General OBERING. Yes, sir.

Senator BILL NELSON. So you are saying that the appropriations may say something different than the authorization law?

General OBERING. Sir, I am saying that we will abide by the law. We will abide by what Congress has asked for us within the direction and the guidance that we get from the Department.

Senator BILL NELSON. We are supposed to be oversight, and we have a law. It is our responsibility to see that the executive branch of Government carries out the law. Anything else you want to say on this issue?

General OBERING. No, sir.

Senator BILL NELSON. All right. In the National Defense Authorization Act for Fiscal Year 2008, it required the MDA to take a number of steps in its acquisition activities to improve trans-

parency, accountability, and oversight. Those things were cost, schedule, performance baselines, and so forth. Have those requirements been fulfilled?

General OBERING. Yes, sir. We believe that we have made a great step forward there. We have totally restructured our programs into finite blocks of capability that can be baselined, fielded, and tracked to include the life-cycle costing of those, and we are working with the Cost Analysis Improvement Group, and others to be able to provide those. So we feel that we have taken great steps there.

In addition, as Secretary Young pointed out earlier, we established the MDEB of which I am the secretary and Secretary Young chairs. That is made up of principals across the Department to aid in the oversight of the program and to make sure that we are complying, obviously with the wishes of the Department and the wishes of the COCOMs as we move forward.

So I think we have done quite a bit there in terms of meeting the intent of that.

Senator BILL NELSON. Okay. The question is, with regard to the law and things such as cost, schedule, performance baselines, and unit cost reporting, will you provide the subcommittee with a specific list of all the specific actions that MDA has taken to comply with this section of the law?

General OBERING. I would be happy to, sir.

[The information referred to follows:]

Pursuant to section 234 of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (Public Law 108–375), the Missile Defense Agency (MDA) established schedule, budget, and performance baselines for each block configuration being fielded (biennial Blocks 04, 06, and 08 under the previous block structure) and reported variances annually in the agency's Statement of Goals (SOG).

In 2007, MDA established a new block structure to address concerns about transparency, accountability, and oversight and to better communicate to Congress and other key stakeholders our plans and baselines and our continuing improvements in Ballistic Missile Defense System (BMDS) capabilities. Blocks will be based on fielded capabilities—not biennial time periods—that address particular threats, and each block will represent a discrete program of work. When blocks are established, schedule, budget, and performance goals will be defined for each block. These goals, revised as necessary, will become baselines when MDA can make a firm commitment to Congress because we have a high level of confidence that the baselines can be achieved.

MDA has established schedule, budget, and performance baselines for Blocks 1.0 (Defense of the U.S. from Limited North Korean Long-Range Threats), 2.0 (Defense of Allies and Deployed Forces from Short-to-Medium Range Threats in One Region/Theater), and Block 3.1/3.2 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats). We have established goals, not baselines for Block 3.3 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats—Improved Discrimination and System Track), Block 4.0 (Defense of Allies and Deployed Forces in Europe from Limited Long-Range Threats/Expand Protection of the U.S. Homeland), and Block 5.0 (Expand Defense of Allies and Deployed Forces from Short- to Intermediate-Range Threats in Two Regions/Theaters). In the SOG that accompanied the President's budget for fiscal year 2009, we presented these baselines and goals.

In each subsequent year's SOG, we will explain any significant variances from schedule, budget, and performance baselines and the reasons for redefining block goals. We will also explain changes in year-to-year funding plans for each block over the period of the Future Years Defense Plan. This level of reporting is a significant enhancement to transparency.

MDA has also begun establishing unit cost baseline estimates for BMDS capabilities being acquired and delivered to the warfighter. Our approach is to build these estimates from the level of selected components to be fielded (such as the Terminal High Altitude Area Defense (THAAD) Fire Unit) to the element THAAD level and

eventually to the block level. This latter calculation will be a full block cost baseline estimate. Before establishing cost baseline estimates, MDA will request an independent review by the Cost Analysis Improvement Group, Department of Defense's (DOD) independent cost estimating unit.

Once the estimates are established, MDA will report any significant cost variance to Congress. This information will supplement the reporting of acquisition cost at the BMDS level in the agency's annual Selected Acquisition Report. We are now in the process of determining the thresholds to report such cost variations and will incorporate them in a MDA directive.

While our capabilities-based, spiral development program may not provide the identical kind of information and baselines generated under DOD Instruction 5000 for traditional acquisition programs, our intention is to fully meet the transparency, accountability, and oversight needs of Congress and other stakeholders.

Senator BILL NELSON. Secretary Young, would you help facilitate this to see that these requirements are implemented?

Mr. YOUNG. Absolutely, sir.

Senator BILL NELSON. Okay. Senator Pryor, what I have been doing is deferring to our colleagues and I've let them ask the questions first. So I would turn to you.

Senator PRYOR. Thank you. Has Senator Sessions already asked?

Senator BILL NELSON. He has already, and he is going to jump in whenever he wants to again. [Laughter.]

Senator PRYOR. Okay, thank you. Thank you, Mr. Chairman, and thank you, Senator Sessions, as well. I appreciate your leadership on this.

Lieutenant General Campbell, let me start with you, if I may follow up on a question, a line of questions I heard Senator Nelson asking when I came into the room—I am sorry for being late—about the THAAD system and the SM–3 system. Let us see, the original inventory objective for the THAAD program was 1,250 missiles. Our current inventory objective is less than 10 percent of that. As I understand it, the people who have looked at it said that we need quite a bit more than what we have in our current inventory, at least that is the concern.

Can you explain how force structure and inventory objectives are determined for these near-term theater systems and how the process could be improved to ensure that our military has the capabilities they need to defend against existing threats?

General CAMPBELL. Yes, Senator. Normally, we do studies. We do modeling and analysis in wartime settings by theaters, taking a look at what the threat has in their order of battle, what blue forces have in their order of battle, and we look at all the forces. We look at offensive forces, defensive forces in combination and make a determination then what is required to defend critical assets within that particular theater.

In most cases, we are never going to get to the point where we will have enough missiles to defend against every ballistic missile that an adversary is going to have. So, therefore, we consider in these protocols offensive capabilities that could reduce their effectiveness, other actions, passive defense measures that a COCOM could take—perhaps moving critical facilities off of locations further away from the shores of an adversary.

So then we arrive and have to make determinations on risk. Do we have a low-risk situation, a moderate risk, or a high-risk situation? Can we live with those risks, given the operations we expect

to perform in that particular theater? Then that results in a number that then we will pursue for a particular system.

Senator PRYOR. Let me make sure I understand. The 1,250 original figure, was that just picked out of thin air?

General CAMPBELL. I am not familiar with the analysis that supported the 1,250. I know that was back in the 1990s, that particular study, but I am not familiar with what scenarios they looked at. I am more familiar with what the JCM has looked at. I am familiar with those scenarios, and I understand the numbers and how we arrived at those.

Senator PRYOR. Do you take into consideration what the COCOMs are saying in terms of their needs?

General CAMPBELL. Absolutely.

Senator PRYOR. Secretary Young, let me ask your thoughts on this. Does this process of determining how many, in this case, THAAD missiles—but determining how many missiles we have, can we improve that process? Does your office play a role in coming out with those numbers? Could you tell the subcommittee that, please?

Mr. YOUNG. I think this is a good discussion for this MDEB we talked about. I would tell you that the updated joint capability mix study is a good starting point. As General Campbell rightly pointed out, we may not be able to address every threat. We may not need to because we have other offensive strike capabilities that will hopefully take out some of the threats before they launch.

But I believe we will bring this discussion into a MDEB to have the discussion. The nice thing or the benefits of having an MDA organization is that we will look across the full set of missile defense capabilities and trade THAAD, SM–3, and PAC–3 and do it effectively and get a joint capability instead of single-service capability. But we will be looking at this, and we have a good starting point for the discussion with the new mix study.

Senator PRYOR. Thank you.

General Obering, thank you again for your leadership on this, and it is good to see you again. Let me ask about the Multiple Kill Vehicle (MKV) program. As I understand it, we are trying to develop this MKV program. Could you give us just a quick status report on that?

General OBERING. Yes, sir. As I have stated and testified in the past, today we have the ability to deal with simple countermeasures, and we have flown against those in our flight test program in the past. When we get to very complex countermeasures, that gives us a problem. So that is a limitation of our system. We are addressing that through a number of ways.

One is to be able to do what we call birth-to-death tracking of the target suite. The second thing is to employ more advanced sensors and algorithms, and we have deployed the radars. Now we are going to be equipping those with the algorithms that will allow us to do the discrimination. The third piece of that is being able to equip each interceptor with more than a single kill vehicle so it can take out more than one what we call "credible object."

So we believe that is very important to meeting the intent that we have stated all along. It has actually been part of the criticisms

of missile defense that you can't handle complex countermeasures. This is the way we do that.

We have a plan that we have embarked upon to provide a volume kill or MKV capability to our GMS interceptors, our KEIs as well, along with the sea-based interceptors, the SM–3 Block 2A, because it will be large enough to be able to handle the volume kill capabilities.

Senator PRYOR. What impact does that have on Japan? As I understand it, they were the single kill vehicle?

General OBERING. Well, first of all, we are not walking away from the single kill vehicle. We will have that as a complement, and that is the baseline right now of the co-development with the Japanese. What we wanted to do is have a volume kill capability as a Block B of that and have the SM–3 Block 2A as the unitary kill vehicle and the Block 2B as the MKV.

I have discussed this with our Japanese friends. Initially, the Japanese were reluctant because they did not want to have anything that would perturb the baseline for the unitary kill vehicle. When we had further discussion with them and we assuaged those concerns, they actually sent a letter to me documenting that they were okay with the MKV program, and we think that we are on track with that.

Senator PRYOR. I assume that we are counting on Japan to play a role with our missile defense system? Is that right?

General OBERING. Yes, sir. They are our leading ally right now. With respect to their own investments in missile defense, they are approaching about $1.5 billion a year, as I recall. They are not only procuring capabilities from us, such as the Patriot 3, they are also co-developing their own capabilities like the SM–3 Block 2A I just talked about and expanding their sea-based capabilities and sensor networks as well.

We have a very strong and robust partnership with Japan.

Senator PRYOR. This is my last question, Mr. Chairman. Not to belabor the history on this next question, but I know that in 2002, Secretary Rumsfeld exempted MDA from some requirements that you had. There was a concern that maybe the warfighters were not having their say in the process. So there is a program that you initiated called the Warfighter Involvement Program.

How has that initiative worked? Are you seeing a positive change? Has it been successful?

General OBERING. Yes, sir. I am glad—thank you very much for that question.

There was a misconception when Secretary Rumsfeld exempted us from the operational requirements documents that we were walking away from warfighter requirements, and we never did that. What we were trying to do is actually be able to accelerate to meet the warfighter desires and to be able to adapt to changes in the threat and to changes in those requirements.

The requirements process that he exempted us from was a very tedious and laborious process that was difficult to change. We went to a different model in which we do much more collaboration with the warfighter as we go through defining what the capabilities are that we will be developing and fielding. In fact, the warfighter involvement process that you refer to is where STRATCOM, under

their unified command plan responsibility as the arbitrator, so to speak, and proponent and advocate for missile defense, works very closely with us.

They gather up all of the COCOMs' requirements via their integrated prioritized list, and when it comes to missile defense, they meld that into a listing for us. Then we work with them to tell them what we think is affordable, what we think is doable from a technical perspective, and when we think we could deliver that.

But I would encourage you, also, to ask the Commander of STRATCOM, General Chilton, about that. I think that they are pleased with that process. In fact, the last discussion I had with him, he actually wants to accelerate that even more than we have done in the past with respect to our POM–10.

Senator PRYOR. Thank you, Mr. Chairman.

Senator BILL NELSON. Several of you have mentioned the MDEB. So, Mr. Francis, let me ask you, as a part of the leadership of the GAO, you have been looking at the oversight of this entire defense program for a number of years. What are your views on the MDEB?

Mr. FRANCIS. Well, Mr. Chairman, I think the executive board is more substantive than its predecessor. I think the membership is of a higher level. There are four standing committees, each with designated responsibilities that I think are intended to create a better flow of information across different areas in the Department and different vested interests.

I think the executive board does have a pretty good charter about making recommendations and particularly looking at business cases for making investment. So I think on that score, the executive board is better than the support group that preceded it. I think also that Mr. Young has been pretty active in having fairly regular meetings. I think the old support group kind of fell into disuse, and it wasn't meeting anymore.

I don't think that the executive board does carry the full weight, if you will, of a defense acquisition board (DAB) on other systems, which is set up to inform and help Mr. Young make milestone decisions. Right now, the executive board is not an approval board, it doesn't approve missile defense decisions. So it stops short of that.

I would say there is probably some information, we were talking earlier about cost, and I think that might get resolved. But right now, they wouldn't get the full cost information that a DAB would. To the extent that Dr. McQueary is not able to do a full evaluation of operational effectiveness and suitability, that would be something else that might limit what the executive board could do.

Senator BILL NELSON. All right. I am going to get to Dr. McQueary in a minute.

General Obering, your testimony makes a number of comments about the new block structure. You say, "Once baselines are defined, work cannot be moved from one block to another." Does that mean before the baselines are defined that work can be transferred?

General OBERING. Yes, sir, we were talking in the context of the old 2004, 2006, 2008 block structure, we had the flexibility to move back and forth in terms of the work scope. In terms of the new block structure, our intent is that we will define the fielded base-

lines. We allocate, as I said, the budget to those, and then we execute to those baselines.

Now there always may be fact-of-life changes that we will have to incur. But again, we would report those as part of our reporting process.

Senator BILL NELSON. Last year's National Defense Authorization Act required that you obtain independent cost estimates for the missile defense systems. Will you also seek independent cost estimates on your block cost estimates?

General OBERING. Yes, sir, and by the way, we have been doing independent cost estimates for quite awhile, so there may be some misunderstanding. But we have been doing independent cost estimates, working with the Department in the past, and we intend to do so with the blocks.

Senator BILL NELSON. Mr. Francis, do you have some comments about the issue of baselines and cost estimates?

Mr. FRANCIS. Yes, Mr. Chairman. I think missile defense intends to do a total cost estimate for each of the blocks and to baseline that. So I think one of the advantages of that is they won't keep moving scope in and out of those blocks and across them. That has made it difficult for us in the past to say, "gee, are you getting value for money?"

One of the things, and I think you cleared it up earlier on a question, is the timeline. In other words, when is missile defense going to provide those estimates and those baselines? What criteria will it use to say when something is ready to be baselined, and then how is it going to report variances on, for example, unit costs and what assets?

So I think some of those things are to be determined, and I think that is something that MDA should work out in consultation with Congress.

Senator BILL NELSON. Now to you, Dr. McQueary. The law requires you to report on the operational effectiveness, suitability, and survivability at the end of each 2-year block. Now with the changing of the block structure so that there are no more 2-year blocks, would you be able to provide the report on the characterization of the effectiveness, suitability, and survivability on an annual basis in your required annual report?

Dr. MCQUEARY. That would be the proposal that we would make to you, sir, if that serves your needs.

Senator BILL NELSON. Okay. Your organization produced a report last October outlining the concept for a basic test plan for the proposed European Ground-Based Midcourse Defense (GMD) program, and your plan would permit an initial demonstration of whether that proposed system could accomplish its mission. You note significant differences between the GMD system and that already deployed. Your report says, "Simply testing the new two-stage booster in a flight test is inadequate to assess the operational effectiveness of the European deployment assets."

So do we correctly surmise from your report's recommendation that it represents minimum testing you believe to be necessary to permit the initial level of assessment of the ability of the proposed system to accomplish its goal?

Dr. MCQUEARY. If I could come back to a point that I made last year of the importance of modeling and simulation? One can get by with fewer numbers of actual tests if one has high-fidelity modeling and simulation. General Obering has expended a great deal of effort this past year. There is much more to be done in order to reach a point to where we have fully accredited models and simulation for BMDS.

Now, with that being said, with high-fidelity accredited models in which we have confidence in those models, based upon showing that the models themselves are responsive and duplicate information that we get from actual tests, it is our belief that for the two-stage rocket, the two-stage motor, that have one test at what I will call a taped target, not a live target, and one test that is against an actual target, and the MDA has that currently scheduled in their plans, I believe. It is our belief that we need one more such shot that simulates the actual engagement scenarios that one would see in the European theater in order to gain confidence in the modeling and simulation so that one could then explore the battle space in more detail using the modeling and simulation.

Senator BILL NELSON. So one more would be how many?

Dr. MCQUEARY. That would make a total of three.

Senator BILL NELSON. A total of three.

Dr. MCQUEARY. A total of three in our judgment, yes. These assume successes on each one of those, by the way.

Senator BILL NELSON. I thought there were three initial tests?

Dr. MCQUEARY. I believe that the MDA has two, and we had indicated that we believe we need three, the third one being a test that is in an actual engagement scenario that one would see as in the European theater.

Senator BILL NELSON. Okay, we have a disconnect on that.

Dr. MCQUEARY. Maybe I have caused it.

Senator BILL NELSON. All right. MDA, I am told, was planning to do two. DOT&E says, no, you need to do three.

Dr. MCQUEARY. That is correct.

