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S. HRG. 109–22, PT. 7

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

ON

S. 1042

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2006 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 7
STRATEGIC FORCES

MARCH 16, APRIL 4, 7, 2005

Printed for the use of the Committee on Armed Services

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006—Part 7
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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006

WEDNESDAY, MARCH 16, 2005

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

NATIONAL SECURITY SPACE POLICY AND PROGRAMS

The Subcommittee met, pursuant to notice, at 3:04 p.m. in room SR–232A, Russell Senate Office Building, Senator Jeff Sessions (chairman of the subcommittee) presiding.

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

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

Majority staff members present: William C. Greenwalt, professional staff member; Robert M. Soofer, professional staff member; and Kristine L. Svinicki, professional staff member.

Minority staff member present: Madelyn R. Creedon, minority counsel.

Staff assistants present: Andrew W. Florell and Catherine E. Sendak.

Committee members' assistants present: John A. Bonsell, assistant to Senator Inhofe; Bob Taylor and Matt Zabel, assistants to Senator Thune; and William K. Sutey, assistant to Senator Bill Nelson.

OPENING STATEMENT OF SENATOR JEFF SESSIONS, CHAIRMAN

Senator SESSIONS. Gentlemen, you may take your seats. The hearing will come to order.

We meet today to receive testimony on military space programs and policies of the Department of Defense (DOD). I'm—Senator Nelson has not joined us yet. I expect him to join us. He'd be the ranking member on this subcommittee. I'm somewhat new to space issues. He has had a long-time interest in that, and he'll be an excellent participant in these discussions.

I'm pleased to welcome today's witnesses, who, collectively, represent the views of the DOD on military space, policy, and programs.

Our first witness, the Honorable Peter B. Teets, Acting Secretary of the Air Force, holds a number of other job titles relevant to today's hearing—a number, really—Under Secretary of the Air Force, Director of the National Reconnaissance Office (NRO), and the DOD Executive Agent for Space. Mr. Secretary, I understand you may be leaving us before too long, and I want to take this moment to express my appreciation, and that of this Senate and this committee, for your tremendous service to America, your commitment to this country. You've won respect across the aisle, you've won the respect of people throughout the DOD who care about these important issues.

Thank you.

Secretary TEETS. I thank you very much, Senator. That's very kind of you to say, and I have enjoyed my association with this committee and with Congress. Thank you very much, sir.

Senator SESSIONS. You've put America first, and you've always tried to do it the right way, and I believe you've achieved tremendous success at that.

Our other witnesses include General James E. Cartwright, Commander of the U.S. Strategic Command (STRATCOM)—General Cartwright, good to to have you with us; General Lance Lord, Commander of Air Force Space Command; Lieutenant General Larry Dodgen, Commander of U.S. Army Space and Missile Defense Command; and Deputy Chief of Naval Operations for Warfare Requirements and Programs, Admiral Joseph Sestak, Jr. We're delighted to have you here.

I thank all of you for your service to our Nation in this important area of our Nation's defense and for the commitment you've given to making our Nation unsurpassed in issues relating to space.

It goes without saying that U.S. military space capabilities are, today, second to none. A lot of hard work, ingenuity, and national treasure has gone into obtaining this capability, and it has paid dividends in recent military conflicts. It is also fair to say that potential adversaries have come to realize the importance of space for the United States military and many of its allies. It is not unreasonable for us to assume that they will try to exploit our vulnerabilities in this area.

During last year's space hearing, this Subcommittee, under the leadership of Senator Allard, emphasized space acquisition and management issues. It was noted that the present generation of military space systems are being modernized in virtually every mission area: strategic missile warning, assured communications, navigation, and intelligence and surveillance. Unfortunately, virtually every modernization program has suffered substantial problems with regard to cost, schedule, and technical performance, so we want to hear from the witnesses whether these programs are back on track, how we can get them back on track, where the deficiencies exist, and what we need to do, collectively, to move forward using the resources at hand.

Beyond a review of individual programs, I've asked the witnesses to address recent and emerging presidential guidance on a number of important space policy issues. Within the last couple of years, the White House has promulgated policies on space transportation, commercial remote sensing, space-based positioning, navigation

and timing, and, as I understand, is about to issue an overarching national space policy document to update the 1996 guidance on U.S. military and civilian space programs.

In addition, the DOD has issued several directives on military space policy, and the Air Force has recently published the Doctrine for Counterspace Operations. This rich trove of policy documentation serves as a backdrop for our examination of important policy issues that could potentially shape the acquisition of future military space systems and capabilities. I'd like to highlight a couple of such issues.

The first and foremost policy question concerns the means by which the U.S. achieves and maintains freedom of action in space while denying such freedom of action to our potential adversaries. This question becomes more pressing as U.S. dependence on space assets continues to grow, while the potential vulnerability of these assets to attack increases due to the counterspace capabilities of potential adversaries. As Secretary Teets previously stated, the mission of space control has not been at the forefront of military thinking, because our people haven't yet been put at risk by an adversary using space capabilities. That will change. It is these sorts of events that the Space Commission members had in mind when they warned about the possibilities of a space Pearl Harbor. I believe we not only need to think about the mission and implications of space control, it is fundamentally irresponsible for us not to do so. I think you're right, Secretary Teets, in that regard.

I remember, Secretary Rumsfeld was asked about space and the militarization of space, perhaps at his first hearing, and he said, "Senator, we've had war on land, we've had war on the water, we've had war in the air, and we will have war in space." I think that was a true statement. We wish it weren't so, but that's the nature of warfare over the centuries, and I think he was correct and honest in that assessment.

So, I think we can't be squeamish about discussing the importance of space to our Nation's defense, and the importance that that capability not be placed in jeopardy.

A second policy issue concerns the way we think about military space and warfare. During the Cold War, space systems were used primarily to help maintain strategic stability, balance of power, and mutually-assured destruction between the two superpowers. Today, space supports the warfighter in this new paradigm, as we are all aware of the infusion of space capabilities into virtually all aspects of U.S. military operations. It would be useful, therefore, to ask whether current approaches to providing space support to the warfighter are working, using Afghanistan and Iraq as examples, or whether there are ways space assets can be made more responsive to the operational needs of the warfighter. I think Lieutenant General Dodgen might have some thoughts on this, and General Cartwright, and others.