Senator BILL NELSON. All right.

Dr. MCQUEARY. But to give full credit to MDA, the test plans that they continue to develop evolve with discussions with us over time. So we continue to discuss the issue with them. It is not closed as far as we are concerned.

Senator BILL NELSON. All right. Let us go back to the models and the testing. In your annual report, you said that the system "was hampered by the lack of flight test data and unverified and unvalidated models and simulations." So it seems that that means until these models and simulations are anchored with enough flight tests, verified and validated, that you are not going to be able to have confidence in the operational performance. Is that true?

Dr. MCQUEARY. Yes, sir. That is true.

Senator BILL NELSON. All right. Your report also says, "MDA must accomplish more development, integration, and testing before it adequately matures its models and simulations and collects sufficient data to allow for verification, validation, and accreditation." Continuing, "This critical step is required before quantitative evaluation of performance can occur."

So it says that, "these models and simulations are a long way from being ready for accreditation." That this situation "has severely hampered the efforts to characterize" the performance of the system. So is it likely going to take several more years to get these validated and verified models in place?

Dr. MCQUEARY. Well, I think it will be measured in years. Whether it is several or whether it is a few I am not sure because we don't have a schedule for the complete development yet, and I think that is the important question to be answered. But I think most importantly, the work that MDA did in this past year of looking at the some 33 models that actually represent various elements of MDA and determining whether those models could be accredited or not was a major step forward because one has to know where one is before deciding where they want to go.

So that was done, and there are, I believe, 5 of the 33 that actually received partial accreditation. But that means there are 26 that did not, and many of those models simply do not have sufficient data from actual flight tests in order to be able to help accredit them. Now that is one step. There are a series of steps associated.

There also must be developed what I will call an MDA model that one would use for fully exploring the battle space so you can do what I will call Monte Carlo simulations—these are looking at variabilities and trajectories and so forth—to gain the confidence that this system will work in the battle space in which it is scheduled to be worked. That applies whether we are talking with the U.S.-based system or the European-based system.

Senator BILL NELSON. All right. Now, and your report further goes on to talk about some of the problems that have been encountered with the target missiles for flight tests, and you observe failure rates of 20 percent and cost increases of 450 percent. Do you want to describe some of your concerns?

Dr. MCQUEARY. In the last 18 months, and General Obering touches upon this same subject in his prepared remarks for the record, and I believe he mentions 2 complete failures out of the 42 units. We have looked primarily at the last 18 months because that is more near-term, and out of that we have had two complete failures, and there were two partial failures in systems.

Senator BILL NELSON. Out of how many flights in the last 18 months?

Dr. MCQUEARY. Out of, I believe, 20. I believe the number is 20.

Senator BILL NELSON. So 4 out of 20?

Dr. MCQUEARY. Four out of 20. So you are talking a 20 percent difficulty rate and certainly a 10 percent failure rate and 10 percent more of difficulty with the targets.

The targets of necessity have become more and more complex because, keep in mind, we are trying to simulate what the threat would be. So inherently the targets will become more complex. In fact, they will become more complex over time.

So the flexible target approach that General Obering and his folks have undertaken, I think that is an important step. But nevertheless, targets have been, to a degree, a limiting factor in how fast testing could be done because some tests had to be delayed be-

cause of target failures, for example, and you have to regroup after that.

Senator BILL NELSON. As a matter of fact, you noted that in your report that a number of the important tests had been delayed or eliminated because of the target problems. Well, what about if targets were available, do you think that the Aegis and the THAAD should conduct four tests per year?

Dr. MCQUEARY. I am an advocate of the test-evaluate-fix approach that General Obering and MDA has used, and that has nothing to do with my association with MDA. It has been a view that I have had for a long period of time in my career. I spent a couple of years on Kwajalein a long time ago before many people in the room were born, and——

Senator BILL NELSON. No wonder you look so cool and collected.

Dr. MCQUEARY. We ran 31 missions in a 2-year period of time, and I can tell you, we were having difficulty understanding what the problems were with a given mission before we went on to the next one. So, I am a very strong advocate on complex systems of taking the time to analyze the data that is collected so we can understand because data tells you, gives you information that isn't always apparent at first look.

I think it is very, very important in developing highly complex systems to have good models and simulations to support them and also to take the time to analyze the data that is associated with those very expensive tests that are conducted.

Senator BILL NELSON. Therefore, you are saying then that just as they did previously, you ought to do four tests a year on Aegis and THAAD?

Dr. MCQUEARY. I don't know whether four is the right number or not. I would tie it to the ability to be able to analyze the data and let that be the driving function.

Senator BILL NELSON. What say you, General Obering?

General OBERING. Sir, I think we should test to verify, not test to discover. I believe that you should test based on your objectives and not on a calendar. As Dr. McQueary stated, if we were going to go out and fly five, six, or seven times a year and we are not learning anything different in each flight test, it is a waste of the taxpayers' money, in my mind. These are expensive tests. They can be $80 million or more for some of these tests.

So what we want to do is take complete advantage of the opportunity to test and understand what we learned from the previous test, and by the way, we work this very closely with the testers. We collect just volumes and volumes of data on these tests. We like to go through and understand all of it. Sometimes it takes us months to go through and reduce that data so that we understand where we want to go for the next one.

What we like to do is base our testing on the event structure, not on a particular calendar. Now, for planning purposes, what we stated is that we would like to target anywhere from two to four tests per year depending on the system and the maturity. But again, that depends on what stage we are going into.

As we complete the testing on the Block 1A for the SM–3, for example, we will probably slow that down in anticipation of more Block 1B testing that is, by the way, a major upgrade to that inter-

ceptor, and is much more dramatic than going from a three-stage to a two-stage on the long-range interceptor. So we like to pace our testing based on our development needs, based on the warfighter objectives, and based on the test team objectives.

Senator BILL NELSON. If you had more targets, would you do more tests?

General OBERING. It depends. It all depends. If you are totally success-oriented, yes, sir. If we were continuing to fly and we were successful in reducing the data, I would say that even if we were successful on every test, we would probably not be able to fly more than twice a year for the long-range program because of the complexity of those tests, the data reduction timelines, the target complexities, and the distances, et cetera. We probably could do better on the shorter range because of the simpler approach to that in terms of the rate.

But again, if you have a target failure, as Dr. McQueary referred to, we had one target failure for THAAD. We had a target failure for the long-range system as well in terms of our intercept. We only had two target failures in the last 18 months for our intercept test, but we had to go understand what that failure mode was before we could get back in the air with another target.

So it doesn't do us any good to have two targets sitting in the barn—we go out, try to fly one, and it fails and then pull the other one out—because we need to understand why that first one failed before we can pull the second one out to go fly it.

Senator BILL NELSON. Mr. Francis, in your testimony, you make the point that the original estimate for the ABL was that it would cost $1 billion, and it would take until 2001. Now the program has had a 500 percent cost increase, over $5 billion, and it won't complete its demonstration until 2009.

At the end of that period, we would expect that there would be an attempt to shoot down a boosting short-range missile to demonstrate proof of the ABL system. If that system works, do you believe that the initial shoot-down demonstration will constitute proof that the ABL system will work as operationally effective?

Mr. FRANCIS. Well, Mr. Chairman, I think that the lethality demonstration in 2009 is essential, and it has been kind of a difficult path to get here. But it is, I think, good that we are at this point.

I would say that the lethality demonstration by itself wouldn't be proof that ABL is the system that we are going to go full with to field for the boost-phase system because it is a demonstration, and I think what that means is that if it is successful, it says, gee, we can do this.

Then the next thing you want to do is actual testing. This is a demonstration. Testing tells you how repeatable this is and how reliable. Can we do this consistently? That would give you another data point.

Then you would have to look at and analyze what I would say is the operational practicality, which is if the asset works, can we get it where it needs to be and can we keep it on station so it can do its job? Then I think, finally, you want to say if we can do all of that, can we provide the basing, the maintenance, logistics, the people, and so forth to make that happen?

I think it is a crucial first question here for ABL to answer, but I think there are other things you want to know before you are absolutely certain that it is the right system.

Senator BILL NELSON. So you are saying not only operationally effective, you are saying affordable, suitable, and survivable?

Mr. FRANCIS. Yes, sir.

General OBERING. Sir, may I chime in on that, please?

Senator BILL NELSON. Please.

General OBERING. That is a great example of where the flexibilities and what we are approaching in MDA is offering a different solution for the department. The ABL program was an Air Force program before it was transitioned to the MDA. It was being acquired under the normal rules, the normal approaches. What they had done is they had established a major acquisition program. They had built up the army of people to support that, and they were working on maintainability, supportability, all of the "-ilities" that everybody wants to have, and they had not even achieved first light out of the laser.

We said stop. When we took over the program, we said, stop, that doesn't make any sense. You have to go through and show that you have the knowledge point achieved to take the first flight of the aircraft that has been heavily modified and be able to fire that laser for the first time. Since we did that, and we have seen steady progress by that program going into the lethal shoot-down for next year.

Now I echo what Mr. Francis says. We are not looking just at a technical demonstration. We are looking at the lessons learned in this demonstration and what does it mean for affordability and for operational suitability? We will collect all of this data from the test series that we will initiate here for the lethal shoot-down in 2009 and then make a determination as to what we need to do to the program, not unlike, by the way, what happened on the THAAD program from 2000 until about the 2005 timeframe.

Senator BILL NELSON. Are you satisfied that you haven't sacrificed the development of the kinetic system on the boost phase?

General OBERING. Sacrificed that? No, sir.

Senator BILL NELSON. By pouring the $5 billion into the ABL?

General OBERING. No, sir. I do not. In fact, we are the ones that initiated the KEI program, and I was a great supporter and have been a great supporter of that program over here on the Hill since I have been the director for the past 3½ years.

So, no, sir, we were not sacrificing that. We could not get support from the Hill on the KEI program to get it an adequate start. We now are getting that support, and so I think we do want to have an alternative.

Senator BILL NELSON. Go ahead, Senator Sessions.

Senator SESSIONS. Did I hear you say how much money had been spent on ABL before it was transferred to your direction?

General OBERING. Sir, I would have to go get you the numbers in terms of what that amount was, but we could do that. Especially what the budget estimates were for it back then, et cetera, we can do that.

[The information referred to follows:]

(1) The initial estimate for the Airborne Laser (ABL) was $1.3 billion (Base Year 2008) with lethal demonstration scheduled for September 2002 as disclosed in the ABL Selected Acquisition Report dated 31 December 1996 (RCS DD–A&T (Q&A) 823); (2) The amount of money spent on ABL from fiscal year 1996 through fiscal year 2001 prior to the program being transferred to MDA in fiscal year 2001 was $1.4 billion (Base Year 2008). Current funding for fiscal year 1996–2009 is $5.1 billion (or $5.4 billion Base Year 2008) with lethal demonstration slated for August 2009.

Mr. FRANCIS. I think, Senator Sessions, the original, as I remember the history of the ABL. I think when it was an Air Force program, it was envisioned to be $1 billion and about 5 years, I think, to get to lethal shoot-down. I think right now the estimate is about $5 billion and I think about 13 years, if that is right.

Senator SESSIONS. The $5 billion includes the date for its projected test is when?

General OBERING. 2009, sir.

Mr. FRANCIS. At that time, I recall the Air Force had the ABL program, and they transitioned it into the acquisition process prematurely because they needed to get more money. So they actually got ahead of their own headlights, I would say, there. As General Obering said, they were proceeding with the full-blown program before they had a good understanding of the basic technologies.

Senator BILL NELSON. Mr. Francis, you recommended last year an independent assessment of the ABL program. Do you still believe that would be useful?

Mr. FRANCIS. Yes, I think a separate pair of eyes on—I think boost phase is something that there has been quite a bit of debate on, and it is something I think that we probably know the least about if you look at the full layer of BMDS. So I still think that is a reasonable thing to do.

Senator BILL NELSON. Okay.

Senator SESSIONS. On that, because there are real concerns here, I know that Senator Nelson has done a lot of work on it. Did I understand that this may be the top directed-energy laser program in the DOD? Are there any other programs that are doing study in this area of significance? General Campbell?

General CAMPBELL. Yes, sir. We are doing a study for solid-state lasers not on the same scope of what General Obering is doing. But that is moving along, and we are moving towards a demonstrator over the next about 18 months of a 100-kilowatt class solid-state laser. It may have potential on the counter rockets, artillery, and mortar mission.

Senator SESSIONS. On that subject, it seems to me that we have proven that capability to some degree. Is it something we could consider deploying in areas around the globe where our bases may be subject to rockets or smaller rockets or mortar rounds?

General CAMPBELL. We think it has potential. The problem with some of the past developmental systems, they were chemically-based lasers, and there is a large logistics footprint, and it is very difficult to move it around and very difficult in handling the chemicals.

Senator SESSIONS. Let us talk about that. We have the green zone and places that are pretty stable, going to be there for some time. You don't have to move a system around a lot, would you, even if it is a fairly substantial thing to move?

General CAMPBELL. No, you wouldn't have to move it around a lot, but the effectiveness of that system against the range of threats they face, in my estimation, is not what we need today, sir. Again, it has been very developmental, limited in scope.

Senator SESSIONS. Do you see a need to accelerate that?

General CAMPBELL. In my view, there is merit in this, and I think we should go after it sooner rather than later.

Senator SESSIONS. That is just a sort of a separate issue. But go ahead.

Senator BILL NELSON. On the high-energy laser systems test facility out at White Sands, General Campbell, in your prepared testimony you asked for "continued support to ensure the vital testing ranges are postured to perform necessary testing." Now, does the Army's budget request for 2009 contain sufficient funds to keep this test facility open?

General CAMPBELL. The President's budget for 2009, we can keep the facility open. But what we lose is the contracting base that runs the existing chemical laser at White Sands. We are very much customer dependent on keeping that going.

General Obering is committed to doing testing this year, but when we get into 2009, we will be in the same condition that we are in this year. The budget was approximately $2.8 million, which keeps the Government crew on station, and we can educate some of our Government crews on maintaining the chemical laser in a mothball status. But once we go about 6 months or a year after we have lost the contracting crew, it could take us 2 to 3 years to recover the capability and quite a bit more cost to bring it back if we still needed that facility for testing.

Senator BILL NELSON. But you don't have any customers except MDA, do you?

General CAMPBELL. That is correct. MDA is the only customer at the moment.

Senator BILL NELSON. So your funds in your request are just to keep it open, not to operate it and able to fully support MDA's testing plans?

General CAMPBELL. That is correct. The current level of funding would be able to keep it in a mothballed status over the next few years. But we would not be able to conduct tests on behalf of MDA.

Senator BILL NELSON. All right. I want to ask about the Arrow. Israel is seeking an upper-tier missile defense system against the Iranian Shahab-3 missiles. They are looking at possible nuclear warheads incoming. The United States pays a big share of this. One of the options is considering the development of a new missile defense interceptor, which would also require the development of a new long-range radar.

Now, isn't this getting duplicative of THAAD and SM–3 systems?

General OBERING. Yes, sir. We believe so, and that is why we have been championing having THAAD and SM–3 as solutions to the concern of the Israelis. We have to work through, obviously, the nondisclosure policy committees to make sure—even to release the data on the SM–3 and the THAAD's performances to try to assuage the Israelis' concern. We have been successful, partially, in being able to do that, and we are continuing to work that process.

Senator BILL NELSON. What about a SM–3 launch from a ground-based THAAD launcher?

General OBERING. Yes, sir. One of the options that we also are investigating is taking a look at a land-based version, if you would, of the SM–3 combined with the THAAD radar. It is a very powerful combination, and we think, by the way, not only is it applicable to Israel but also applicable to other areas for our own defense as well as our other allies.

Senator BILL NELSON. So you think that might be the solution?

General OBERING. Well, sir, that is certainly one of the options that we are putting into our analysis of alternatives.

Senator BILL NELSON. How about defending NATO Europe, General Campbell? Could Aegis, BMD, and THAAD have an important role in defending Europe against Iranian threats that exist today?

General CAMPBELL. Yes, sir. They would play a role. In fact, if you look at the planned deployment, there is a requirement for complementary systems to protect the southeastern part of Europe.

Senator BILL NELSON. All right, and that would be true against Iranian missiles before they would get the long-range missiles?

General CAMPBELL. Yes, sir, that is true. They are developing a missile today that can range parts of southeastern Europe.

Senator BILL NELSON. General Obering, one of the success stories is the Aegis BMD system with its SM–3 interceptor. You may not want to recognize it, but it was a collaborative program with the United States Navy. That is a joke. [Laughter.]

General OBERING. I hope so, sir.

Senator BILL NELSON. You have had impressive results. The question is, are we buying enough of the interceptors to continue to develop the system to its full potential? Can you confirm that this system with the SM–3 will have a greater capability when it has the improved software and hardware to allow launching and engaging on remote sensor tracks?

General OBERING. Yes, sir. We are planning that. But if I may, I feel like a proud father because of all of my children. We have had tremendous success with Aegis. We have also had tremendous success with our long-range system, and we have had tremendous success with THAAD. So I am very pleased with that.

We have had our challenges on all of the programs. We have had our challenges on the long-range. We certainly have had our challenges on the Aegis as well. We had issues with the third-stage rocket motor and with the solid divert and attitude control system. But working together as a team, we were able to solve those and move ahead, and I feel very comfortable there.

Same thing with THAAD. We have had issues with THAAD that we had to work through with respect to qualification of components and that type of thing. But our test program that we have had going back to 2001, and certainly since 2005, I think is a tribute to that collaboration across the board.

With respect to the sea-based, as I said in the earlier THAAD discussion, and by the way, I was asked this question several years back by Secretary Rumsfeld about whether we don't need more land-based, silo-based missiles, more than the 54 that we are currently producing? My answer was "no," sir, we don't because that is enough to provide us the persistent 24/7 coverage that we need

for the United States and our allies in the regions, and where we want to go to next is to more mobile capabilities and enhance those capabilities to be able to address the longer-range threats.

So that is why we are moving that way as we move into the future because we have been able to secure the homeland and our allies from the initial long-range. Now let us look at what we can do for the future.

Senator BILL NELSON. The joint capability mix study indicates that you need to buy about twice as many SM–3 missiles as currently planned. Is that going to be necessary to have additional procurement?

General OBERING. Yes, sir. That is our intent, to be able to do that. We would flow that in our POM is what we intend. It would not require any significant capitalization to be able to do that with respect to a production rate.

Senator BILL NELSON. Is the Aegis BMD program and the Navy, is that program funding going to be restored from when they shot down the defense satellite?

General OBERING. Sir, that was MDA money that did that, and we have been working that within the department to be able to recover that cost.

Senator BILL NELSON. What is the cost?

General OBERING. Because we took only one shot, it was roughly about $70 million total.

Senator BILL NELSON. You are going to get that money back from whom?

General OBERING. We are trying to work it through the supplemental process is what I understood. By the way, sir, if I may, while you are on the subject, that was a great lesson in integration that was learned by many, many folks. It is something that we have been preaching for a long time.

Senator BILL NELSON. We certainly compliment you on that.

General OBERING. The ship could not have done that by itself. It had to have off-board information to be able to do that, and it took the whole team to be able to do that. Now that has implications for, as you stated in your question, how we integrate land-based radars with the ships, how we integrate the ships with land-based interceptors. It can tremendously extend your detection and engagement zone, so it is a very, very powerful force multiplier.

Senator BILL NELSON. In your proposed Europe two-stage interceptor, is there going to be any difference between the two-stage booster that you test and the two-stage booster that is proposed to be deployed operationally?

General OBERING. No, sir, not at this time. This is an identical configuration with respect to about 95 percent of that interceptor. We are just removing the third stage. We are doing some modifications to the adaptors, to the software, as you state. So there are minimal changes to that.

In addition, we have other upgrades that we will do across the board to our GMD programs, but they will be factored in as we go. We are always in a state of continuous improvement, if you want to call it that. But right now, the configuration that we plan to fly for the booster verification and the intercept test is the configura-

tion that we would plan to deploy. There may be minor improvements, but that is the plan.

Senator BILL NELSON. You have had some quality problems with the hardware in the Ground-Based Interceptors. What has been done to replace that equipment, retrofit it, and how about the flight software?

General OBERING. First of all, some of the reliability issues that we have had, both from a qualification standpoint on the ground-based—the long-range system, as well as the THAAD system in terms of the qualifications there, we have worked through. We have been able to divert funds to do that. That was more than 2 years ago now, and we are reaping the benefits of those rewards.

We continue to preach that in terms of the next generation of improvements on the long-range system and make sure that we are paying attention to the new configurations and improvements in the kill vehicle, along with the software improvements as well. So I feel that we are on track there.

Senator BILL NELSON. Okay. Do you take the interceptors out of their silos, the ones that are there operationally? Do you use them as flight test vehicles?

General OBERING. The plan is that we take them out and that we do the refurbishment for those. Some of those will be outfitted with a flight termination system so that we can use those in our flight testing. But we like to be able to test the configurations coming off the line as well.

So we do some improvements. For the most part, we can upgrade the software right through the umbilicals in the silo. We remove them for other things, like we have changed the fuel mixture and some other things to improve its performance. Those are the things that require the interceptors to be removed.

Senator BILL NELSON. Senator Sessions.

Senator SESSIONS. You know about Europe and French President Sarkozy on March 21 said this in Cherbourg, France. "In order to preserve our freedom of action, missile defense capabilities against a limited strike could be a useful complement to nuclear deterrence"—I guess that is mutually assured destruction—"without being a substitute for it."

He went on to say, "It is in this spirit that we are taking part in the collective work of the Atlantic alliance. We have solid technical know-how in this area that could be taken advantage of when the time comes."

General Obering, that reflects to me a fundamental support for the concept of a missile defense system in Europe. Would you agree with that?

General OBERING. Yes, sir.

Senator SESSIONS. That is somewhat of a change from what we have seen in the past in France?

General OBERING. Yes, sir, and by the way, that is reflective. Right now, we have about 18 nations around the world that we have some type of activity on missile defense—everything from, as I stated earlier, the Japanese involvement to basic research and development across the board. We are seeing a resurgence of this because nations are recognizing the threat. They are recognizing the urgency of this.

Senator SESSIONS. There is an interesting article on the 25th anniversary of the missile defense program by Mr. Hackett. It fell on Easter Sunday, and he made reference to the fact that this is a lifesaving program. It defends against attack. It doesn't attack somebody else. It defends human beings from dangerous attacks, and hopefully, we can continue to see that improve.

Dr. McQueary, I appreciate your role, it is very important. I respect your ideas about the third test there. I think it is important that we try to accomplish that if we can. But you note in your prepared statement that the hit-to-kill is no longer a technological uncertainty, "It is a reality being successfully demonstrated many times over the past few years," and you note that the GMD, the BMDS, "has a limited capability to defend against simple ballistic missile threats launched from North Korea toward the United States."

So I think that represents your analysis a bit detached from the system that we are onto something that is important here.

Secretary Young, is the DOD committed not only to deploying the system that we have, but making it even more effective against sophisticated countermeasures and other type capabilities we might face in the future.

Mr. YOUNG. Certainly. The budget request seeks to continue that process.

Senator SESSIONS. I will just say this about the funding that we are in. I think Congress has an obligation to review where we spend the money and what lower priorities could be sacrificed in favor of higher priorities. But I really think we ought to support at least the President's fundamental budget because we already see things like THAAD we wish we could do more of. We wish we could do more of some of these other systems that I think we need to do.

Finally, Mr. Chairman, I would note that, at least for this hearing, it may be General Obering's last time before us. I have to say that during your leadership and your predecessor's, we have seen our way through some highly challenging technological problems to a day that when the North Koreans rattle their missiles, we feel confident that we can knock it down, or that we have a satellite that endangers life around the world if not destroyed and we have proven we can knock it out of the sky.

I do believe that enhances our security. I believe it enhances the ability of our President to make good decisions and not have to worry about being intimidated by even a relatively small nation who may have this technology. I think, General Obering, you have testified many times, you are a very good advocate for the program and proven to be a good manager, and I wanted to express my appreciation.

We may well see you before you get away from us in November. I understand that is your expected date to depart.

Senator BILL NELSON. We can always call him back. [Laughter.]

Senator SESSIONS. What if we had a test failure, do you think we might call him back?

General OBERING. I am sure.

Senator SESSIONS. Even if you have left, we may call you back.

Senator BILL NELSON. Or a success.

Senator SESSIONS. Or a success.

Senator BILL NELSON. We might have you, when is the next test?

General OBERING. Sir, we have a series of tests in June with Aegis and THAAD, and then we have a July planned test now for the long-range system, and then we have another one of the long-range system later in the year, as well as THAAD.

Senator BILL NELSON. Well, why don't we have you back in July, after the July test? Of course, what Senator Sessions said speaks for the committee as well in thanking you for your public service.

I am curious in this thought that was brought up early in the hearing. How would the Poles and the Czechs treat it if we deployed the radar, but not the launchers?

General OBERING. Well, sir, first of all, as I said, they are meant to go together. That is meant to provide the coverage that we need for the longer range. It is certainly—the radar provides value. The interceptors have to have the sensors to provide value as well. So we are viewing that as a package, and I think that they probably view that as a package as well.

But the radar, in and of itself, is a tremendous advantage to the shorter- and medium-range defenses.

Senator BILL NELSON. So you don't have a feeling about how each of those countries would feel if there were a decision by the next President just to deploy the radar?

General OBERING. No, sir. You would have to ask them.

Senator BILL NELSON. Okay. Well, we will see you in July then.

General OBERING. Don't feel compelled, sir. [Laughter.]

Senator BILL NELSON. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

CONCURRENT DEVELOPMENT AND FIELDING

1. Senator LEVIN. Secretary Young and Mr. Francis, to meet the President's direction to rapidly field an initial missile defense capability, the Department of Defense (DOD) accepted the increased risk of concurrently developing and fielding systems. Among other things, such concurrency poses the risk of fielding prototype systems that don't work properly, need fixing after they are deployed, and cost additional money. I know you have both given a great deal of serious thought to the issues and risks posed by such a highly concurrent acquisition approach, which is not the Department's normal or desired acquisition approach. Now that we have achieved that initial rapid fielding, do you agree that we should consider reducing the degree of concurrency in the missile defense acquisition program?

Mr. YOUNG. The Ballistic Missile Defense System (BMDS) is an effort to develop and integrate a number of elements produced in relatively small numbers. To date, the Missile Defense Agency (MDA) has used knowledge points composed of ground and flight testing and modeling and simulation to assess the performance and maturity of each element and the system as a whole. As the Director of Operational Test and Evaluation testified, MDA is working to improve the fidelity of the respective models and to benchmark these models against test results. The limited fielding of the BMDS has been largely threat and event driven, with fielding decisions based on available information. You are correct that some of the urgent deployment efforts have resulted in a need to modify some of the fielded systems. I plan to conduct comprehensive evaluations of BMDS Element progress in preparation for procurement actions, and will consider, among other aspects, concurrency implications for future development and fielding.

Mr. FRANCIS. Yes, the amount of concurrent development and fielding of the MDA's BMDS assets should be reduced. In 2002, the President directed DOD to begin fielding an initial missile defense system capable of defending the United States, deployed troops, friends, and allies against ballistic missiles of all ranges in all phases of flight as soon as technically possible. Prior to this directive, MDA had adopted an acquisition strategy that included many of the knowledge-based practices that enable leading commercial developers to field sophisticated products on

time and within budget. However, in order to field an initial capability quickly, MDA accepted the risk of concurrent development and fielding during its initial block of work—Block 2004—and departed from its knowledge-based strategy. If MDA had followed its knowledge-based approach, the Ground-based Midcourse Defense (GMD) program would have moved through a sequence of eight events that included assessing the maturity of critical technologies, designing the element, and demonstrating the stability of the element's design in an end-to-end test using production representative components—all before making a decision to produce and field the element. Instead, the GMD program concurrently matured technology, designed the element, tested the design, and produced and fielded the system, even though the stability of the element's design had not been demonstrated in an end-to-end test and production processes were not mature. Consequently, the program encountered quality control problems and to date, the performance of certain GMD interceptors remain questionable because the program was inattentive to quality assurance.

The Government Accountability Office (GAO) understands that significant risk had to be accepted to satisfy the President's directive to field an initial capability by 2004. However, now that an initial capability has been fielded, MDA should return to an acquisition strategy that achieves a better balance between expediency and risk. Although Block 2004 ended on December 31, 2005 and fielded an initial capability, MDA has continued to concurrently develop and field assets before they were fully tested. MDA's acquisition strategy should provide a means for demonstrating design maturity and operational effectiveness prior to continued manufacturing and fielding of components. If MDA continues to use concurrency as a means to expedite fielding, we believe MDA will continue to experience cost growth and performance shortfalls.

2. Senator LEVIN. Secretary Young and Mr. Francis, what do you believe would be the major benefits of a less concurrent missile defense program?

Mr. YOUNG. Benefits of a less concurrent program include increased performance data prior to fielding, reduced retrofit requirements after fielding, and increased configuration stability between production and deployed interceptors which should reduce missile production and support costs. However, maintaining concurrency allows incremental improvements to be available for implementation into the deployed interceptors. Thus, the challenge for DOD is executing a program with the appropriate balance. I am taking additional steps to ensure that the Department, through the Missile Defense Executive Board (MDEB), maintains the appropriate balance between maturity and production stability, technical risks and cost to decide when to field a BMDS capability.

Mr. FRANCIS. GAO has found that fully developing a component or element and demonstrating its capability prior to production increases the likelihood that the product will perform as intended and minimizes the risk of unexpected cost increases. Over the last several years, GAO has undertaken a body of work that examines weapon acquisition issues from a perspective that draws upon lessons learned from best product development practices. Collectively, these practices comprise a process that is anchored in knowledge. It is a process in which technology development and product development are treated differently and managed separately. The process of developing technology culminates in discovery—the gathering of knowledge—and must, by its nature, allow room for unexpected results and delays. GAO has found that consequences accrue to programs that are still working to mature technologies well into system development when they should be focused on maturing the system design and preparing for production. For example, while undertaking a concurrent approach to developing and fielding BMDS components, MDA experienced cost increases that amounted to $1 billion each for its first and second increments of work. Additionally, its GMD element realized in 2005 that the performance of some of its interceptors could be degraded because the interceptors included potentially unreliable parts as the program encountered quality control problems that stemmed from an acceleration of its acquisition cycle. While MDA has begun the process of retrofitting these interceptors, it is costing the agency more money and time to do so. If a knowledge-based approach had been followed to develop and manufacture these assets, MDA may have fielded more reliable assets as well as reduced performance risks and costs of those interceptors containing questionable parts.

MISSILE DEFENSE EXECUTIVE BOARD

3. Senator LEVIN. Secretary Young, the MDEB was established last year to provide more effective oversight of the missile defense program. This was a much needed step in the right direction. How does the MDEB oversight role of the MDA differ from the oversight role that the Defense Acquisition Board (DAB) provides to other major defense acquisition programs?

Mr. YOUNG. The MDEB was established to recommend and oversee implementation of strategic policies and plans, program priorities, and investment options to protect our Nation and allies from missile attack. The MDEB authorities and responsibilities extend to comprehensive oversight of all of the MDA's activities including those outside the scope of the traditional milestone review process for individual programs (e.g., assessments and potential influence on policy, threat assessments, capability requirements, budget formulation, and fielding options). Within the MDEB forum, I will be able to pursue an agenda that examines these topic areas and any other that will enhance BMDS development and fielding. When compared to a typical program DAB, the MDEB meets more frequently and, under my leadership, will continue to meet six times a year, or more often when necessary, to address appropriate MDA oversight topics. I plan to use the MDEB in a decision-making manner which will be very comparable to the DAB role.

4. Senator LEVIN. Secretary Young, does the MDEB consider, as its charter suggests, how best to field near-term capabilities to meet warfighter needs against existing short- and medium-range threats in a timely, efficient, cost-effective manner?

Mr. YOUNG. Yes, the MDEB's Operational Forces Committee is chaired by the Vice Chairman of the Joint Chiefs of Staff and is composed of other principal members of the Joint Requirements Oversight Council. The MDEB relies on the Operational Forces Committee to review and prioritize BMDS requirements, integrate those current Department priorities, and provide recommendations. The Policy Committee has reviewed possible threat expansion, and will continue to influence Ballistic Missile Defense (BMD) priorities and MDEB deliberations regarding deployment capabilities. In addition, the use of research, development, technology, and evaluation funding allows the flexibility to redirect resources to meet the needs to counter emerging or evolving threats.

5. Senator LEVIN. Secretary Young, has the Board made any recommendations for the missile defense program? If so, what recommendations were made, and have they been approved?

Mr. YOUNG. The MDEB recommendations include the following: the lead Service for the European Midcourse Radar (EMR), expansion of capability analyses for other than primary BMDS threats and specific language for a Guidance memorandum from the Deputy Secretary of Defense for the BMDS Life Cycle Management Process and Business Rules. The lead Service and capability analysis recommendations were approved and have generated work in both areas. The Deputy Secretary of Defense Guidance memo is currently in coordination with a signature anticipated in the near term. These are initial steps for the MDEB. I intend to pursue a more aggressive agenda and role as we move forward and mature the MDEB process.

6. Senator LEVIN. Secretary Young, the MDEB charter says that it will "engage other government agencies," among a host of other institutions, to help "advance our mission successfully." Is Congress one of the government entities with which the MDEB is intended to engage? If so, do you plan to engage Congress on a regular basis?

Mr. YOUNG. I believe the MDEB is a unique opportunity to focus senior Department officials on a national priority, and to positively influence and closely monitor its development and operations. I maintain an inclusive approach to provide all stakeholders a voice in the process, and will engage Congress when appropriate to provide assessments of insight and oversight progress. Congress is a partner in the activities of DOD. I am prepared to work with and engage Congress as requested.