Well, those are some of the thoughts that I would have for us today. There are a lot of things that I look forward to acquainting myself with.

I am, as I said, before you arrived, Senator Nelson, glad to have you as our ranking member. I know you've had long association with these issues, and have much insight into them.

I'm also delighted to be joined by Senator Jim Inhofe, who has, for many years, fully understood the importance of these issues, and has been a champion for them.

Senator Nelson?

STATEMENT OF SENATOR BILL NELSON

Senator BILL NELSON. Thank you, Mr. Chairman.

There are many issues to be discussed, and not much time, so I will truncate my comments. Let's talk about the Space-Based Infrared Radar System (SBIRS), let's talk about the Evolved Expendable Lauch Vehicles (EELVs), and let's talk about advanced extremely high frequency (AEHF) and Transformational Satellites (TSATs). I'd also like to hear about a vision for space.

In conclusion, I just want to thank Secretary Teets for his long, distinguished, public-service, both in the private sector, as well as the public sector.

Thank you.

Secretary TEETS. Thank you very much, Senator.

Senator SESSIONS. Thank you.

Mr. Secretary, sort of to follow up on that; in your prepared statement, you noted that it is a policy—I'll tell you what——

Senator INHOFE. I really do, and I just would be very brief.

Senator SESSIONS. Yes, go ahead. Jim would like some opening comments.

Senator INHOFE. Yes, one of the reasons I came down——

Senator SESSIONS. If you would want to take my time——

Senator INHOFE. That's very nice of you, Mr. Chairman.

Senator SESSIONS.—in terms of——

Senator INHOFE. No.

Senator SESSIONS.—asking questions, please do that, too.

Senator INHOFE. I didn't know whether they were going to have opening statements or not.

I only would hope that we could address some things—I've long felt that the future is in controlling space. We have, historically, controlled space, but not to the degree that—to a greater degree than we do today, because we have so many others that are getting in on this. It was—you quoted, Mr. Chairman, the Space Commission's report, and specifically they said, "An attack on elements of the U.S. space system during a crisis or conflict should not be considered an improbable act."

Now, you stop and think about that statement. That's pretty strong, and these people know what they're talking about. They say the types of attacks could include, but not be limited to, jamming of the signal links between satellites and ground stations; permanently/temporarily degrading satellites with lasers; degrading or destroying satellites or ground systems with electromagnetic pulse attacks; conducting cyber attacks to disrupt computer systems; and to control satellite functions; and to collect, analyze, and distribute information. They came out with a lot of other specific things.

I guess, General Lord and Secretary Teets, what are we doing to counter these advances—I mean, these concerns that I have right now, and to ensure that we are going to be able to maintain the space capability, relative to other nations right now? Where do you see that we are?

Secretary TEETS. Sir, I think, at this point in time, we have taken some strong action to make certain that we, indeed, can have freedom of action in space. We know more today than we have ever about what else is up in orbit around us. We have started to implement some change that would allow us to provide some defense against attack, although we are still very vulnerable. If I had one strong worry to relay to this committee, it would be exactly that, that we do have significant vulnerability.

Now, I know this is an open hearing, and I don't want to go into the details of our vulnerabilities, because—for obvious reasons.

But we have an aggressive research and development program underway. We recognize the fact that there may come a point in time, in the not too far distant future, when it's going to be necessary for us to deny an adversary their use of space. As a result, I think we are moving in the right direction, but we have a ways to go in this whole arena of space control.

Senator INHOFE. Should we be doing more than we're currently doing, or are you satisfied—and you, too, General Lord—with what the budget is providing, in terms of counterspace operations?

Secretary TEETS. I think that—and then I'll let General Lord take it—but my own view is that we are moving ahead at a proper pace. We are doing research and development. I think we'll see an increase in the amount of resource applied to space control over the course of the next few years.

General LORD. Senator, let me add to that. I think Mr. Teets is accurate. As we put together forces to present to General Cartwright to meet his global responsibilities with space, we're focusing in the space-control area, particularly on space surveillance, which is really being able, as you said, to understand the environment of space, who's out there, who's operating, and our mixture of our ground-based, our optical, and radar sensors to be able to discriminate effects in space. Because what we have to be able to do is decide, is this an enemy action, perhaps, or is this something that may naturally occur in the phenomenon of space? We have to be able to discriminate that. So we're pushing hard on that—in that area, with space situational awareness.

We're taking actions in what we call defensive counterspace, which is to harden our links and nodes to make sure we understand what's—the links that go from—for Global Positioning System (GPS), for example, as we talk from the ground station to the satellite and back, to make sure those are protected, et cetera. So we have a tactical view of that with our troops who work in 14th Air Force in Vandenberg and work at Schriever Air Force Base, to really do what we have—we call a defensive counterspace mindset to kind of think about this all the time. If we do have an upset in a computer, we don't assume, right from the beginning, that this is something that naturally occurred, we kind of take a more defensive look at that, rule out all the possibilities, and then solve the problem and move on. So we're generating, not only our system capabilities, but our human and professional development so that we have people that really understand the medium we're operating in.

Senator INHOFE. Well, and one more thing, Mr. Chairman, I'm trying to find a hole in the schedule this week to give my third 1-

hour China speech. In that speech, I'll read a little bit about, in here, what I'm going to say.

China is not only looking to build blue-water navy to control the sea lanes, but also develop undersea mines and missile capabilities to deter the potential disruption of its energy supplies from potential threats, including the U.S. Navy, especially in the case of a conflict with Taiwan. The weapons China is investing in include cruise missiles, submarines, long-range target-acquisition systems—specifically, cutting-edge satellites, unmanned aerial vehicles, and advanced Su-30s and Su-35s, which, according to a very heroic statement that was made in 1998 by the now-Chief of the Air Force, is really better than our best strike vehicles. This is—the logical progression of this is to try to reach for space superiority.

Is there anything that you can say specifically about your concern over what China is doing that can be said in an open session? For anyone who wants to respond.

Secretary TEETS. I'd be happy to take a first stab at that, if you'd like. I think that you are ringing the right bell with the statements that you have made there. I do have a concern about the push that China has on space technology.