NOT ENOUGH GROUND-BASED MIDCOURSE DEFENSE FLIGHT TESTS

7. Senator LEVIN. Dr. McQueary, your most recent annual report on missile defense says that there have not been enough flight tests of the GMD system, nor validated and verified models and simulations, to characterize its performance. You also said that it is "the least mature" and "least understood" of the deployed missile defense systems, and that it "has undergone less testing in all areas of effectiveness and suitability." For example, your report says that "a characterization of suitability

is not yet possible," and that "more flight tests are required to make this characterization." The same is true for characterizing the survivability of the GMD system. So, is it correct that, based on the limited flight test data so far, and the lack of validated and verified models and simulations, you cannot yet say whether the system is operationally effective, suitable, or survivable?

Dr. MCQUEARY. That is correct.

8. Senator LEVIN. Dr. McQueary, with respect to GMD test adequacy, your report says: "limited flight test data (two intercepts in 4 years), limited operational realism (target scene presentations), and a lack of independent accreditation of models and simulations impaired test adequacy." The report notes that, as a result, "confidence in the system performance predictions based on the models and simulations is low." So is it correct to understand that, especially if there is only one flight test this fiscal year, it will likely be some years before these problems can be resolved and GMD flight testing adequacy will not be impaired?

Dr. MCQUEARY. Yes. The problems can be resolved as soon as the root causes are identified. The details are contained in the classified Part II of our fiscal year 2007 assessment of the BMDS. Unfortunately, one flight test per year will not be adequate to determine operational effectiveness, suitability, and survivability, with confidence, anytime soon. Nor will it be sufficient to assess equipment reliability or show repeatability. A comprehensive ground and flight test program, combined with verified, validated, and accredited models and simulations, are necessary to confidently assess and predict performance.

GROUND-BASED MIDCOURSE DEFENSE SALVO AND MULTI-TARGET TESTS

9. Senator LEVIN. Dr. McQueary, the GMD system is designed to intercept multiple missile targets, and its standard firing doctrine is to shoot two interceptors at each missile target. When I asked General Renuart, the Combatant Commander of Northern Command (NORTHCOM) who is responsible for operating the system, about testing the system in an operationally realistic manner, he agreed that we should conduct salvo test launches and multiple target intercept tests. Given the importance of demonstrating the intended capability of the system so we have confidence that it works, do you agree that it would be important to conduct flight tests of the GMD system using salvo launches of two interceptors, and using multiple targets for intercepts?

Dr. MCQUEARY. I also think the MDA should conduct at least one GMD salvo launch. Yes, ground testing can demonstrate salvo launches and multiple targets. However, there are some things that ground testing cannot demonstrate such as simultaneous communications with two closely spaced interceptors, or the possible detrimental impacts on the sensor of the trailing kill vehicle when the divert and attitude control system (DACS) is firing on the leading kill vehicle. Aegis BMD successfully conducted a salvo engagement during FTM–13, and Terminal High Altitude Area Defense (THAAD) plans a salvo engagement on FTT–10.

OPERATIONAL TESTING STILL DESIRED

10. Senator LEVIN. Dr. McQueary, although missile defense system testing so far has been developmental testing with operational characteristics added, there is no dedicated operational testing planned yet. Operational test and evaluation is the process for learning how a weapon system will actually work in an operational setting. Do you agree that, in addition to the current testing effort, there is still value in operational test and evaluation for missile defense systems, and that such operational testing should take place?

Dr. MCQUEARY. Yes. We learn things about system performance and system limitations during operational testing that we don't normally learn during developmental testing or even during combined developmental/operational testing. The Secretary of Defense, in his January 2002 memorandum on missile defense program direction, recognized this and stated that when a decision is made to transition a block configuration of an element to a Service for procurement and operation, an Operational Test Agent will be designated and an operational test and evaluation will be conducted to characterize the operational effectiveness and suitability of the block configuration of the element. I agree with this policy. However, I believe that for the elements of the BMDS, the scope of the operational test and evaluation required to determine operational effectiveness, suitability, and survivability, could be tailored based on what we previously learned during the combined developmental/operational testing. Verified, validated, and accredited models and simulations

would also play an important role in this evaluation. This approach would provide the best value to the Nation given the expense of testing the BMDS.

OPERATION IRAQI FREEDOM CONSUMES MISSILE DEFENSE CAPABILITIES

11. Senator LEVIN. General Campbell, your prepared testimony says: "Operation Iraqi Freedom (OIF) consumes significant quantities of our key missile defense capabilities, leaving other worldwide commitments under-resourced." What key missile defense capabilities does OIF consume, and what other worldwide commitments are left under-resourced as a result?

General CAMPBELL. U.S. Army Air and Missile Defense forces continue to provide a full range of air and missile defense protection in the U.S. Central Command (CENTCOM) theater of operations. Specifically, key missile defense capabilities provided include:

- Patriot missile defense of critical assets;
- Counter rocket, artillery, and mortar (C–RAM) protection of critical assets. The C–RAM mission includes both sensor and warning and an active intercept capability;
- Air defense and airspace management for maneuver commanders;
- Performance of a detainee operations mission by an air and missile defense battalion.

As with virtually all other mission areas within the Army and the other Services, the operations tempo requirements of OIF have dictated some difficult decisions to ensure adequate air and missile defense capabilities within the CENTCOM Theater. Air and missile defense resources that would normally support other combatant commanders are assigned to the CENTCOM Theater. A good example is European Command (EUCOM). There, the U.S. committed to providing theater missile defense forces, such as Patriot, to NATO's Active Layered Theatre Ballistic Missile Defense Program which is scheduled to be operational in the 2010–2011 timeframe. We will have to find the right balance between CENTCOM's missile defense requirements and our NATO commitment.

12. Senator LEVIN. General Campbell, would it reduce the strain of this situation if we had additional missile defense force structure deployed to address the other worldwide commitments, like additional PAC–3, SM–3, or Theatre High Altitude Area Defense (THAAD) systems?

General CAMPBELL. Yes, it would. There is a growing demand signal from Geographical Combatant Commanders for additional missile defense force structure to meet regional requirements. This has led the Army to fund additional Patriot force structure and led the MDA to address the recent recommendations from the latest iteration of the Joint Capability Mix Study in the upcoming budget submission. MDA plans to seek congressional approval to procure additional SM–3 and THAAD assets.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

OVERSIGHT OF BALLISTIC MISSILE DEFENSE PROGRAMS

13. Senator BILL NELSON. Secretary Young, as the Under Secretary of Defense for Acquisition, Technology, and Logistics (AT&L), you are the senior acquisition official in DOD, with the statutory authority to overrule service acquisition executives. You are expected to provide active, rigorous, and detailed oversight of major DOD acquisition programs, including BMD programs. You are also the Chairman of the MDEB, which has a responsibility for reviewing and making recommendations on the programs of the MDA. Please provide a detailed explanation of the specific steps you are taking and planning to take to exercise your oversight responsibilities of the BMD programs of the MDA.

Mr. YOUNG. I will continue to conduct reviews of the BMDS and its elements to assess program status, and continue the tempo of the MDEB to provide a broader DOD exposure. For development, fielding, and support of BMDS blocks and element assessments, I plan to implement a rigorous baseline agreement with defined cost, schedule, and performance parameters to allow continuous evaluation of program execution. I am evaluating the additional steps to be taken to ensure sufficient Department oversight and influence is exercised. We will derive an early and continued visibility into BMDS and its elements by a broad spectrum of the Department, enabling us to provide the necessary guidance to maintain missile defense priorities within program cost and schedule constraints. In addition, the Director, Operational

Test and Evaluation (DOT&E) and the operational testers are continuously involved with MDA activities and, together, annually report to Congress on the status of BMDS testing.

14. Senator BILL NELSON. Secretary Young, do you believe there are any additional authorities or responsibilities you might need to exercise more effective oversight of the MDA and its programs?

Mr. YOUNG. The Department currently provides oversight of MDA in accordance with the memorandum issued by Secretary Rumsfeld. Within the constraints of this memorandum, I have the authorities assigned to USD(AT&L) to exercise oversight of the MDA, and the BMDS and its elements.

TRANSITION AND TRANSFER OF BALLISTIC MISSILE DEFENSE PROGRAMS

15. Senator BILL NELSON. Secretary Young, the MDA is notionally the developer and initial fielding organization for missile defense systems, with each weapon system expected to be transitioned to one of the military Services at the appropriate time. The Services would be concerned about having to pay for expensive missile defense systems in addition to all their other priorities competing for funding. How and when do you believe missile defense systems should be transitioned to the Services and under what circumstances?

Mr. YOUNG. The DOD criteria for transition are consistent with standard program management guidelines for assessment of element maturity, effectiveness, and supportability. The criteria include the maturity of the element design, the testing completed, the assessment by DOT&E, delivery schedules, funding profile, and planning for operation and support (O&S). Current Department guidance has the Director, MDA recommend an element for transition to the Under Secretary of Defense for Acquisition, Technology, and Logistics, who makes his recommendation to the Deputy Secretary of Defense, who approves the transition.

The MDA and the Services are engaged in near continuous discussions on how and when to transition and transfer missile defense capabilities. The Department is considering a BMD Life Cycle Management Process intended to address these concerns.

16. Senator BILL NELSON. Secretary Young, given the many competing priorities for Service funding, how do you believe these programs should be funded when they are transitioned to the Services?

Mr. YOUNG. The Department is considering a BMD Life Cycle Management process to address this issue.

BASELINES AND COST ESTIMATES FOR BALLISTIC MISSILE DEFENSE BLOCKS

17. Senator BILL NELSON. General Obering, your prepared testimony makes a number of comments about the new block structure that deserve some clarification. For example, you say: "Once baselines are defined, work cannot be moved from one block to another." Does that mean that before baselines are defined, work can be transferred from one block to another? If so, isn't that the problem we were trying to fix?

General OBERING. Congress expects us to be both transparent and accountable. In that spirit, we intend to explain our plans clearly—committing only to a program that we can confidently deliver. Prior to commitment to a baseline, we will establish goals for blocks we would like to baseline in the future. Within the fiscal year 2008 BMDS Block Baselines and Goals (SOG) document submitted to Congress with the fiscal year 2009 President's budget we called these blocks "Capability Goals." These goals are dependent on the successful completion of technology development or the occurrence of some event(s) prior to baseline commitment. It is our expectation that the content for these capability goals can be achieved and will be baselined. However, circumstances may arise, such as change of requirements or nature of the threat that would require us to shift work from one block to another. Once we commit to a baseline, we intend to field that block with the promised schedule, budget, and performance and will not move that work to another block. Before we commit to baselines, we remain open to moving work in or out of a block if there is a good reason for doing so, however, we will always coordinate these changes with the warfighter community and explain the reason to Congress to further the goals of transparency and accountability.

18. Senator BILL NELSON. General Obering, you also say: "When MDA believes a firm commitment can be made to Congress, the Agency will establish schedule, budget, and performance baselines for a block." It is not clear what that means, and why you can't make a commitment to Congress now. Please explain what you mean by this comment.

General OBERING. The quoted statement is a general tenet of our new block structure. We will make a firm commitment when we have a high level of confidence that the baselines can be achieved. Actually, we have established those baselines for Blocks 1.0 (Defense of the U.S. from Limited North Korean Long-Range Threats), 2.0 (Defense of Allies and Deployed Forces from Short-to-Medium Range Threats in One Region/Theater), and 3.1/3.2 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats) and presented them in our fiscal year 2008 BMDS Block Baselines and Goals (SOG) document that accompanied the President's budget for fiscal year 2009. In the spirit of enhancing transparency and accountability, we comit to deliver on established baselines. As presented in the SOG, we established goals (not baselines) for Blocks 3.3 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats—Improved Discrimination and System Track), 4.0 (Defense of Allies and Deployed Forces in Europe from Limited Long-Range Threats/Expand Protection of the U.S. Homeland), and 5.0 (Expand Defense of Allies and Deployed Forces from Short-to-Intermediate Range Threats in Two Regions/Theaters) because we did not believe a firm commitment can be made to Congress at this time. It would not make much sense, for example, to baseline the schedule for Block 4.0 because we are still waiting for host nation agreements to be finalized. It would also not be reasonable to baseline the performance of an interceptor that we have not yet built or tested, such as the SM–3 Block IB interceptors in Block 5.0.

19. Senator BILL NELSON. General Obering, given that, as you acknowledge, Block 1 is nearly complete and Block 2 is well underway, why haven't you already established those baselines for Block 1 and Block 2?

General OBERING. Actually, we have established schedule, budget, and performance baselines for Blocks 1.0 (Defense of the U.S. from Limited North Korean Long-Range Threats) and 2.0 (Defense of Allies and Deployed Forces from Short-to-Medium Range Threats in One Region/Theater), as well as Block 3.1/3.2 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats), and presented them to Congress in our fiscal year 2008 BMDS Block Baselines and Goals (SOG) document that accompanied the President's budget for fiscal year 2009.

20. Senator BILL NELSON. General Obering, are you saying you don't expect to establish baselines until a block is completed?

General OBERING. Not at all. Our fiscal year 2008 BMDS Block Baselines and Goals (SOG) document sent to Congress with the President's budget for fiscal year 2009 was the first under our new block structure. In this SOG, we presented our baselines for Block 1.0 (Defense of the U.S. from Limited North Korean Long-Range Threats), which is still ongoing but expected to be complete in fiscal year 2009, and Blocks 2.0 (Defense of Allies and Deployed Forces from Short-to-Medium Range Threats in One Region/Theater) and 3.1/3.2 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats), which are projected for completion in fiscal year 2011 and fiscal year 2013 respectively.

INDEPENDENT REVIEW TEAMS

21. Senator BILL NELSON. General Obering, I understand you have recently established a number of Independent Review Teams and at least one Mission Readiness Task Force (MRTF), as well as other Readiness Review Teams. Please provide a list of each of the review teams you have established, and explain the specific reasons you established each team.

General OBERING. In March 2005, I established an MRTF under the leadership of RADM Kathleen Paige to focus our efforts on delivering a BMDS that is ready to conduct its mission when called upon. The MRTF was initially focused on the GMD element and its flight test program with the charter to develop and refine disciplined procedures for the flight test readiness review process. Admiral Paige's efforts provided a near-term comprehensive test plan to restore the GM flight test program, and the guiding principles provided by the task force have been applied across the BMDS to ensure our readiness to conduct each system level flight test.

Upon Admiral Paige's retirement from active duty at the end of 2005, I retained Don Mitchell, a key member of the MRTF, to apply mission readiness principles

across all BMDS elements. Mr. Mitchell heads the Independent Readiness Review Teams (IRRT) for GMD, Aegis BMD and THAAD, and is my direct representative to the program directors, providing independent advocacy for mission readiness.

In addition to these element IRRTs, over the past year I convened a review team to assess the test plan for our Space Tracking and Surveillance System (STSS) satellite demonstration effort. After a series of technical challenges in the thermal vacuum testing of the first STSS satellite, I asked for a team of nationally recognized space experts from the National Reconnaissance Office, Defense Advanced Research Project Agency, National Aeronautics and Space Administration, and the Johns Hopkins University Applied Physics Lab to review our program plan and identify any risk areas.

22. Senator BILL NELSON. General Obering, what tasks have you assigned to each of these independent teams, and when do you expect them to report back to you?

General OBERING. The IRRTs are charged with the following:

(1) Working within the element's mission readiness review process to identify risks to mission success and offer advice to mitigate those risks;

(2) Serving as an independent voice to the program directors on any technical issue affecting the conduct of a mission; and

(3) Providing inputs for consideration as part of the program director's decision to proceed with a mission or to provide their own assessment to the Director regarding the element's readiness to proceed. The element IRRTs provide input for executive management reviews conducted before the execution of each mission.

For the STSS independent review, each participating organization was asked to review our satellite demonstration program and then provide technical and programmatic recommendations and space acquisition lessons learned that could be applicable to STSS or future MDA space elements of BMDS. They provided me a final report in March 2008.

23. Senator BILL NELSON. General Obering, what programmatic decisions or changes could result from their work?

General OBERING. The IRRT provides a non-advocate perspective to the mission readiness assessment process and is a valuable tool for assessing and managing risk. This team also provides the Director with deeper insight into the technical issues surrounding a particular mission.

The STSS review team validated the program plan. Their recommendations helped us to improve how we manage risk, and we made adjustments to our test program accordingly.

OPERATIONAL REALISM IN GROUND-BASED MIDCOURSE DEFENSE FLIGHT TESTS

24. Senator BILL NELSON. Dr. McQueary, your February 2008 annual report on missile defense noted that for the GMD flight tests, "warfighters operating from Fort Greely, the primary fire control facility, did not participate in these tests." If warfighters at Fort Greely were to participate in flight tests by launching the interceptors, perhaps while the control facility at Colorado Springs launched the targets, would that add operational realism to the flight tests, and would it provide additional confidence that the system could work as intended?

Dr. MCQUEARY. Yes to both questions. Anytime warfighters operate from their wartime positions, operational realism is enhanced. Fort Greely is the primary fire control node for GMD; the control facility at Shriever Air Force Base (AFB) is the secondary fire control node for GMD. Both locations are designed to fire interceptors from either Fort Greely or Vandenberg AFB. Although launching interceptors from Fort Greely in peacetime is unacceptable for safety reasons, launching them from Vandenberg AFB using the Fort Greely fire control and a formed warfighter crew should be demonstrated at least once in the GMD test program and builds confidence.