Now, of particular concern to me is this issue of the European Union starting to forget about any kind of International Traffic in Arms Regulations (ITAR) and just move forward to transfer technology to—European space technology to China. I think it's a huge concern. I think the administration is dealing with it as strongly as they can, in a diplomatic way. But I heartily encourage that, because I think transfer of European space technology to China will give them a significant jump in their capability.

Senator INHOFE. I think that's right. That's another part of my speech, the attitudinal change of the European Union in terms of what they're willing to share with China.

Any other comments on that?

General CARTWRIGHT. I would just add that, as we look, and given the forum that we're in, to the capabilities that we have in space, the capabilities we plan to put in space, that we make sure we understand what the critical nodes are, and that we start to design in, at the front end, the survivability and the assuredness of those nodes. That can be a layered approach, much as we've done with, say, missile defense or something like that but look at that and architect it in at the front end. That's a lot of the work that we're trying to sit down, between STRATCOM and Air Force Space Command, to take a look at this at the front end; don't try to engineer it in at the back end.

Senator INHOFE. That's a good point. A good point.

Senator SESSIONS. Jim——

Senator INHOFE. All right, thank you very much——

Senator SESSIONS.—thank you.

Senator INHOFE.—Mr. Chairman, for allowing me to jump in there.

Senator SESSIONS. I'm glad you had that opportunity, and I know you care about this deeply.

I forgot to give our panelists an opportunity to make a opening statement.

Secretary Teets, if you or any other members of the panel would like to share some thoughts with us, I think it would be appropriate that you do so and kind of lay any—give us any perspectives that you feel we should be aware of.

STATEMENT OF HON. PETER B. TEETS, ACTING SECRETARY OF THE AIR FORCE

Secretary TEETS. Thank you, sir. I'd be happy to take a few moments, if I may.

Mr. Chairman and Senator Nelson, let me say that, as you made your opening statements, you mentioned that I have spent about 3½ years now with multiple hats on. I have been the Under Secretary of the Air Force and the Director of the NRO and DOD's Executive Agent for Space, and I feel really strongly that these positions should continue to be vested in a single individual, because it gives an opportunity, really, to have some singular management of national security space programs that can provide the continuity while maximizing the cooperation between military and Intelligence Community space.

Just as an example of what I mean, I would just relate to you that recently we decided to relocate the Space Radar Program Office to the Washington, DC, area, and establish it as a joint office. This'll ensure both the Intelligence Community and the warfighting community that their needs will be met as we move toward fielding this kind of a vital capability. The role consolidation is vital to creating the daily executive-level focus needed to tackle the complex national security space issues, and I urge that this tri-hatted position be maintained.

Now, from that perspective, I want to also thank this committee and, frankly, the entire Congress, for your support of national security space. I've had the opportunity to testify before this subcommittee on several occasions now, and we really do appreciate the strong push that you're giving to national security space.

Quickly, going through a few of our priorities, I would like to mention that our first priority is mission success, both in operations and in acquisition. I would be forthright with you and tell you that we have not yet solved all of our acquisition problems, and we have recently announced another difficulty with the Space-Based Infrared System (SBIRS)-High program. We expect a Nunn-McCurdy notification, for sure. I've written to the appropriate people in that regard. I think it's possible that we'll have a Nunn-McCurdy breach; that is to say, a 25-percent exceedance of the annual production—or, excuse me, the average unit production cost for the three production geostationary satellites.

Now, SBIRS-High is a troubled program. It's been troubled from the outset. It was a program created in the 1990s, and it was not well formed. I would simply say to you that we have, subsequent to that time, changed our space policy, acquisition policy, and we have found ways to improve that situation. But we are, at this point in time, still suffering from the effects of a program that was not funded properly, it was not scoped properly, it was not set up with proper incentives to the contractor, and we continue to bear the legacy of that initial formation.

At the National Reconnaissance Office, I'll just say we're in a similar kind of a situation with a major program there known as the Future Imagery Architecture. I'll leave it at that for the sake of this hearing.

Now, we will, in fact, be able to bring space power to bear in warfighting and intelligence-gathering. By doing so, we will maximize the leverage that we can get from joint operations. The Space Radar Program that I mentioned earlier will be formed well. It will be founded upon the acquisition principles that we have learned over these last few years.

But mission success in space does begin with mission success in space lift. I would point out that the last two Titan IV launch vehicles are scheduled to launch this year, marking the end of an era.

Another era ended in February, when the last Atlas III placed an NRO payload into orbit, the 75th consecutive successful Atlas launch.

Our EELV, the Atlas V, and the Delta IV carry on our proud space-launch tradition and ensure our access to space. As we continue our transition away from legacy launch systems, our strategy is to maximize mission success by maintaining two families of launch vehicles. They are the best ever, but we cannot afford to risk grounding critical national security payloads because we relied on a single rocket fleet with a single design.

Once our space systems are on orbit, space professionals use them to provide situational awareness, continuous communication, and other critical services to combatant commanders, senior leaders, and front-line troops. Our nation's warriors and intelligence professionals make extensive use of space capabilities.

Now, last year, Congress directed us to address the technology and affordability challenges of this space-based radar system that I mentioned earlier, and also look at the transformational communications satellite programs in a meaningful way. We have restructured both programs to address your concerns.

As I mentioned earlier, we fundamentally restructured the space-based radar program, now called Space Radar. We are developing a space demonstration that will address technical and operational risks, validate costs and technology maturity, and exercise the concept of operations that would be employed in the operational vehicle. This demonstration would take place in fiscal year 2008.

We're also moving ahead on modernizing military satellite communications systems through incremental acquisition of our planned transformational communications architecture. Our first step will be fielding the Wideband Gapfiller system to be launched inside of a year from now, followed by the Mobile User Objective System, currently being developed by the Navy, AEHF Satellites being produced by the Air Force, and then TSAT.

The first TSAT launch was purposely delayed in the fiscal year 2006 cycle to allow time for laser communications technology to mature and for us to further develop the front-end processor necessary for making this truly an Internet in the sky. We remain on a path to deliver a transformational communication capability to the warfighter as soon as technology readiness levels and our budget permit.