25. Senator BILL NELSON. Dr. McQueary, your report also notes that "the addition of limited operational realism to BMDS testing against strategic threats has uncovered unanticipated deficiencies that will require additional development and testing." You also note that the MDA "has not identified their root causes." Can you say how much additional development and testing you believe will be required to resolve these unanticipated deficiencies and will that require identifying their root causes?

Dr. McQueary. Until the MDA identifies the root causes and applies permanent fixes for the deficiencies, we will never have confidence that the mitigation strategies will work in all circumstances and intercept conditions. Once the MDA identifies the root causes and applies permanent fixes, two flight tests should be sufficient to prove the solutions.

COBRA DANE FLIGHT TEST

26. Senator Bill Nelson. Dr. McQueary, the primary sensor for the GMD system that is deployed in Alaska and California is the Cobra Dane radar on Shemya Island, rather than the Beale radar in California. Cobra Dane is the radar that would see a potential North Korean missile launch and provide the data for the GMD interceptors to defeat the missile. However, there has never been an intercept flight test using the Cobra Dane radar, and the one target fly-by of Cobra Dane did not provide a basis for confidence in its performance. If it were possible, and I know it is difficult given the geography, to have an intercept flight test using Cobra Dane as the primary sensor, would a successful test using Cobra Dane increase your confidence in the ability of the system to work as it is actually intended to work?

Dr. McQueary. Certainly a successful intercept flight test using Cobra Dane as the primary sensor would increase our confidence in Cobra Dane performance. My office has been looking at the requirements to conduct this intercept flight test. When we complete our study, we will be glad to share it with you.

27. Senator Bill Nelson. Dr. McQueary, your annual report says that, because there are no validated and accredited models for operational evaluations of Cobra Dane, "this will require the MDA to fly another target through the Cobra Dane field of view." Am I correct that unless there is such a test, your organization will not be able to assess the performance of Cobra Dane? I presume that is why this is one of your recommendations to MDA.

Dr. McQueary. We saw some performance issues from the first flight test that the model did not predict. That is why I support a retest after all the fixes have been made. Following the retest, the MDA should be able to verify and validate the Cobra Dane model which will allow us to more confidently assess Cobra Dane performance. This approach tracks well with General Obering's "test-analyze-fix-test" approach.

28. Senator Bill Nelson. General Obering, since Cobra Dane is the primary sensor for GMD against a potential North Korean long-range missile, will you schedule a target fly-by test as soon as possible to confirm the performance of Cobra Dane and if so, when will that test take place?

General Obering. Yes. MDA is planning flight test opportunities to include both dedicated and non-cooperative targets. A flight test is planned in fiscal year 2012 to test the cumulative Cobra Dane upgrades planned through software build 2.6.6.1. In the interim, we are actively evaluating the incremental software changes made to Cobra Dane subsequent to the September 2005 test using our tactical hardware/software-in-the-loop based ground test program, targets of opportunity from foreign launches, and satellites tracks.

MDA PROJECT FTX FLIGHT TESTS FISCAL YEAR 2010–2012

Draft: March 14, 2008

	FTX–07 Fiscal Year 2010	FTX–08 Fiscal Year 2011	FTX–09 Fiscal Year 2012
Primary ... Objectives	Within a BMDS framework, demonstrate SCN–06–0027 end-to-end simulated engagement of a complex target launched from KLC with AN/TPY–2 (FB) and AN/SPY–1 (if available) providing initial track and SBX serving as the commit sensor using a simulated GBI launched from Vandenberg Air Force Base and perform all functions to intercept the lethal object from a complex target scene.	Within a BMDS framework, conduct a tracking exercise (with potential simulated engagements) of a medium range ballistic target as risk reduction for follow-on theater campaign events.	Within a BMDS framework, Cobra Dane characterization of software build 2.6.6.1 (Requested by DOT&E).

MDA PROJECT FTX FLIGHT TESTS FISCAL YEAR 2010–2012—Continued

Draft: March 14, 2008

	FTX–07 Fiscal Year 2010	FTX–08 Fiscal Year 2011	FTX–09 Fiscal Year 2012
Sensors ...	SBX, TPY–2 (FB), Aegis BMD with BSP and sidecar, Beale UEWR.	THAAD, Aegis BMD, Patriot/MEADS, Japanese Participation.	Cobra Dane, Aegis BMD, SBX.

29. Senator BILL NELSON. General Obering, will you also work with the DOT&E to determine a means by which to conduct an intercept flight test using Cobra Dane as the primary sensor, in which it provides the data to develop the Weapon Task Plan?

General OBERING. Yes, I will continue to work with the DOT&E to explore options to conduct an intercept flight test using Cobra Dane as the primary sensor. However, due to the alignment of the Cobra Dane, a representative target with representative track times would need to be launched from within the Russian Flight Information Region to support this type of test.

TERMINAL HIGH ALTITUDE AREA DEFENSE DELAYS

30. Senator BILL NELSON. General Obering, during the hearing, you stated that you decided to delay the THAAD interceptor delivery due to cost overruns. Please detail and explain what the causes were of the overruns for the THAAD program, detailing each item with its cost.

General OBERING. Let me provide a clarification. The delay to THAAD interceptor deliveries was driven by both cost overrun and cost growth for the program. The detailed items that had to be mitigated and contributed to the fiscal year 2008/2009 shortfalls with their associated funding across those 2 years were as follows:

- $31.4 million - The Development contract's final increment of the 5 percent cost overrun
- $94.0 million - Critical contract changes necessary to prepare for Fire Unit Fielding (e.g., Fire Control obsolescence and redesign for the 5-ton truck)
- $92.8 million - Insensitive Munitions/Final Hazard Classification requirements impact
- $82.5 million - The impact of target availability slips to flight tests
- $21.5 million - Risk reduction and flight test analysis additions
- $13.9 million - THAAD's participation in Juniper Cobra 09

31. Senator BILL NELSON. General Obering, is it correct that there were additional requirements imposed on the THAAD program by the Army, for an insensitive munitions capability, and for using a 5-ton truck instead of a Humvee for the THAAD Fire Control Station? If so, why did you not use your extraordinary acquisition flexibility before the budget request was submitted to provide the funds from lower priorities outside of THAAD to meet those new requirements, without delaying the THAAD interceptor production by a year?

General OBERING. Yes, additional requirements for Insensitive Munitions/Final Hazard Classification compliance and weight limitations in up-armoring the Humvee-based THAAD Fire Control requiring transition to a 5-ton truck both contributed to the need for additional funding for the THAAD program. While 75 percent of our budget is dedicated to near-term fielding capabilities such as THAAD, resource decisions between programs must be based on priorities across the Agency. In the case of THAAD, we have made additional internal realignments which have restored THAAD interceptor production and precluded the 1-year slip.

32. Senator BILL NELSON. General Obering, at the hearing you created some confusion about the fact that your fiscal year 2009 budget request would delay the delivery of THAAD Fire Units 3 and 4 by a year, since you suggested that you had been working since November to address this problem. Do you acknowledge the fact that your budget justification documents for fiscal year 2009, delivered to Congress in February 2008, state that the timeframe for contract award for THAAD Fire Units 3 and 4 fielding is planned for the first quarter of fiscal year 2010, and had "slipped 1 year due to fiscal year 2008/2009 funding shortfall" and also state that the timeframe for delivery of Fire Unit 3 is planned for the period from the fourth

quarter of fiscal year 2012 to the fourth quarter of 2013, and had "slipped five quarters due to fiscal year 2008/2009 funding shortfalls"?

General OBERING. Yes, the February 2008 budget justification documents for fiscal year 2009 state contract award for THAAD Fire Units 3 and 4 fielding had slipped 1 year due to the program's fiscal year 2008/2009 funding shortfall and delivery of Fire Unit 3 was slipped from the fourth quarter of fiscal year 2012 to the fourth quarter of 2013. Subsequent to the House and Senate Authorization Staffer Day briefing, the Agency made additional internal realignments which have restored the $65 million in fiscal year 2009 to enable award of the THAAD Fire Units 3 and 4 long lead contract as originally planned and restored delivery of Fire Unit 3 back to the fourth quarter fiscal year 2012.

33. Senator BILL NELSON. General Obering, the MDA previously removed three flight tests from the THAAD flight test program, thus increasing risk in the program. It appears that four of the remaining flight tests will now be delayed because you will not have targets delivered on time for the tests. What were the original schedules for THAAD Flight Tests 11–14, and what is their current schedule? Please detail the reasons for the schedule delay in Flight Tests 11–14, and whether additional funding would have prevented the delays.

General OBERING.

- Provide the original and current flight test schedule: The original and current schedule for Flight Tests 11–14 are shown below. The reason for the revised dates for all four tests was target availability.

Flight Test	Original Schedule	Current Schedule	Impact
FTT–11	19 Dec. 08	22 Jun 09	Slipped 6 months
FTT–12	17 Feb. 09	14 Sep 09	Slipped 7 months
FTT–13	23 Jun 09	Feb 09	Slipped 9 months
FTT–14	1 Dec 09	Jun 09	Slipped 7 months

- Would additional funding have prevented the flight test delays? From a THAAD organizational perspective, additional funding would not have had an impact on the flight test delays as the THAAD program was resourced to execute these tests on the original schedule. From a Targets organizational perspective, for FTT–11 and –12b, target availability was not influenced by insufficient funding. The primary schedule driver for FTT–11 and –12b was the significant disconnect between what the Government expected to see in the offerer's proposal and what the contractor proposed for the MBRV–1 re-entry vehicle work. Issues were associated with resolving technical disconnects. The proposal value was far higher than anticipated and technical changes were incorporated during the process. The FTT–13 and FTT–14 target availability delays were influenced by a technical review of all BMDS target requirements and balancing of available hardware resources across all test events.

JOINT CAPABILITIES MIX STUDY II

34. Senator BILL NELSON. General Campbell, last year you told us that the Joint Capabilities Mix Study had indicated that we would need to buy about twice as many Standard Missile-3 (SM–3) and THAAD interceptors as we are currently planning. That would mean buying about 200 THAAD interceptors instead of 96, and about 300 SM–3 interceptors instead of 147. Does the newest version of the Joint Capabilities Mix Study support that same conclusion, or suggest that we might need even more?

General CAMPBELL. The most recent iteration of the Joint Capability Mix (JCM) Study supported the previous study findings for the minimum quantities of SM–3 and THAAD interceptors for combat operations in two near simultaneous conventional campaigns in the 2015 timeframe.

35. Senator BILL NELSON. General Campbell, am I correct in understanding that the studies are looking at the minimum quantity of upper tier interceptors required for combat operations? In other words, this is not the maximum, but the minimum we would need?

General CAMPBELL. That is correct. Both former as well as the current iteration of the JCM Studies make a recommendation for the minimum number of intercep-

tors required for 2015 combat operations in two near simultaneous conventional campaigns.

36. Senator BILL NELSON. General Campbell, what role will this study have in helping to determine force structure and inventory levels for THAAD and SM–3?

General CAMPBELL. This study is the starting point in addressing warfighters' BMD interceptor requirements and serves as an input into the Department's calculus in developing future force structures. The Vice Chairman signed the Joint Requirements Oversight Council Memorandum endorsing the study and further directs the Office of the Secretary of Defense, the MDA, and the Services to develop plans for addressing inventory recommendations.

GLOBAL CONCEPT OF OPERATIONS

37. Senator BILL NELSON. General Campbell, I understand you are working on a global concept of operations (CONOPs) for the BMDS that is intended to clarify the roles and responsibilities of the regional combatant commanders for missile defense. Can you tell me when that effort will be done, and whether the Commander of EUCOM will have a command and control responsibility for defending his Area of Responsibility (AOR) against missile attacks, including with the proposed GMD system in Europe?

General CAMPBELL. We are currently coordinating with the Joint Staff and Geographic Combatant Commanders to develop and clarify the missile defense roles of Regional Combatant Commanders. We expect to finalize a global CONOPs by midsummer of this year.

The Commander of EUCOM will always have an inherent responsibility with commensurate authority to defend his AOR per the Unified Command Plan and will utilize the resources in his AOR to include the proposed resident strategic European missile defense capabilities. Because the proposed European missile defense system would also have the capability to defend against trans-regional capabilities that threaten other AORs, the global CONOPs is being written to address both regional and trans-regional command and control issues. This will ensure we optimize the overall BMDS. The U.S. Strategic Command (STRATCOM) has the overall responsibility to synchronize combatant commander missile defense plans into a global defense design by mitigating operational seams and vulnerabilities.

PRODUCTION RATE

38. Senator BILL NELSON. Secretary Young, General Obering, and Mr. Francis, the THAAD program is currently planning to build interceptors at a rate of two per month. The THAAD production facility is already capable of producing three per month. The contractor estimates that producing three interceptors per month could save more than $1 million per missile and result in earlier fielding. Would you agree that two per month is a less efficient and less economical production rate than three per month, and that a higher production rate would allow for unit cost savings?

Mr. YOUNG. Yes, there are efficiencies that result in a reduction of total contract cost and interceptor unit cost by increasing the production rate from two to three interceptors per month. These savings would be realized through the shorter period of performance for production deliveries and cost efficiencies realized by the higher production rate.

General OBERING. Yes, there are efficiencies that result in a reduction of total contract cost and interceptor unit cost by increasing production rate from two interceptors a month to three per month. The savings would be realized by a shorter period of performance for production deliveries and cost efficiencies realized by the higher production rate.

Mr. FRANCIS. I agree that producing three THAAD missiles per month is more efficient and more economical than producing two per month as the Government can reduce its costs on subcomponent buys. Moreover, with a potential requirement to produce additional missiles for Foreign Military Sales, it may become imperative for the program to increase its production rate from two to three per month. However, it should be noted that until the program has proven the performance of its missiles through testing, increased production rates may lead to costly retrofits if the remaining testing reveals any significant problems. Currently, the production rate of two per month is sufficient to support the program's ground and flight test schedule.

The THAAD program is planning to deliver 98 interceptors to accompany 4 fire units. The program may also award a foreign military sales contract for 3 additional fire units including 144 interceptors in the future. The delivery of 98 THAAD inter-

ceptors is paced based on need dates for flight and ground testing. The additional interceptor quantities would require an increase in interceptor production rate to accommodate FMS production concurrent with Fire Units 3 and 4. For the remainder of development testing, production is scheduled at the rate of two to three interceptors per quarter. However, the current production capacity for fire unit interceptor deliveries at Troy, AL, is three interceptors per month based on a single shift operation. According to THAAD officials, the interceptor production facility in Alabama has recently incorporated lean manufacturing principles and other improvement processes that will allow the production facility to increase to three interceptors per month. Additionally, the contractor estimates that producing three interceptors per month could result in a cost savings of $1 million per missile and accelerate fielding. Based on the increased production rate, resulting efficiencies and additional units over which to spread fixed costs, it is estimated the interceptor average unit cost for Fire Units 3 and 4 would be reduced from $9.8 million to $9.0 million for Fire Unit 3 and from $9.5 million to $8.1 million for Fire Unit 4. The savings incurred based on increasing the production rate to at least three per month could provide a significant savings to the MDA and may provide for fielding assets in an accelerated timeframe. However, until testing of the missile and its components are complete, increasing the production of these interceptors increases the potential for costly rework if it is discovered that the missiles do not perform as intended.

39. Senator BILL NELSON. Secretary Young, does DOD have the policy of trying to achieve the most economical and efficient acquisition of weapon systems?

Mr. YOUNG. The DOD constantly strives to provide the most effective weapons systems to the warfighter at the most economical and efficient acquisition means possible. To influence BMDS execution, I plan to implement a rigorous baseline agreement with defined cost, schedule, and performance parameters, and increase Department involvement, to allow continuous evaluation of acquisition and performance metrics. I have issued multiple weekly AT&L notes which call on all members of the acquisition enterprise, including MDA, to focus on lowering cost, executing within budget, trading requirements which drive cost and schedule, and ensuring budgets match plans, and advocating economic order quantity purchases. It is DOD policy to seek the most economical and efficient acquisition approach to weapon systems.

QUESTIONS SUBMITTED BY SENATOR JACK REED

IMPROVED OVERSIGHT AND ACCOUNTABILITY

40. Senator REED. Secretary Young, in a significant departure from longstanding practice, DOD granted MDA exceptional flexibility and authority in its concurrent development and rapid fielding of an initial set of limited missile defense capabilities. According to the GAO, this "unprecedented funding and decisionmaking authority" has "made MDA less accountable and transparent in its decisions than other major programs, making oversight more challenging." Now that the initial fielding of the limited missile defense capabilities has been accomplished, what steps will you take to increase and improve accountability and oversight of MDA and its programs

Mr. YOUNG. I conduct reviews of the BMDS and its elements to assess program status, and continue the tempo of the MDEB to provide broader Department exposure. For development, fielding, and support of BMDS blocks and element assessments, I plan to implement a rigorous baseline agreement with defined cost, schedule, and performance parameters to allow continuous evaluation of execution. We will derive an early and continued visibility into BMDS and its elements by a broad spectrum of the Department, enabling us to provide the necessary guidance to maintain missile defense priorities within cost and schedule constraints. In addition, the DOT&E and the operational testers are continuously involved with MDA activities and, together, annually report to Congress on the status of BMDS testing.

SLOW PACE OF TESTS

41. Senator REED. Dr. McQueary, your most recent annual report on missile defense concludes that there have not been enough flight tests of the GMD system to characterize the capability of the system or validate and verify models and simulations. Although the GMD program has planned to conduct two flight tests per year, because of various problems it conducted only one successful flight test last year, and will conduct only one flight test during this fiscal year. If the GMD program

conducts only one flight test per year, doesn't that mean it would take even longer than expected to produce sufficient flight test data to gain confidence in the system's capability, and to determine if the system is effective, suitable, and survivable?

Dr. MCQUEARY. Yes. Unfortunately, we cannot explore a lot of the mission battlespace with only two flight tests. Nor can we access equipment reliability or show repeatability. The key is to employ an evaluation-based test strategy that gathers the maximum amount of relevant data during each flight test event to not only document performance but also to validate the models for simulations. General Obering's "test-analyze-fix-test" approach is the right way to do developmental testing. Each ground and flight test generates a significant volume of data that must be analyzed before the next test can be accomplished. If this important step is not accomplished, there is a significant risk that the next test will fail wasting time and resources. Two flight tests per year for GMD is about right. Unfortunately, circumstances have reduced GMD testing to only two completed intercept tests in the last 2 years.

GROWING DEMANDS FOR ADDITIONAL CAPABILITY

42. Senator REED. General Campbell, your prepared testimony mentions the "growing demands of the combatant commanders to provide global air and missile defense against the entire threat set." Are the combatant commanders (COCOMs) asking for, or interested in, additional PAC–3, SM–3, or THAAD force structure or inventory?

General CAMPBELL. Yes, the COCOMs have asked for greater quantity and earlier availability of missile defense forces. We are continuing to refine the force structure requirements through additional analysis and inform the MDA of future COCOM capability needs through the U.S. STRATCOM led Warfighter Involvement Process, the Joint Requirement Oversight Council process, and the MDEB.

PROGRAM ELEMENT REBASELININGS

43. Senator REED. General Obering, how many times have each of the following elements been rebaselined or replanned: GMD, THAAD, airborne laser (ABL), Aegis BMD, multiple kill vehicle (MKV), kinetic energy interceptor (KEI), STSS, command, control, battle management, and communications (C2BMC), and sensors?

General OBERING.

GMD - 5,
THAAD - 4,
ABL - 5,
Aegis BMD - 1,
MKV - 0,
KEI - 2,
STSS - 0,
C2BMC - 2,
Sensors - 0.

44. Senator REED. General Obering, what were the cumulative cost and schedule variances at the time of the rebaselinings or replans?

General OBERING.

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GMD		Type of action	CV	SV	Comments
	Feb-02	Rebaseline	-11	-108	All GMD replans/rebaselines due to changes in Program Direction or funding.
	Jan-04	Replan	-171	-146	
	Aug-06	Replan	-1051	-240	
	Apr-07	Replan	-1132	-125	
	Dec-07	Replan	-1067	-116	

THAAD		Type of action	CV	SV	Comments
	Jan-02	Replan	21	14	THAAD has never rebaselined the contract nor reset cost and schedule variance performance data.
	Feb-03	Replan	18	20	
	Nov-04	Replan	6	9	
	Feb-07	Replan	-154	-28	

ABL		Type of action	CV	SV	Comments
	Oct-01	Rebaseline	-102	-27	
	Aug-02	Rebaseline	-22	-19	
	Oct-03	Rebaseline	-247	-40	
	Aug-04	Rebaseline	-115	-48	Program restructure
	May-07	Rebaseline	-47	-30	Partial rebaseline on Air Vehicle Integration and Test (AVIT) Only

Aegis BMD		Type of action	CV	SV	Comments
	Mar-06	Rebaseline	-28	-498	In Jan 06, Aegis BMD took a $100M execution year budget mark causing a major program replan. Due to period of performance extension and significant scope changes to the Lockheed Martin Aegis BMD Block 04 development effort, a rebaseline was authorized.

KV		Type of action	CV	SV	Comments
		N/A	N/A	N/A	The Agency will initiate a BMDS level baseline for MKV at Payload System Requirements Review (SRR) scheduled to occur in Spring 2009

KEI		Type of action	CV	SV	Comments
	Jan-05	Rebaseline	-8	-28	
	Nov-06	Rebaseline	2	-4	

STSS		Type of action	CV	SV	Comments
		N/A	N/A	N/A	STSS has not rebaselined or adjusted variances due to replan

C2BMC		Type of action	CV	SV	Comments
	Jan-05	Replan	-3	-11	Both replans driven by funding reductions.
	Feb-06	Replan	-23	0	

Sensors		Type of action	CV	SV	Comments
		N/A	N/A	N/A	

AIRBORNE LASER PROGRAM ESTIMATES

45. Senator REED. General Obering, what were the planned date of the lethality demonstration and the estimated cost of the ABL program through lethality demonstration when MDA assumed management of the program?

General OBERING. MDA assumed management of ABL in 2002. In the Selected Acquisition Report (SAR) dated 31 December 2001 (RCS: DD—A&T (Q&A) 823), the Approved Acquisition Program Baseline had lethal demonstration in September 2003 with a cost of $3.02 billion (Base Year 2008 dollars). The current ABL program estimate achieves lethal demonstration in fourth quarter fiscal year 2009 with a cost of $5.4 billion (Base Year 2008 dollars).

46. Senator REED. General Obering, what is the current estimated cost through the lethality demonstration?

General OBERING. The total cost for ABL to complete lethal demonstration, encompasses 13 years, fiscal years 1996–2009. This cost is $5.4 billion (Base Year 2008 dollars) and $5.1 billion (Then Year dollars).

NEW BLOCK STRUCTURE WORKSHARE

47. Senator REED. General Obering, you stated in your testimony that work for a particular block will only benefit that block. Yet in the GMD element, money is being requested in Block 3.0 for the purchase of two-stage test interceptors to be utilized for Block 4.0. Please reconcile the discrepancy.

General OBERING. While the two-stage is being developed specifically for the European Interceptor Site (EIS), the two-Stage variant of the GBI provides additional capabilities and engagement options whether fielded at Fort Greely, AK; Vanden-

berg AFB, CA; or in Europe. The GBI two-stage variant development program is considered a core capability enhancement to the GMD system, and was therefore budgeted in Block 3. The fielding of the two-stage interceptor is planned for Europe; European fielding activities are budgeted as part of Block 4.

NEW BLOCK STRUCTURE BASELINES AND ESTIMATES

48. Senator REED. General Obering, MDA plans to estimate total costs for each block and then baseline those costs for the purposes of reporting variances to Congress. What is the timetable for estimating total costs and baselining them for each block?

General OBERING. We are currently working on cost estimates for Blocks 2.0 (Defense of Allies and Deployed Forces from Short-to-Medium Range Threats in One Region/Theater) through 5.0 (Expand Defense of Allies and Deployed Forces from Short-to-Intermediate Range Threats in Two Regions/Theaters) and plan on completing these estimates by this summer. We have also asked the Cost Analysis Improvement Group (CAIG) to conduct independent cost estimates. Based on these estimates, we intend to submit the cost baselines for Blocks 2.0 and 3.1/3.2 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats) with the fiscal year 2009 BMDS Block Baselines and Goals (SOG) with the President's budget for fiscal year 2010. When we have sufficient confidence that the cost baselines are achievable for Blocks 3.3 (Expand Defense of the U.S. to Include Limited Iranian Long-Range Threats—Improved Discrimination and System Track), 4.0 (Defense of Allies and Deployed Forces in Europe from Limited Long-Range Threats/Expand Protection of the U.S. Homeland), and 5.0, we will submit them in subsequent SOGs.

49. Senator REED. General Obering, what criteria will MDA use other than the qualitative criteria associated with sufficient knowledge levels and urgency of threat? For example, will there be a dollar or time threshold for a block that cannot be exceeded before it is baselined?

General OBERING. While we do not have a dollar or time threshold in mind, we understand the importance of establishing baselines sooner rather than later for purposes of accountability and transparency. Our established process is to initiate the block and then to define baselines for it. A new block will be initiated when a significant new capability against particular threats is expected to be fielded based on a consideration of technological maturity, affordability, and need. Technology maturity and successful achievement of knowledge points will be a critical factor in the decision to establish a new block. We will define baselines (schedule, budget, and performance) for block when we can make a firm commitment to Congress based on a high level of confidence that the baselines can be achieved.

50. Senator REED. General Obering, what units will be identified for unit cost tracking, and what criteria will be used to select these units?

General OBERING. We are still developing our procedures for establishing and reporting unit cost estimates. In general, our approach will be to establish unit costs for all equipment being fielded in the following categories: interceptors and weapons; sensors; command and control sites, nodes, and equipment sets; and launch systems. We are still developing these estimates and intend to submit them with our fiscal year 2009 BMDS Block Baselines and Goals (SOG) with the President's budget for fiscal year 2010.

51. Senator REED. General Obering, what criteria will be used to define significant variances and report them to Congress?

General OBERING. We are still refining the specific criteria that will be used to define significant variances; and we intend to define and report on them in our fiscal year 2009 BMDS Block Baselines and Goals (SOG) with the President's budget for fiscal year 2010.

52. Senator REED. General Obering, will you work with Congress to determine the appropriate thresholds for variances?

General OBERING. Yes. In order to achieve the goals of accountability and transparency, we are now determining the appropriate thresholds for reporting variances. We are committed to working with Congress in this regard.

PUBLIC REPORTING OF BLOCK VARIANCES

53. Senator REED. General Obering, at the hearing, you agreed to publicly report cost and schedule variances, and performance variances within the limitations of protecting classified information. What form will this public reporting of variances take?

General OBERING. Our reporting of variances to Congress will be presented in our annual BMDS Block Baselines and Goals (SOG) document and annual BMDS SAR. The former must accompany the President's budget submission and the latter must follow within 60 days of that submission. Schedule and cost data are typically unclassified while performance data are typically classified. To meet the needs of Congress, we expect to continue the practice of issuing both a classified and unclassified version of the SOG, and an unclassified SAR with a classified annex that includes the performance information.

COST ESTIMATES FOR BLOCKS

54. Senator REED. General Obering, you have indicated that MDA plans to establish cost estimates for each of the blocks in the new block structure. What costs will be included in the total costs for each block? For example, will the total costs include both acquisition costs and O&S costs? If O&S costs are included, will they be part of the baseline?

General OBERING. As described in our President's budget for fiscal year 2009 and budget overview and our fiscal year 2008 BMDS Block Baselines and Goals (SOG), each block includes the fielding and development funding associated with the specific capability that the block delivers. Also, O&S costs are not included in block baselines, but are tracked separately.

55. Senator REED. General Obering, if O&S costs are included as part of the baseline, would MDA consider decisions that would change the estimates for acquisition and O&S costs, but not the total life cycle cost, to be nonreportable variances? For example, if the acquisition costs for a block increased but were offset by an O&S decrease, holding total life cycle costs constant, would this be considered a reportable variance?

General OBERING. Since O&S costs are not part of the baseline, changes in those costs will not be reported as variances. This particular example, however, would be a reportable variance, because a change in the fielding and development costs for a baselined block would be a reportable variance. Such variances will be reported annually in the BMDS Block Baselines and Goals (SOG) and the BMDS SAR.

56. Senator REED. General Obering, if O&S costs are included as part of the baseline, how will acquisition costs be tracked and reported, in order to ensure accountability and transparency of variances in acquisition costs?

General OBERING. O&S costs are not included as part of block baselines. Baseline costs include fielding and development costs. We will report variances to Congress in our annual BMDS Block Baselines and Goals (SOG) document and annual BMDS SAR.

57. Senator REED. General Obering, regarding acquisition costs alone, if a change in the mix of assets occurs, for example, more THAAD missiles are bought and fewer C2BMC planners are bought—again, without changing the total cost of the block—would that be a reportable variance?

General OBERING. We intend to report variances in schedule, budget, and performance from block baselines to Congress. In this example, the addition of THAAD missiles or subtraction of C2BMC planners would impact scheduled deliveries and performance and would therefore be reported as variances, even if total block costs remained the same.

58. Senator REED. General Obering, given that capability development items will make up about half of MDA's budget by the end of the current 6-year program plan, how will MDA track actual execution of not only technical progress, but progress against the cost and schedules envisioned for these items?

General OBERING. While our President's budget submission for fiscal year 2009 shows that capability development is more than 50 percent of MDA's budget toward the end of the 6-year program planning period, we expect that percentage to decrease over time because, within the next few years, some BMDS element technology programs will progress to the point where they can be incorporated within new blocks. Under our new block structure, a new block will be initiated when a

significant new capability against particular threats is expected to be fielded based on a consideration of technological maturity, affordability, and need.

As for tracking actual execution of technological progress, we follow a knowledge-based approach. We use standards—called knowledge points—to assess the progress of our BMDS element technology programs. These knowledge points address both technical maturity and affordability issues. We also pay close attention to technology readiness levels and engineering and manufacturing readiness levels to assess progress. Further, we use earned value management systems to track cost and schedule performance against planned work. However, we continually seek better engineering and business practices and will continue to investigate other means for assessing technology maturity.

COST ACCOUNTING FOR DEFERRED TESTS

59. Senator REED. General Obering, in the normal course of BMD development programs, changes have occurred in the test schedules for individual elements. It is difficult, however, to determine how budgeted funds are accounted for when tests are deferred, combined, or dropped. When a test is planned and funded for one fiscal year and then is deferred to a future fiscal year, how are costs accounted for?

General OBERING. The MDA accounts for funds budgeted for tests using traditional Work Breakdown Structure. Funding for system level tests and element specific tests is delineated within the BMDS Block or Mission Area Investment (MAI) level with each Program Element (PE). This Block or MAI level correlates directly to the budget projects (e.g., AX08, YX04, EX09) outlined in the MDA fiscal year 2009 President's budget (PB09) submission. Test funding is directly related within these budget projects, and by correlation each BMDS Block or MAI. An example of this would be the R2a accomplishment entitled "Element Test and Evaluation" on page 232 of the MDA PB09 submission.

As the BMDS test program changes (as test activities are deferred, combined, and/or dropped) the amount of funding MDA accounts to test activities changes as well. MDA accounts for these changes using a defined corporate change process which spans the current year of fiscal execution as well as the follow-on budgeting and planning fiscal years. This corporate change process allows for the proper and necessary accounting of MDA test funding whether the test change affects a single fiscal year or spans multiple fiscal years. Frequently, there are fiscal expenditures for a test that occurred well in advance of the actual test date. These expenditures manifest themselves as "sunk" costs for these tests whether deferred, combined, or dropped.

60. Senator REED. General Obering, specifically, are the funds originally budgeted for the test used for something else, and then new money requested for the year in which the rescheduled test occurs?

General OBERING. If a test is deferred, and funding originally budgeted for that test has not yet been obligated for the purposes of that test, MDA corporately determines whether it is appropriate to realign that funding to support other test priorities or whether to fully utilize the authority of the research, development, test, and evaluation (RDT&E) appropriation and retain those funds for later obligation against that rescheduled test. Frequently, there are fiscal expenditures for a test that occurred well in advance of the actual test date. These expenditures manifest themselves as "sunk" costs for these tests whether deferred, combined, or dropped.

61. Senator REED. General Obering, please use the specific example of FTG–04 and track how the costs for the test were budgeted for and expended. FTG–4 has been budgeted for and rescheduled five times between October 2005 and February 2008. Can MDA show what the costs of this test were as originally estimated and budgeted for in October 2005 and compare this with the current estimated costs of the test and where they are budgeted?

General OBERING. The attached Flight Test Replan History chart tracks the evolution of the GMD program's spiral development approach with regard to FTG–04. The June 2005 plan was created following the initial MRTF recommended realignment of the GMD flight test program. Two target-only flight tests were added into the schedule during this period, and GMD's consistent flight test successes since the MRTF led to the acceleration of flight test objectives, a prime example of which is FTG–04. FTG–04 is a far more complex test now than was envisioned in June 2005. A comparison between the original FT–4 and FTG–04 today is shown below:

Original Cost Estimate FT–4 in October 2005: $96 million - planned as a GMD-only flight test, and the first intercept following the MRTF re-plan of mid-2005. The

target was planned with one pre-selected engagement radar to generate the weapons task plan and the target was planned to be a very simple separating target.

Current Cost Estimate FTG–04: $147 million - planned as a full BMDS test and the third GMD intercept since the MRTF re-plan. FTG–04 is now planned as a multi-sensor engagement which includes four radars; and the target now includes countermeasures.

62. Senator REED. General Obering, have any of the funds budgeted for this test been obligated and expended? If so, how much and for what purposes?

General OBERING. Approximately $147.1 million (or 100 percent) of FTG–04 funds have been obligated for all planned test costs.

- $26 million for planning, execution, and analysis
- $9 million for test lab upkeep (the portion attributable to FTG–04)
- $35 million for target
- $9.5 million for target range
- $50 million for ground-based interceptor (GBI)
- $4.2 million for GMD Core Range
- $13.4 million for Variable Core Range

Approximately $101.0 million (or 68.6 percent) of FTG–04 funds have been expended through April 23, 2008.