Another of our top priorities, and the one that will enable success in all the other priorities, is to strengthen our team of space professionals—government, civilian, military, and industry professionals from across the DOD and the Intelligence Community. Space professionals around the world apply space power for our Nation. We are working with the Services and the national agencies to synchronize their respective space-cadre strategies and to implement our space human-capital resources strategy.

The next top national security space priority is to continue to integrate space capabilities for national intelligence, warfighting, and homeland security. We expanded this priority from the 2004 version to emphasize our homeland security contributions. Space systems assist in tracking illicit material and hazardous cargo, contribute to border security, and have the potential to do even more.

With respect to this type of integration, I believe a single individual holding all three space leadership roles is the right organizational construct to ensure our national and military space systems complement one another to improve our total security. Fully integrated national security space capabilities enhance decision-making and warfighting capabilities at all levels.

The next priority is to produce innovative solutions for the most challenging national security problems. We must sustain a solid foundation of science and technology to create innovative solutions. To that end, we've put together a science and technology council, consisting of Air Force Research Laboratory participation, Naval Research Laboratory, NRO, Advanced Systems and Technology—and in a forum of that nature, we invite National Aeronautics and Space Administration (NASA) in to participate with us, as well, so that we can properly leverage each others technology developments as we go forward.

My final top priority is to ensure freedom of action in space. America's dependence on space is well known, and any enemy will try to negate our advantage. We're pursuing improved space situational awareness to accurately characterize the space environment, distinguish malfunctions from attacks, and prevent collisions in space. In addition, we are developing the ability to protect our satellites and the capabilities they provide. This is a military and economic imperative for our Nation.

Because we rely so heavily on space capabilities, we must be prepared, when directed, to confront adversaries on the high ground of space. Our intent is to use diplomatic or other nonlethal means to preclude hostile use of space. But if these measures fail, we reserve the right, under international law, to take defensive action against an adversary's space capability.

For example, the Air Force's counter-communications system will achieve initial operating capability this year. It is a ground-based, transportable asset intended to disrupt an adversary's satellite communications, but its effects are temporary and reversible.

I'm proud of our national security space accomplishments. We improved our space-system capabilities on and off the battlefield, and we are modernizing every major space program while sustaining existing constellations. I'm highly optimistic about national-security space's future.

I sincerely do appreciate your commitment to helping us deliver these vital capabilities. With your ongoing support, we'll continue to develop, produce, launch, and operate critical space systems for this great nation.

Thank you, again, for your support.

[The prepared statement of Secretary Teets follows:]

PREPARED STATEMENT BY HON. PETER B. TEETS

INTRODUCTION

It is my distinct honor to appear before the committee today to discuss our National Security Space activities as Under Secretary of the Air Force, Director of the National Reconnaissance Office (NRO), and Department of Defense (DOD) Executive Agent for Space. I am further honored to be joined by the Service leads of our National Security Space activities: General James Cartwright, Commander of United States Strategic Command (USSTRATCOM); General Lance Lord, Commander of Air Force Space Command (AFSPC); Lieutenant General Larry Dodgen, Commanding General, Army Space and Missile Defense Command; and Vice Admiral Joseph Sestak, Deputy Chief of Naval Operations, Warfare Requirements and Programs (N6/N7). Our appearance here, together, underscores the importance of unity of effort in our National Security Space endeavors.

I began these remarks by listing my three titles because the consolidation of responsibilities across National Security Space in one person has been a hallmark of my tenure. As you recall, the 2001 Commission to Assess the United States National Security Space Management and Organization (Space Commission) strongly recommended such a consolidation to create daily, senior focus that is needed to tackle the complex issues facing our National Security Space efforts. I believe the Space Commission got it right, and we should continue on this path.

One of the advantages I have enjoyed over the past 3-plus years has been the ability to manage programs across both the open and classified space portfolios. I feel strongly that these positions should continue to be consolidated under a single individual. There are a number of reasons why. First, a single manager across all of the National Security Space programs provides a continuity and focus to the overall National Security Space program that could not exist otherwise. Second, a single manager provides for the best coordinated, most cost-effective and efficiently managed program, maximizing the leverage between both military and Intelligence Community (IC) space. Third, a single office simplifies the chain of command, harmonizing both the IC and the DOD efforts in space under a single, accountable authority, ensuring the needed cooperation and coordination occurs. This is especially important as we consider the need to improve planning, development, acquisition, and management of our space capabilities, including the industrial base, as our space capabilities also have a tremendous economic and social impact.

Another advantage has been the ability to focus the efforts of the broad space team. As in previous years, I have worked with leaders from organizations across the National Security Space community to review and revise our priorities. As we studied where we are and where we are headed in National Security Space, we found that the 2004 priorities were still sound, so with a few refinements we carried the same priorities into 2005. Our 2005 priorities are: (1) achieving mission success in operations and acquisition; (2) developing and maintaining a team of space professionals; (3) integrating space capabilities for national intelligence, warfighting, and homeland security; (4) producing innovative solutions for the most challenging national security problems; and (5) ensuring freedom of action in space. These five equal priorities are supported in the fiscal year 2006 budget for our defense and intelligence space programs, and I will now discuss each of these priorities in detail.

ACHIEVE MISSION SUCCESS IN OPERATIONS AND ACQUISITION

My first priority is mission success in operations and acquisition. Our success in space operations enables the American way of war. We have brought space to bear in warfighting and intelligence gathering and our Nation cannot do without it.

Space systems provide global access unhindered by geographic or political boundaries, unrestricted by surface or air defenses. When integrated with airborne and surface sensors, or when acting alone, our systems provide critical intelligence, surveillance, and reconnaissance (ISR) information to national decisionmakers and combatant commanders. They monitor the global environment and produce weather forecasting data for battle planners; carry global communications to and from theater; warn our national leaders and deployed forces of incoming missiles; and send

precise navigation and timing signals to troops on the ground, ships at sea, aircraft in flight, and weapons en route to targets. These space capabilities facilitated the tremendous successes our joint warfighters achieved during major combat operations in Afghanistan and Iraq, remain critical components of the joint team around the world, and will enable continued success in the global war on terrorism and future conflicts.

As recognized in the Space Transportation Policy recently signed by the President, mission success in space begins with mission success in spacelift. We have a string of successes with 40 successful National Security Space launches in a row.