- $11.4 million (or 43.8 percent) for planning, execution, and analysis
- $9 million (or 100 percent) for test lab upkeep
- $22.126 million (or 63.2 percent) for target (target acquired through Sandia National Laboratories, expenditures take approximately 120 days to process through the Department of Energy)
- $2.8 million (or 29.5 percent) for Target Range
- $48.5 million (or 97 percent) for GBI
- $3.1 million (or 73.8 percent) for GMD Core Range
- $4.03 million (or 30 percent) for Variable Core

GROUND-BASED INTERCEPTORS RETROFIT PROGRAM

63. Senator REED. General Obering, at the hearing, there was some discussion of the program to retrofit the GBIs with more reliable components. What are the components to be retrofit on the GBIs (please list) and what is the cost of each new component?

General OBERING. The following table reflects components that will be replaced in four GBIs planned for refurbishment in calendar year 2008.

No of Vehicles	Component	Description
4	Booster Avionics Module (BAM)	Attitude Control System Deck Replacement
	$12.4	**BAM Total Cost**
4	Booster Stack	Stage 1 Nozzle Replacement
4	Booster Stack	Trunnion Electronics Box
2	Booster Stack	Stage 2 Electronic Control Unit
2	Booster Stack	Stage 3 Electronic Control Unit
1	Booster Stack	Stage 3 Trust Vector Control Actuator
1	Booster Stack	Stage 1 Electronic Control Unit
1	Booster Stack	Payload Shroud
	$12.4 M	**Booster Stack Total Cost**
4	Exoatmospheric Kill Vehicle (EKV)	Pencil Filters
4	EKV	Helium Filters
4	EKV	Fuel Mixture Change
	$6.24 M	**EKV Total Cost**
	$31.04M	**Total Hardware Costs for GBI Refurbishments in CY08**

64. Senator REED. General Obering, please provide an update on the retrofit program, including how many interceptors have been retrofit as well as the schedule (by month) to complete retrofitting the remaining interceptors.

General OBERING. Four interceptor refurbishments are scheduled in calendar year 2008 with planned completion dates of July, August, November, and December. Two of these four interceptor refurbishments are currently in process. The basic booster upgrades have been completed and the Booster Avionics Module upgrades with new Attitude Control System (ACS) decks are in process and near completion. The removed ACS decks and all other available parts that are removed during refurbishment will be used to conduct stockpile reliability analysis. The original refurbishment study had identified future upgrades for an additional 13 vehicles to be completed from calendar year 2009 through calendar year 2012. However, these additional refurbishments are not on contract and therefore no firm schedule yet exists.

65. Senator REED. General Obering, please detail the cost to retrofit and/or refurbish each individual interceptor.

General OBERING. Each interceptor is unique in the degree of retrofit/refurbishment that will need to be completed in order to provide the warfighter the most operationally reliable system. For the four scheduled calendar year 2008 refurbishments, the estimated costs for each are $7.0 million–$9.0 million per interceptor for moderate refurbishment. The refurbishment study identified upgrades for an additional 13 vehicles to be completed from calendar year 2009 through calendar year 2012. In an effort to provide the refurbishment program a flexible and timely contractual response for unscheduled maintenance, a Request for Proposal was sent to the prime contractor on April 28, 2008, requesting pricing for three refurbishment options (Minimal, Moderate, and Extensive). The ranges of cost for each of these options are expected to be: Minimal - $2 million–$6 million; Moderate - $7 million–$10 million; Extensive - $14 million–$16 million. The details of what each particular interceptor refurbishment will cost have yet to be developed given we are still in the early stages of the GBI refurbishment program.

ACQUISITION APPROACH

66. Senator REED. Mr. Francis, MDA suggests that its acquisition approach is both novel and an improvement to the more linear approach outlined in DOD acquisition policy (referred to as DOD 5000) and, by association, GAO's work on best practices. What are your views on MDA's acquisition approach as compared with DOD acquisition policy and best practices?

Mr. FRANCIS. Our work on DOD weapon systems over the past 6 years shows that programs have not adopted the knowledge-based approach in DOD's acquisition policy. Instead, acquisition programs have preferred to manage technology, design, and manufacturing risks at the same time which leads to cost growth and schedule delays. MDA's concurrent development and fielding approach to acquisitions has more in common with other acquisition programs than with DOD acquisition policy, because most programs do not abide by DOD policy. DOD policy is linear only in the sense that it calls for following sound systems engineering principles for a given scope of work. For example, key technologies should be mature before committing to system development; a design should be stable before committing to system demonstration; and the design and production processes should be mature before committing to production. This approach, to me, is inarguable and its linearity, sensible. The policy also provides for non-linear spiral development to provide evolutionary advances to a basic capability. Thus, I would characterize the issue as not so much as policy having failed, but rather as policy not having been tried. Taken in this context, MDA's approach is not so much a novel departure from DOD policy as it is taking the de rigueur departure followed by most programs to an even greater degree.

MDA's acquisition strategy allows its programs to work on maturing technologies while they are also maturing the system design and preparing for production. Our work has found that programs following this practice have higher cost growth than programs that start system development with mature technologies. As reported in our March 2008 assessment, for DOD programs that similarly began with immature technologies, their total RDT&E costs grew by 44 percent more than programs that

began with mature technologies.[1] More often than not, programs were still maturing technologies late into system development and even into production.

Based on our body of work, in order to have good outcomes, the best practices contained in DOD acquisition policy require the use of a knowledge-based approach to product development that demonstrates high levels of knowledge before significant commitments are made. We have found that programs managed outside the knowledge-based process are more likely to have surprises in the form of cost and schedule increases. MDA has experienced some of these problems, although a full accounting is not possible because of the flexibilities MDA has had in using funds, deferring work, and tracking costs. One must also keep in mind that MDA has benefited from "linearity" in a very basic sense. That is, MDA's ability to accelerate the development and fielding of assets in the past few years owes much to the advanced development work that was conducted in the preceding 20 years.

NEW BLOCK STRUCTURE

67. Senator REED. Mr. Francis, MDA has changed its block structure from the previous 2-year blocks to a series of capability blocks that are intended to respond to particular threats, but without the previous time limits. How does MDA's new block structure address the issues GAO has reported on regarding the previous 2-year block structure?

Mr. FRANCIS. MDA's new block construct, which was redefined in 2007 to better communicate the agency's plans and goals to Congress, makes many positive changes. These include establishing a unit cost for selected block assets, including in a block only those elements or components that will be fielded during the block, and abandoning the practice of deferring work from block to block.

MDA's new block construct provides a means for comparing the expected and actual unit cost of assets included in a block. As we noted in our fiscal year 2006 report, MDA's past block structure did not estimate unit costs for assets considered part of a given block or categorize block costs in a manner that allowed calculations of expected or actual unit costs.[2] Under the new block construct, MDA expects to develop unit costs for selected block assets—such as THAAD interceptors—and request an independent verification of that unit cost from DOD's CAIG. MDA will also track the actual unit cost of the assets and report significant cost growth to Congress. However, MDA has not yet determined for which assets a unit cost will be developed and how much a unit cost must increase before that increase is reported to Congress.

The new construct also makes it clearer as to which assets should be included in a block. Under the agency's prior block construct, assets included in a given block were sometimes not planned for delivery until a later block. For example, as we reported in March 2007, MDA included costs for ABL and STSS as part of its Block 2006 cost goal although those elements did not field or plan to field assets during Block 2006.[3] Agency officials told us those elements were included in the block because they believed the elements could offer some emergency capability during the block timeframe.

Finally, the new block construct should improve the transparency of each block's actual cost. Under its prior construct, MDA deferred work from one block to another; but it did not track the cost of the deferred work so that it could be attributed to the block that it benefited. For example, MDA deferred some work needed to characterize and verify the Block 2004 capability until Block 2006 and counted the cost of those activities as a cost of Block 2006. By doing so, it understated the cost of Block 2004 and overstated the cost of Block 2006. Because MDA did not track the cost of the deferred work, the agency was unable to adjust the cost of either block to accurately capture the cost of each. MDA officials told us that under its new block construct, MDA will no longer transfer work, along with its cost, to a future block. Rather, a block of work will not be considered complete until all work that benefits a block has been completed and its cost has been properly attributed to that block.

68. Senator REED. Mr. Francis, what issues still need to be addressed with the new block structure?

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[1] GAO, Defense Acquisitions: Assessments of Selected Weapon Programs, GAO–08–467SP (Washington, DC: Mar. 31, 2008)

[2] GAO, Defense Acquisitions: Missile Defense Acquisition Strategy Generates Results but Delivers Less at a Higher Cost, GAO–07–387 (Washington, D.C.: March 15, 2007).

[3] GAO–07–387.

Mr. FRANCIS. Although improvements are inherent in MDA's new block construct, its full benefit to transparency and accountability depends on future actions. MDA has not yet estimated the full cost of a block. Also, MDA has not addressed whether it will transfer assets produced during a block to a military Service for production and operation at the block's completion, or whether MDA will continue its practice of concurrently developing and fielding BMDS elements and components.

According to its fiscal year 2009 budget submission, MDA does not plan to initially develop a full cost estimate for any BMDS block. Instead, when a firm commitment can be made to Congress for a block of capability, MDA will develop a budget baseline for the block. This budget will include anticipated funding for each block activity that is planned for the 6 years included in DOD's Future Years Defense Plan. MDA officials told us that if the budget for a baselined block changes, MDA plans to report and explain those variations to Congress.[4] At some future date, MDA does expect to develop a full cost estimate for each committed block and is in discussions with DOD's CAIG on having the group verify each estimate; but documents do not yet include a timeline for estimating block cost or having that estimate verified. It is not clear at this point whether the block cost estimate will contain acquisition costs only or will include O&S costs as well (a life-cycle cost estimate). While it is important to have a life-cycle cost element, it is also important to track acquisition costs separately from life-cycle costs for reporting purposes. Transparency would suffer if, for example, an increase in a block's acquisition costs offset by a corresponding reduction in O&S costs were treated as having no effect on the life-cycle cost total, thus precluding the need to report the acquisition cost increase.

The new block construct also does not address whether the assets included in a block will be transferred at the block's completion to a military Service for production and operation. Officials representing multiple DOD organizations recognize that the transfer criteria established in 2002 are neither complete nor clear given the BMDS's complexity. Without clear transfer criteria, MDA has transferred the management of only one element—the Patriot Advanced Capability-3—to the military for production and operation. Joint Staff officials told us that for all other elements, MDA and the military Services have been negotiating the transition of responsibilities for the sustainment of fielded elements—a task that has proven arduous and time-consuming. Although MDA documents show that under its new block construct the agency should be ready at the end of each block to deliver BMDS components that are fully mission-capable, MDA officials could not tell us when MDA's Director will recommend that management of components, including production responsibilities, be transferred to the military.

Finally, it is not clear, under MDA's new block construct, whether the concurrent development and fielding of BMDS elements and/or components will continue. Fully developing a component or element and demonstrating its capability prior to production increases the likelihood that the product will perform as designed and can be produced at the cost estimated. To field an initial capability quickly, MDA accepted the risk of concurrent development and fielding during Block 2004. For example, by the end of Block 2004, the agency realized that the performance of some ground-based interceptors could be degraded because the interceptors included inappropriate or potentially unreliable parts. MDA has begun the process of retrofitting these interceptors, but work will not be completed until 2012. Meanwhile there is a risk that some interceptors might not perform as designed. MDA also continued to accept this risk during Block 2006 as it fielded assets before they were fully tested. MDA has not addressed whether it will accept similar performance risks under its new block construct or whether it will fully develop and demonstrate all elements/components prior to fielding.

69. Senator REED. Mr. Francis, what challenges do you see that MDA will face in estimating block costs, baselining them, having them independently verified, and reporting variances?

Mr. FRANCIS. As MDA continues to implement its new block strategy, it will have to make important decisions on establishing baselines and reporting variances. Specifically, MDA must decide what it is going to include in a block's cost, identifying the assets for which unit costs will be developed, outlining how much a unit cost must increase before that increase is reported to Congress, estimating costs capability development efforts. I believe that MDA should work closely with Congress in making these decisions.

[4] MDA expects to initially develop budget baselines and report variances to this baseline for Blocks 1.0, 2.0, and a portion of 3.0.

MDA may find that estimating costs for near-term blocks such as Blocks 1.0 and 2.0 may be easier to develop since the work for these blocks is nearly complete. However, estimating costs for work scheduled to occur in Blocks 4.0 and 5.0 may be more difficult as work for these blocks is scheduled farther into the future. Additionally, it will be more difficult to estimate costs for elements captured under its Capability Development effort, such as the ABL, KEI, and MKV programs. These programs are in the midst of developing technology. Such programs generally do not have firm cost, schedule, or performance baselines because they are in a period of discovery, which makes schedule and cost difficult to estimate. MDA's experience with the ABL program provides a good example of the difficulty in estimating the cost and schedule of technology development. In 1996, the ABL program believed that all ABL technology could be demonstrated by 2001 at a cost of about $1 billion. However, MDA now projects that this technology will not be demonstrated until 2009 and its cost has grown to over $5 billion. It is imperative that MDA establish baselines, because until it does it will be difficult for decisionmakers to evaluate the business case for the BMDS.

SIGNIFICANCE OF COST INCREASES

70. Senator REED. Mr. Francis, in your prepared testimony, and in your March report, you make the point that the Block 2006 missile defense system had a $1 billion cost increase. Some might argue that, in a program with an annual budget of more than $9 billion, such cost increases are not worrisome, amounting to only a 5-percent increase over the 2-year block. Would you agree with that argument? If not, why not?

Mr. FRANCIS. Although we reported in 2007 that during Block 2006 MDA increased costs by about $1 billion, we could not discern the full cost of the block because the agency deferred some budgeted work to future costs in order to stay within its revised budget and offset increasing contractor costs.[5] Thus, the actual cost increase is likely higher. Although the measurable percentage increase seems relatively small, we should not be insensitive to the fact that at $8 to $10 billion per year, the missile defense budget is unusually large. Thus, a small percentage increase translates into a significant amount of money. Moreover, even a 2.5 percent cost increase per year for a more typical major defense acquisition program that would normally span 10 or so years, would, using the Nunn-McCurdy criteria for the current baseline, be enough to trigger a significant cost growth breach by year 6 and a critical cost growth breach in year 10. That is, at that rate of cost growth, a program would accrue a 25 percent cost increase over 10 years. Furthermore, every dollar spent inefficiently in developing and procuring weapon systems is less money available for many other internal and external budget priorities—such as the global war on terror and growing entitlement programs. These inefficiencies also often result in the delivery of less capability than initially planned, either in the form of fewer quantities or delayed delivery to the warfighter.

The consequence of cost growth is reduced buying power and lost opportunities. Funded at $8 billion to nearly $10 billion annually, MDA's BMDS is the largest research and development program in DOD's budget. Every dollar spent on inefficiencies in acquiring one weapon system is less money available for other opportunities. As program costs increase, programs must request more funding to cover the overruns, make trade-offs with existing programs, delay the start of new programs, or take funds from other accounts. Ultimately, cost overruns and delays affect warfighters who have to operate costly legacy systems longer than expected, find alternatives to fill capability gaps, or go without the capability.

QUESTIONS SUBMITTED BY SENATOR MARK PRYOR

THAAD SYSTEM

71. Senator PRYOR. General Obering and General Campbell, in your statements you both allude to the vital importance of THAAD to the terminal defense segment of MDA for the protection of our Homeland and overseas bases, our service men and women deployed in support of Operation Enduring Freedom and OIF, and our friends and allies. Furthermore, you acknowledge that Iran is expanding its delivery systems by developing an extended-range version of the Shahab–3 that could strike our allies and friends in the Middle East and Europe, and also identify a new

[5] GAO, Defense Acquisitions: Missile Defense Acquisition Strategy Generates Results but Delivers Less at a Higher Cost, GAO–07–387 (Washington, DC: March 15, 2007).

Ashura medium-range ballistic missile capable of reaching Israel and U.S. bases in Eastern Europe. While the THAAD program is designed to protect the warfighter from these threats today, it is underfunded by $65 million, effectively delaying the program up to 1 year. What kind of priority does our missile defense strategy give the THAAD program? Doesn't it make sense to fully fund THAAD or maybe even buy back the contract and bring Fire Units 3 and 4 on schedule?

General OBERING. The Agency's fiscal year 2009 budget reflects an overall strategy that focuses on near-term delivery of BMD capabilities, to include THAAD. It is fully funding the program and has realigned funding to enable contract award for interceptor long-lead components which restores Fire Unit 3 and 4 schedules.

General CAMPBELL. The MDA has performed an excellent job in developing a BMDS capability. The agency has also collaborated with the DOD, combatant commanders, and Services to deliver capabilities based on a balance of resources and technological maturity moderated by the warfighter's priority of need. In recognition of the high priority of need that THAAD enjoys, I understand the MDA has recently taken steps to realign internal funding to restore planned procurement and delivery of these two fire units and interceptors as originally planned and scheduled. THAAD represents a cutting edge BMD capability that we need to field as early as possible.