Within the last few months I visited space professionals at Cape Canaveral Air Force Station, Florida and Vandenberg Air Force Base, California to kick off the processing of the last Titan-IV launch vehicles in our fleet. These Titan IVs are scheduled to launch this year, marking the end of an era. Another era ended this past February, when the last Atlas-III placed an NRO payload in orbit—the 75th consecutive successful launch for an Atlas launch vehicle.

We now have our Evolved Expendable Launch Vehicles (EELVs), the Atlas-V and Delta-IV, to carry on our proud space launch tradition and ensure our access to space. Eight launches have now been flown, four from each provider, with a ninth launch planned in early March for a commercial satellite. Building on our initial successful EELV launches, we continue our transition from heritage launch systems to two modernized families of vehicles that cover the range of our National Security Space needs. Our strategy is to ensure mission success by maintaining two families of rockets, at least through this decade. These launch vehicles are the best ever, but we cannot now afford to risk grounding critical national security payloads because we relied on a single rocket fleet with a single design.

In December 2004, we conducted a demonstration flight of the first Delta-IV Heavy Lift Vehicle (HLV). The flight met its primary demonstration objectives; however, an early shutdown of the first stage common booster cores left one of its payloads at a lower-than-planned orbit. We are thoroughly examining the cause of the shutdown and will make the changes necessary to ensure mission success in the vital heavy lift regime.

Through the remainder of this fiscal year we plan to launch six more payloads. A new Global Positioning System (GPS) Block IIR–M satellite will sustain the GPS constellation and increase the number of military code capable satellites. Four NRO launches will strengthen our space-based reconnaissance capabilities. Our last Defense Support Program satellite will sustain our strategic missile warning capabilities.

Support to Global War on Terrorism and Other Operations

Our space systems and space professionals provide innovative and unique support to U.S. and coalition military and intelligence operations worldwide. They provide situation awareness, continuous communication, and other critical services to combatant commanders, senior-level decisionmakers, and fielded forces.

Our warriors make extensive use of our space capabilities. As an example, just before a special operations mission in Iraq, we received a request for critical space support. We used multiple systems to complete time-sensitive collections against the target area. Immediately upon the final collection, we passed the last crucial bit of data to the mission planners. They used the updated target area characteristics for planning safe entry and exit routes around significant obstacles. The special operation succeeded with zero loss of life.

Fielded forces rely on the precision navigation standard from GPS, but space professionals also provide GPS-enhanced theater support (GETS) that improves signal quality and accuracy. GETS allows combatant commanders to make the best use of high quality targeting data.

In addition to warfighting applications, space systems provided key geospatial information to support civil authorities responding to the Florida hurricanes, wildfires in California and Alaska, and oil spills along the east coast of the United States. Humanitarian missions responding to the Indian Ocean tsunami also benefited from space systems.

Space Acquisition Programs

We are equally committed to mission success in acquisitions, and are taking positive steps to improve our acquisition processes. Late last year, we updated our space acquisition policies for both the DOD and NRO, bringing them into close alignment. The policies codify best practices such as Independent Technology Readiness Assessments and Independent Cost Assessments. We are committed to fully funding our programs as they enter their preliminary design phase (Key Decision Point B), and

to demonstrating technology maturity in a relevant environment before we settle on a complete design (Key Decision Point C).

In addition to strengthening our acquisition policies, we completed a follow-up to our comprehensive, independent study of space acquisition. Headed by Tom Young, the Young Panel reported good progress in our reforms, and urged us to continue our hard work. The panel recommended we continue our efforts to provide program managers an adequate management reserve. A sufficient reserve gives a program manager the flexibility to address problems in a timely manner; in contrast, lack of a reserve may drive the need to restructure the program—and often to reprogram funds. A delay of 8 to 10 months typically accompanies a formal reprogramming action, during which we suffer additional schedule erosion and increased costs. The Young Panel found that the cost of resolving a problem could grow by 300 percent as a result of this delay. Adequate margin under the program manager's control would address these issues and save time and money. We recognize the difficulty of budgeting for a reserve, but I believe the benefits of flexibility and ability to mitigate cost growth argue in favor of adequate reserves.

Last year, Congress reduced our SBR and TSAT budget requests, directing us to spend more time addressing the technology and affordability challenges facing both programs. Our message to Congress this year: we heard you and we have restructured both programs in a way that addresses your concerns.

We fundamentally restructured the Space-Based Radar program, which we now simply call the "Space Radar" program. Space Radar will be the single space radar effort for the Nation, and provide the deep look, all-weather, day and night surveillance and reconnaissance capabilities required by both the IC and joint warfighters. As part of an integrated ISR network, Space Radar will provide critical information with an affordable architecture by leveraging horizontal integration and advanced technology. To address our current technological and operational risks, we are developing a space demonstration that will work with other ground and air radar programs. With the demonstration, we will validate Space Radar costs and technology maturity as well as demonstrate the Concept of Operations and user utility. This will culminate in an operational Space Radar initial launch in 2015.

We are also moving ahead on acquisition of military satellite communication systems through an incremental acquisition of our planned Transformational Communications Architecture. Our first step will be to field the Wideband Gapfiller System—the first of which is scheduled to launch later this year. We will follow this with the Mobile User Objective System (MUOS), Advanced Extremely High Frequency (AEHF) satellites, and TSAT.

MUOS and the AEHF system are both high priorities for the joint force; for example, the Navy looks forward to these systems' contributions to their ForceNet. MUOS, the new DOD narrowband tactical communications program, continues within budget and on schedule for initial operational capability in 2010. It is the common denominator for command and control providing the capability to communicate from tactical to theater levels, to allies and coalition partners, and between DOD and non-DOD agencies. The AEHF program will provide survivable, protected satellite communications for strategic and tactical users. We added about $1 billion in fiscal year 2006 through fiscal year 2009, and are working closely with the National Security Agency to resolve problems surrounding government-furnished cryptographic equipment. We are proceeding with a three-satellite AEHF constellation, and we retain the option for a fourth spacecraft.

The first launch of TSAT was delayed from fiscal year 2012 to fiscal year 2013, giving us more time to bring the laser communication technology to maturity. TSAT remains as important as ever to every Service and all combatant commanders, as ultimately their requirements (higher capacity communications, Communications "On-The-Move," and ISR platform integration) will not be satisfied by the currently planned WGS, MUOS, and AEHF constellations. For example, as the Army implements modularity and dispersed operations, effective command and control of ground forces becomes increasingly reliant on beyond line-of-sight systems. TSAT will provide the ability to communicate while on the move, with the coverage and capacity needed to implement net-centric warfare concepts across geographically separated areas. We remain on a path to deliver a transformational communication capability to the warfighter as soon as technology maturity and our budget permit.

We continue to come to grips with the Space-Based Infrared System (SBIRS). We delivered our first Highly Elliptical Orbit payload in August 2004, and are on track for delivering our second payload in June of this year. Also, our Signal Processing Assembly and Single Board Computer problems have been resolved. A more rigorous management approach has been instituted, with increased government oversight. We added more testing at earlier integration levels to allow us to quickly address any new technical problems. When fielded, SBIRS will provide unprecedented mis-

sile warning, missile defense, technical intelligence, and battlespace characterization to the warfighter. We continue to give SBIRS our highest attention.

GPS modernization continues to be a priority, not just for DOD but for civil users of GPS as well. The Air Force is planning to launch eight of the modernized GPS IIR–M satellites. Each of these satellites offers greater protection against jamming threats, along with new signals for our military and civil users. We continue procuring the next generation of GPS satellites, GPS–IIF, and remain committed to developing and fielding GPS–III and its advanced anti-jamming capabilities.

DEVELOP AND MAINTAIN A TEAM OF SPACE PROFESSIONALS

My second priority is to develop and maintain a team of Space Professionals. We have great people in the space business and I am dedicated to providing them the tools and training they need to succeed. Our space professionals achieve and maintain our advantage as the world's leading space faring nation. Comprising a unique mix of government civilian, military, and industry professionals from across the DOD and IC, they are space power's most crucial element. We are developing well-educated, motivated, and competent people who are skilled in the unique demands of the space medium. Today they are deployed with our forces around the world and in place in the U.S., employing their skills, and advancing space power for our Nation.

We are working with the Services and National Agencies to synchronize their respective space cadre strategies. Additionally, we continue implementing our Space Human Capital Resources Strategy. On December 15, 2004, we delivered to the Senate and House of Representatives Armed Services Committees an implementation plan for this strategy. This plan includes specific goals and metrics, and a schedule for achieving those goals. Implementing our strategy will foster a challenging and productive work environment; encourage and support individual career development; and build a system that attracts, develops, and retains a talented and diverse team of professionals able to meet future space challenges.

Over the last year, the Air Force established the National Security Space Institute (NSSI) to develop space professionals' ability to harness space systems for warfighting effects and combat support. NSSI courses cover military space systems, space warfare concepts, space tactics and space acquisition. In 2004, the NSSI taught more than 2,500 in-residence students from the Army, Navy, Air Force, and national agencies, including Active Duty, Reserves, National Guard, and Government civilians.

INTEGRATE SPACE CAPABILITIES FOR NATIONAL INTELLIGENCE, WARFIGHTING, AND HOMELAND SECURITY

My third priority is to continue to integrate space capabilities for national intelligence, warfighting, and homeland security. We expanded this priority from the 2004 version, to emphasize our contributions to homeland security. For example, space systems assist in tracking illicit material and hazardous cargoes, and contribute to border security. But our Nation's security begins overseas, including areas where we do not have forces on the ground. In those areas, space systems can provide our eyes and ears. We are committed to bringing all our space systems to bear in support of warfighting and intelligence needs at home and abroad. Fully integrated National Security Space capabilities will enhance decisionmaking and warfighting capabilities at all levels.

The integration of our space forces is being done across the DOD and IC. For example, USSTRATCOM has established a Joint Functional Component Command for Space and Global Strike, which will improve integration of space capabilities. In fiscal year 2004, the NRO trained over 4,600 personnel, more than one-third of whom were deployed or deploying U.S. military personnel, on the latest techniques to fully exploit space systems and capabilities to support combat operations.

Our ongoing activities in support of the global war on terrorism highlight the fact that space capabilities have become increasingly integrated in our national intelligence and warfighting operations. As mentioned, we are pursuing additional integration by addressing intelligence and warfighter needs in the Nation's next-generation Space Radar program. We have forged an agreement between the Secretary of Defense (SECDEF) and the Director of Central Intelligence (DCI) to ensure the multi-mission needs, requirements, and capabilities will be satisfied for both communities. In response to this agreement, I have restructured the Space Radar Program Office and relocated it to the Washington, DC, area to improve stakeholder interaction and collaboration.

PRODUCE INNOVATIVE SOLUTIONS FOR THE MOST CHALLENGING NATIONAL SECURITY PROBLEMS

My fourth priority is to produce innovative solutions for the most challenging national security problems. To counter proliferation of weapons of mass destruction (WMDs), detect emerging terrorist organizations, secure our economic institutions, and defend our homeland, we are fielding space capabilities targeted against a variety of threats. We are working specifically on three needs: Detection, to locate and investigate WMD activity, terrorist threats, missile launches, and so forth; Communication, to deliver actionable information to those in harm's way and those who need to make timely decisions; and Action, to prevent adversaries from harming us here or abroad. We must sustain a solid foundation of science and technology (S&T) to create innovative solutions.

We recently published the DOD Space S&T Strategy, and at our Fall summit we focused on our four S&T vectors: (a) Next Generation Launch Capability; (b) Operationally responsive, low-cost 500 kg or less satellites and launch capability to support warfighter and intelligence needs; (c) Assured freedom of action in space; and (d) Integrated Persistent ISR. We will use these operational vectors to help align programs, focus the Department's space S&T investment, and adjust S&T portfolio priorities as needed. We will continue to refine and review these vectors, and ensure our DOD and IC efforts are synchronized.

We explore many new ideas through Joint Experimentation, which also provides a venue for rapid prototyping of emerging technologies. In August 2004, emerging space capabilities were integrated into the Air Force's Joint Expeditionary Forces Experiment. This experiment focused on Battle Management Command and Control improvements, to advance network-centric operations. In this experiment, the Satellite Interference Response System (SIRS) demonstrated the potential for a deployable defensive counterspace capability to detect, characterize, and roughly geolocate interference or jamming of satellite communications links. The information was reported to the Combined Air and Space Operations Center (CAOC), where planners developed options to mitigate the interference. SIRS gave the CAOC the capability to rapidly react to potential satellite jamming to protect critical space capabilities.