72. Senator PRYOR. General Obering, what has contributed to the cost growth in THAAD and SM–3?

General OBERING. The Aegis BMD program of record is and continues to be an aggressive program from a cost, technical, and schedule perspective. Aegis BMD is managing eight developments simultaneously along with a missile manufacturing program and an aggressive ship installation schedule. There have been unplanned technical challenges with the Third Stage Rocket Motor and Divert Attitude Control of the SM–3 Block IA development that required additional ground/element level testing to ensure all operational modes of the missile were well understood and available prior to its deployment to the fleet. Additional engineering was also required to deal with unplanned SM–3 manufacturing and diminishing manufacturing sources issues.

Aegis BMD's aggressive testing schedule has driven an increase in modeling and simulation and scenario certifications as risk reduction measures to ensure flight mission success to achieve Operational Evaluation of the Block 2004 capability. Finally, assessment of mission assurance and other "core" standards within the program, along with added security requirements associated with Kill Assessment have driven additional unplanned costs.

Aegis BMD has taken these development and testing experiences into account with the SM–3 Block IB upgrade, as well as, future spirals of the Aegis BMD System.

For THAAD, there have been several factors contributing to cost overrun and cost growth for the program.

- The Development contract has an estimate at completion that is predicted to end the contract with an approximate 5 percent overrun to contract cost. The overrun has been driven principally by variances experienced in the interceptor for design discoveries during assembly/subassembly ground qualification testing requiring subsequent rework and launcher component hardware and software complexities.
- There has been cost growth in scope to the program caused primarily by: (a) critical contract changes necessary to prepare for Fire Unit Fielding (e.g., Fire Control obsolescence and redesign for the 5-ton truck); (b) Insensitive Munitions/Final Hazard Classification requirements; (c) the impact of target availability causing delays to the flight test program; (d) risk reduction and flight test analysis efforts; and (e) THAAD participation in Juniper Cobra 09.

QUESTION SUBMITTED BY SENATOR JOHN MCCAIN

COMPLIANCE OF SECTION 223

73. Senator MCCAIN. Secretary Young, section 223 of the National Defense Authorization Act (NDAA) for Fiscal Year 2008, as passed by Congress, prohibits the use of RDT&E funds for procurement or advance procurement of long lead items, including for SM–3 Block IA interceptors in fiscal year 2009. Yet the fiscal year 2009 President's budget request for the MDA includes a request for $130.0 million in RDT&E funds for the SM–3 Block IA interceptor. Please explain why DOD is not

following the law, and what you plan to do to bring MDA into compliance with the NDAA for Fiscal Year 2008.

Mr. YOUNG. Due to time constraints and the advanced state of the DOD budget, MDA was unable to incorporate changes to the fiscal year 2009 President's budget submission to be consistent with the requirements of section 223. However, MDA was able to implement the direction of Congress to program construction projects in the Military Construction (MILCON) appropriations. The Department will carefully consider these requirements as we develop the next budget request.

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

COMPLIANCE OF SECTION 223

74. Senator SESSIONS. Secretary Young, section 223 of the NDAA for Fiscal Year 2008 requires MDA to revise its budget structure to include procurement, O&S, and MILCON accounts in addition to its traditional research and development appropriations. The provision also requires MDA to establish acquisition cost, schedule, and performance baselines for MDA programs. The purpose of this provision was to provide Congress greater insight into MDA budgets and to provide greater clarity as to the true costs of our missile defense programs. It was in no way an attempt to slow down the fielding of the current generation of missile defense systems, such as GMD, Aegis BMD, and THAAD. What effect does this provision have on the pace of development, testing, and fielding of missile defense systems, such as GMD, Aegis BMD, and THAAD?

Mr. YOUNG. Establishment of baselines for MDA programs should have no impact on development, testing, or fielding of MDA systems. The transition by the MDA from use of research and development funding to research and development, procurement, O&S, and MILCON funding, if planned and executed in an incremental fashion, should have little to no effect on the pace of development, testing, and fielding of the BMDS elements, including the Ground-Based Mid-Course Defense, Aegis BMD, and THAAD. To the extent fielding requires use of procurement appropriations, normally the full funding policy would apply. In the absence of any top-line increase, full-funding may require that some development, testing, or fielding activities be deferred to future years to stay within budget controls. The Department's MDEB has reviewed the potential impacts of procurement funding use with the MDA, and is committed to working with the MDA to meet fielding requirements and comply with section 223.

75. Senator SESSIONS. Secretary Young, should the bureaucratic effect of this provision be to hinder the pace of missile defense fielding, can we be assured that you will inform Congress and take steps necessary to rectify the problem?

Mr. YOUNG. Section 223 of the NDAA for Fiscal Year 2008 (Public Law 110–181) requires the budget justification materials submitted to Congress in support of the DOD budget for any fiscal year after 2009 to set forth separately requested amounts for the MDA for: (1) RDT&E; (2) procurement; (3) operation and maintenance; and (4) MILCON. I will stay informed of any hindrance to missile defense fielding, and steps to correct the problems, and in turn, inform Congress.

CERTIFICATION OF SYSTEM

76. Senator SESSIONS. Secretary Young, section 228 of the NDAA for Fiscal Year 2008 requires that before more than 40 GBIs may be installed at Fort Greely, the Secretary of Defense must certify that the Block 2006 GMD element has demonstrated through end-to-end testing that it has a high probability of working in an operationally effective manner. Your predecessor, Ken Krieg, sent a letter to Congress, dated September 19, 2006, stating that the MDA "completed a successful end-to-end flight test of the long-range missile defense capability on September 1." This test included a successful intercept of the target. There was another successful end-to-end flight intercept test of the GMD system in fall 2007. In light of these successful tests, when will the Secretary of Defense certify that the Block 2006 GMD element has a high probability of working in an operationally effective manner?

Mr. YOUNG. I will review the progress to date, the testing completed, the assessment by the DOT&E, and planning for O&S, and determine when a recommendation can be provided to the Secretary of Defense. The MDA's development program incorporates ground and flight testing and modeling and simulation to evaluate system and element performance. I will consider the depth and breadth of their preparation, resulting performance, and analysis of their results to formulate the criteria

and timing of a certification decision. I will place a significant emphasis on the DOT&E assessments. In addition, I will review plans for operating and sustaining the Ground-based Missile Defense (GMD) element and the funding allocated for Service involvement.

EUROPEAN MISSILE DEFENSE SITE

77. Senator SESSIONS. General Obering, please update the committee on the ongoing work to ensure that the proposed U.S. missile defense site in Europe is fully integrated into NATO's missile defense efforts.

General OBERING. The technical integration between the U.S. missile defense site in Europe and the NATO missile defense capability will occur primarily through the command and control (C2) processes and systems of the U.S. and NATO. The U.S. and NATO are continuing to work toward integration of our BMD C2 systems. We are working collaboratively in the following three areas.

1. Integrate U.S. BMDS elements' test beds and NATO test bed. We are establishing the modeling and simulation and testing environment for identifying areas for analysis and demonstrating progress on the integration. We are developing the connectivity and establishing the infrastructure between U.S. Missile Defense Integration and Operations Center (MDIOC) BMD test bed and the NATO Active Layered Theater Ballistic Missile Defense Integration Test Bed. The MDIOC will be the single point-of-presence in the U.S. for BMDS elements' participation with the ITB. The MDIOC is located in Colorado Springs, CO, and the ITB is located in The Hague, The Netherlands.
2. Develop technical documentation. We are writing Interface Control Documents for the non-real-time (i.e., planning) and real-time (i.e., situation awareness) aspects of C2. Once completed, these documents will be used by contractors to build or modify U.S. and NATO C2 systems, as necessary. These documents will also contribute to the U.S. and NATO standards process, such as updates to the U.S. Military-Standard 6016 for exchanging Link-16 information.
3. Demonstrate integration. We are incrementally demonstrating and exercising the display and information exchange capabilities via increasing complexity of interoperability demonstrations and exercises. We have scheduled four C2 demonstrations/exercises in 2008. The first demonstration was successfully completed in January. We demonstrated the ability to develop a critical asset list, analyze coverage, and recommend a specific element of BMDS to protect a specific asset. We also demonstrated the ability to exchange situation awareness information (i.e., tracks) and display a consistent operating picture. We have three more C2 events planned with demonstrations scheduled in May and June, culminating in a NATO-led exercise in September.

Activities for 2008 have been discussed and scheduled. Integration efforts between the U.S. and NATO for subsequent years have not been finalized. Continued analysis and more complex demonstrations on planning and situation awareness will be the focus of the efforts.

78. Senator SESSIONS. General Campbell, please update the committee on STRATCOM's efforts to develop the CONOPs for the European Missile Defense Site, and the role you expect EUCOM and NORTHCOM to play in operating the system.

General CAMPBELL. Extending missile defense to deployed forces, friends, and allies in Europe, known as European Capability (EC), has created an intense collaborative planning effort between the MDA, U.S. STRATCOM, U.S. NORTHCOM, and U.S. EUCOM. The development of the Global BMD CONOPs provides the overarching framework for EC development and will guide how the Commanders of NORTHCOM and EUCOM will employ EC in the defense of Europe and the Homeland. Because the Global CONOPs continues to be developed and coordinated, detailed command and control relationships between EUCOM and NORTHCOM have not yet been determined. We expect the Global CONOPs to be finalized this summer. Concurrent with Global CONOPs development, STRATCOM is also assisting EUCOM with a regionally focused European BMD CONOPs.

79. Senator SESSIONS. General Obering, of the $712 million requested for the European Missile Defense System, $241 million is for MILCON. Please explain why these funds are necessary, and the schedule implications should these funds not be available in fiscal year 2009.

General OBERING. This funding provides fiscal year 2009 MILCON funds in the amount of $133 million for the EIS and $108 million for EMR to support deployment of a European Capability to expand the layered BMDS. This European Capability will enhance protection of the U.S Homeland and provide for the defense of deployed U.S. troops and European Allies. The fiscal year 2009 MILCON funding is essential to allow startup of site preparation, contractor mobilization, long-lead item acquisition, and construction of site and facilities infrastructure. These activities must be started in fiscal year 2009 to maintain and execute scheduled development of the site to meet a 2013 capability readiness timeline. Failure to provide these funds in fiscal year 2009 would result in a 1-year delay in delivery of this vital capability and preclude operational readiness.

In addition, failure to provide these funds would have diplomatic implications that could impact the schedule. Full funding is vital to the conclusion and implementation this year of the bilateral missile defense agreements necessary to allow the United States to begin to deploy capabilities critical to the defense of the homeland and U.S. Allies. Funding cuts could discourage both potential host nations from expending further political capital in efforts to conclude or implement these agreements. Furthermore, as Congress has encouraged us to do, the administration has sought and obtained NATO support for U.S. missile defense sites in Europe through the unanimous declaration at the Bucharest summit. Less than full funding for the missile defense sites in Europe could jeopardize this progress by signaling that the United States is backing away from its commitment to this program.

OPERATIONS AND SUSTAINMENT COSTS

80. Senator SESSIONS. Secretary Young and General Obering, approximately $715 million of the MDA request for fiscal year 2009 is for the operations and sustainment of fielded missile defense capabilities. Why is the MDA funding operations and sustainment costs?

Mr. YOUNG. The MDA is funding operations and sustainment costs for BMDS elements to ensure continuous operation of the system, and to prevent creation of competition from within each lead Service for limited funding resources. A potential advantage of funding BMDS O&S through a defense-wide account is the ability to manage BMDS funding as a portfolio, with the latitude to balance development, procurement, and support priorities at the Department level, and to rebalance resources in a timely manner as conditions change. The MDEB will take an active role in the BMDS Program Objective Memorandum (POM) preparation, resource allocation, and program execution reviews.

General OBERING. MDA is funding operations and sustainment costs for BMDS elements to ensure continuous operation of the system, and we will continue to sustain fielded assets until we transition them to the Services. We are working closely with the Services to transition these assets. After transition, the lead Service will be responsible for operations and sustainment of the capability.

81. Senator SESSIONS. Secretary Young and General Obering, is this not something the Services should be responsible for?

Mr. YOUNG. At this time, DOD has not decided to make the Services responsible for O&S funding in the near term. For the next few years, while we develop O&S cost experience, DOD's approach will be to oversee the management of the BMDS portfolio, using the MDEB and involving all stakeholders in annual planning and preparation of the BMDS program plan. The intent of the BMDS Life Cycle Management Process and the BMDS Business Rules, which are currently in coordination with the Deputy Secretary of Defense, is to manage resource formulation and allocation responsibilities at the Department level. In the year of execution, each Service would receive a funding allocation from the defense-wide account as a result of the plan endorsed by the MDEB and approved by the Deputy Secretary of Defense. During the execution year, periodic reviews will be performed to assess performance against baseline plans. By doing this, the risk and responsibilities remain at the Department level.

General OBERING. The Services will be responsible for operations and sustainment of BMDS assets upon capability transition. The BMDS Life Cycle Management Process and the BMDS Business Rules are currently in coordination for Deputy Secreatary of Defense signature. These documents will assist AT&L in managing BMDS sustainment resource formulation and allocation responsibilities at the Department level. The current vision is that in the year of execution, each Service would receive a sustainment funding allocation from defense-wide resources per the MDEB endorsed and Deputy Secretary of Defense approved plan.

82. Senator SESSIONS. Secretary Young and General Obering, if not the Services, then why not create a defense-wide line to fund O&S costs for fielded missile defense capabilities?

Mr. YOUNG. The MDEB has recently reviewed the draft BMDS Life Cycle Management Process which involves the MDA, the Office of the Secretary of Defense, STRATCOM, combatant commands, Joint Staff, and the Services in an annual program plan and budget preparation process to derive a Deputy Secretary of Defense approved BMDS POM and budget submittals. The BMDS Life Cycle Management Process will allow development of the missile defense budget as a portfolio (with input by all participants), will use a defense-wide account, and will undergo MDEB review prior to final approval. The DOD is implementing this initiative during POM–10 preparation to learn from the experience and be prepared to fully influence POM–12. The portfolio managed defense-wide account will include all types of funding appropriations, and will be the source of funds transferred to the Services for administration in the year of execution. O&S funding will be part of this process.

General OBERING. Business rules have been developed under the MDEB that incorporates the defense-wide approach. The business rules are currently in coordination within the Department. The advantage of funding BMD operations and sustainment through a single DOD-wide account is that this approach ensures the funding remains dedicated to sustaining missile defense capabilities.

TRANSFER OF THAAD SYSTEM

83. Senator SESSIONS. General Campbell, you note in your prepared statement that "THAAD capabilities will begin to transfer to the Army in 2009." What does this mean in a practical sense?

General CAMPBELL. The THAAD Project Office of the MDA has developed and manufactured a mission specific set of equipment that delivers a capability. The equipment that comprises this capability will be transferred to the Army. Currently, this equipment includes: 3 launchers; 24 missile rounds; 1 THAAD fire control/communications (TFCC) component; 1 radar component; and peculiar support equipment.

In parallel, the U.S. Army has defined, structured, and resourced an organization (battery) of 99 soldiers. These soldiers will complete new equipment training and collective training in fiscal year 2009, at which time the THAAD Project Office will deliver the manufactured mission equipment set along with Army provided command support equipment to the Army organization.

84. Senator SESSIONS. General Campbell, will the Army now assume the O&S costs for the four planned THAAD Fire Units?

General CAMPBELL. The issue of total THAAD transition and transfer from the MDA to the Army continues to be negotiated. It should be noted that some O&S costs were assumed by the Army when the initial THAAD unit began personnel fill. The Army also funds O&S for unit common support equipment and installation infrastructure. The Army will assume additional O&S resource responsibilities as each unit is filled and activated.

The major issue that remains under discussion and negotiation is at what point does the the Army assume responsibility to resource the O&S cost for the THAAD mission specific equipment set (interceptors, launchers, etc.). At present, the MDA is responsible for providing support to the THAAD mission specific equipment and has committed to fully funding Contractor Logistics Support (CLS) through fiscal year 2013. In the following 2 fiscal years, MDA will fund CLS as it relates to consequences of design defect issues and the approved THAAD Operational Mode Summary/Mission Profile.

85. Senator SESSIONS. General Campbell, who will then be responsible for purchasing more than the 96 planned THAAD missiles?

General CAMPBELL. Until the THAAD Project Office is transferred to the Army, along with an appropriate increase in Total Obligation Authority, the Army position is that responsibility to resource additional THAAD missiles rests with the MDA.

86. Senator SESSIONS. General Campbell, clearly, 96 interceptor missiles will not be sufficient. What are Army plans for acquiring additional THAAD missiles and Fire Units?

General CAMPBELL. Presently the Army has no plans to acquire additional THAAD missiles or fire units. However, the MDA does intend to address THAAD inventory challenges in the next budget submission.

QUESTION SUBMITTED BY SENATOR JOHN THUNE

AIRBORNE LASER

87. Senator THUNE. General Obering, one of the important components of missile defense is the ability to attack the missile while it is still in its boost phase. The ABL is an excellent example of this capability. What do you need from Congress to ensure that you will be able to conduct a lethal shoot-down of a threat representative boosting target in 2009?

General OBERING. Continue your solid support for ABL and the MDA funding requirement in the PB09 submission.

[Whereupon, at 4:26 p.m., the subcommittee adjourned.]