In another recent example of rapid prototyping, NRO engineers developed a tool that enables U.S. personnel deployed to Iraq and Afghanistan to access intelligence information computers in the theater. This tool provided our forces efficient and rapid availability to mission critical information. While the Tactical Satellite (TACSAT) program is more traditional, we are also using it to explore small satellite technologies and assess their military applications. The Naval Research Lab hopes to launch TACSAT–1 this summer, and Air Force Research Lab (AFRL) will continue to develop the technology with annual TACSAT launches.

A promising area of innovation is our work to develop Operationally Responsive Space (ORS) to increase the responsiveness, flexibility, and affordability of our space capabilities. The joint Air Force/Defense Advanced Research Projects Agency (DARPA) Falcon program remains focused on providing low-cost (~$5 million per launch vehicle excluding payload and payload integration) responsive space launch for small payloads (<1,000 lbs. to low earth orbit) with a first demonstration scheduled this year. AFSPC and AFRL are also working on the Affordable Responsive Spacelift Sub-Scale Demonstrator (ARES), which will develop a quarter-scale demonstration of a hybrid vehicle with a reusable first stage and an expendable second stage. The goal of ARES is to reduce medium lift costs by three to six times and enable turn-around times of 24–48 hours between launches.

Ultimately, how we employ both rapid launch and small satellites falls under a concept we call Joint Warfighting Space (JWS). JWS is focused on providing dedicated, responsive space capabilities and effects to the Joint Force Commander in support of national security objectives. The DOD Office of Force Transformation, DARPA, and the Air Force are enthusiastic about the potential of JWS. The combined efforts of these initiatives—operationally responsive launch vehicle and satellite development—will transform the delivery of space-based capabilities.

One of the most innovative initiatives we are pursuing calls for exploiting a region we refer to as "Near Space," which includes altitudes from about 65,000 to 325,000 feet. Using platforms somewhat similar to weather balloons or blimps, we can realize many of the same benefits space provides—persistence, large field of regard and relative immunity from threat—while enjoying the relative ease of access and lower costs typically associated with aircraft. "Near Space" platforms are not intended to replace air or space, but will provide additional capability—such as over the horizon communication and ISR—fully integrated with air and space platforms. AFSPC has

conducted a series of "Near Space" demonstrations and the results are extremely encouraging.

What we want National Security Space to provide to our national leaders and combatant commanders is simple to state, hard to achieve, and has not changed from last year. We call it "transparency"—the ability to see everything and know everything, while simultaneously denying our adversaries both the ability to do the same and the knowledge that such capabilities are being used against them. We are constantly working to ensure our S&T efforts result in our ability to always be one step, or more, ahead of our adversaries—to see first, understand first, and act first.

ENSURE FREEDOM OF ACTION IN SPACE

My final priority is to ensure freedom of action in space. America's dependence on space capabilities continues to grow. Our reliance on space has not gone unnoticed by our adversaries. We have been and will continue to be challenged in space and we must be ready to protect our capabilities. Our adversary's attempted denial of our Global Positioning System through jamming during Operation Iraqi Freedom is an indication of our need to protect our space capabilities in the future. To answer this and other emerging threats we will maintain robust capabilities for assured launch, since freedom of action in space begins with the ability to get into orbit. In addition, we will develop the ability to protect our space assets and, if necessary, prevent potential adversaries from using space in a manner hostile to our national interests. Protecting our satellites and the capabilities they provide is both a military and economic imperative for the well being of our Nation.

Improved space situation awareness

The first step in protecting our space capabilities is improving our Space Situation Awareness (SSA). With SSA we can accurately characterize the space environment, distinguish a malfunction from an attack, and reliably prevent collisions in space. We are implementing a three-phased approach to improve space situation awareness, involving sensors, data fusion, and operating concepts. We are also sustaining and upgrading sensors to keep the Space Surveillance Network healthy, and developing and fielding new ground and space based sensors. Wargames such as Schriever III, conducted this February, emphasized the importance of a robust and fully integrated SSA architecture. We continue to develop the Rapid Attack Identification, Detection, and Reporting System (Spiral 1)—with the potential to provide radio frequency interference detection and geolocation for satellite communications, and detection and characterization tools for interference at our ground sites—and the Single Integrated Space Picture (SISP) to provide visibility of theater MILSATCOM support.

Development of space control systems

Because we rely so heavily on space capabilities, we must be prepared, when directed, to confront our adversaries on the "high ground" of space. We continue to develop a range of capabilities to meet current and future potential threats. Our intent is to preclude hostile use of space through diplomatic or other non-lethal means, and if such measures fail, we reserve the right under international law to take military action against an adversary's space capability in self-defense. To that end we have fielded the ground-based Counter Communications System (CCS), scheduled to achieve full operational capability this year. CCS is ground-based, transportable, and intended to disrupt adversary satellite-based communications in a temporary and reversible manner.

CONCLUSION

I am proud of the accomplishments we have made in National Security Space through my tenure over these past 3-plus years. We took several disparate organizations and integrated them in a way that better serves our Nation. At the same time, we demonstrated and improved the capabilities our space systems provide on and off the battlefield.

National Security Space remains a work in progress. We are modernizing every major space system and providing new or enhanced capabilities, while sustaining existing constellations that provide critical capabilities to joint warfighters. The complex technologies involved with all of our space systems, the small quantities of critical satellites, and the inability to repair them on-orbit requires significant upfront investment and attention to practices that are more demanding than in other acquisitions. As long as we continue to expect our space systems to provide asymmetric advantages, even after years on-orbit, then we must build systems that are on the leading edge of technology. We are working to minimize difficulties; but as we continue to push the technological envelope, challenging situations will always

be part of the equation. I remain highly optimistic about National Security Space's future.

As stated by the Space Commission and last year's National Commission on Terrorist Attacks Upon the United States (the 9/11 Commission), our capabilities—in this case our National Security Space capabilities—must be viewed as an integrated whole. Because the military and intelligence elements in space comprise a national security capability, we should keep the functions that oversee them integrated. That is why I strongly recommend that a single individual continue to hold the dual positions of Under Secretary of the Air Force and Director of the NRO, as well as the responsibility as DOD Executive Agent for Space.

I appreciate the continued support Congress and this committee have given to help deliver these vital capabilities, and I look forward to working with you as we continue to develop, produce, launch, and operate critical space systems that deliver vital capabilities to this great Nation.

Senator SESSIONS. Thank you, Mr. Teets. That's a good overall view of where we are. Thank you for your work in helping us be in the strong position we are today.

General Cartwright, did you or any of the others want to make an opening statement? We'd be glad to do that.

STATEMENT OF GEN. JAMES E. CARTWRIGHT, USMC, COMMANDER, UNITED STATES STRATEGIC COMMAND

General CARTWRIGHT. Mr. Chairman, I've submitted my statement for the record. I think, given the time and the challenges we have today, I'll stand ready for your questions.

[The prepared statements of General Cartwright and General Lord follow:]

PREPARED STATEMENT BY GEN. JAMES E. CARTWRIGHT, USMC

Mr. Chairman and members of the subcommittee: This is my first opportunity to appear before you as Commander of the United States Strategic Command (USSTRATCOM). Thank you for the time you've given me to discuss the missions assigned to us as we continue to prosecute the global war on terror and take on the challenge of combating weapons of mass destruction.

My prepared remarks cover USSTRATCOM's role in the challenging 21st century environment and plans for addressing those challenges with capabilities to serve our Nation's needs in war and in peace.

THE 21ST CENTURY GLOBAL ENVIRONMENT

Global interdependence—economic, political, and social—combined with near instantaneous global connectivity, is a trademark of the new century. It also heightens the importance of strong links between U.S. strategic objectives and regional operations. U.S. strategic objectives have profound influence on individuals, regions, nations, and non-state actors and networks. The tight linkage between U.S. strategic objectives and the conduct of regional operations is evident in our operations in Afghanistan and Iraq, and more recently in Asia in the aftermath of the tsunami. In Afghanistan, the strategic objective to combat global terrorism guided, as well as constrained, our regional decisions. The regional operations in Iraq are clearly influencing cultural, economic, and security considerations around the globe.

Our adversaries are using asymmetric approaches; exploiting social, political, and economic vulnerabilities to avoid confronting superior U.S. forces head on. We continue to see increases in the speed and deceptive scale of proliferation of potential weapons of mass destruction, including delivery and concealment capabilities. We see adversaries who would use improvised explosive devices (IEDs) and suicide bombs against their own people and infrastructure, as well as against deployed multinational forces. These adversaries have easy access to the same global technology base we do, and can exploit the same communication and information resources as the American public. They have proven they are an intelligent and adaptable enemy.

All operations, while regional in execution, have global consequence and therefore require a global perspective. Regional combatant commanders, who are responsible and accountable for conducting combat and peacekeeping operations in their areas of responsibility (AORs), have long depended upon support provided from outside

their AORs. Much of that support, which in the past was provided on an ad hoc basis, has now been codified in the Unified Command Plan as a USSTRATCOM global responsibility. We are positioning USSTRATCOM to advance a distinctly global and strategic perspective on current and emerging capabilities necessary to deter threats to our way of life, particularly those threats involving weapons of mass destruction. USSTRATCOM will enable combatant commanders regional operations through realization of a comprehensive set of global mission capabilities, soundly integrated to achieve more effective and efficient execution.

We look upon this responsibility as both an exciting challenge and a solemn obligation to the regional combatant commanders, the American men and women who serve in their AORs, and to the American people.

GLOBAL ENABLERS

21st century operations are fundamentally different from those of the last century. Combat operations are being conducted in rapidly changing circumstances, shifting from humanitarian operations to intense firefights within a few hundred yards of each other with little or no warning. This dynamic nature is matched by a varying composition of assisting partners. We must be ready to conduct integrated, distributed operations using global and regional military forces. In many situations, these forces will be augmented by other U.S. Government personnel, coalition and commercial partners, and possibly, nongovernmental organizations. To plan and effectively execute these types of distributed, agile, and integrated operations, the regional combatant commands increasingly rely on multiple capabilities the global commands must support or provide.

The Unified Command Plan expands USSTRATCOM responsibilities through the assignment of global mission areas that span levels of authority, cross regional boundaries, and intersect with various national and international agencies. USSTRATCOM's missions are:

- Global deterrence;
- Global support from space-based operations;
- Global intelligence, surveillance, and reconnaissance;
- Global strike;
- Global information and network operations;
- Global command and control;
- Global integrated missile defense coordination; and
- Globally combating weapons of mass destruction.

Achieving the full potential of these missions is contingent upon identifying the right capabilities mix and sustaining our global reach through space. However, without the context of advanced situational awareness and the power of collaboration, even the best tools may be insufficient to deter and defeat a determined adversary. We are placing an emphasis on the following global enablers:

The New Triad

USSTRATCOM supports The New Triad concept; a strategic way ahead in pursuit of a more diverse set of offensive and defensive warfighting capabilities. We are active participants in all three legs of The New Triad: offensive nuclear and non-nuclear strike (including nonkinetic), passive and active defenses, and a defense infrastructure capable of building and sustaining all offensive and defensive elements, including the critical support areas of command, control, and intelligence.

Coupled with improved collaboration and shared global awareness, The New Triad concept will enable more precisely tailored global strike operations. With a full spectrum of nuclear, conventional, and nonkinetic options available, regional combatant commanders will be enabled to achieve specific local effects against high value targets in the context of the strategic objective.

While we are confident in our ability to support effective global strike operations today, we must continue to evolve that capability to meet the demands of an uncertain tomorrow. For example, I intend to conduct experiments to better understand the value of weapon accuracy within a range of stressing environments. If modeling and testing confirm the value of such capability, this may lead to new thoughts on the balance between nuclear and conventional strike alternatives.

The new responsibilities assigned to USSTRATCOM have required the command to broaden its Cold War focus from deterring nuclear or large-scale conventional aggression to becoming a major contributor to the much broader defense strategy. Nuclear weapons, however, continue to be important, particularly for assuring allies and friends of U.S. security commitments, dissuading arms competition, deterring hostile leaders who are willing to accept great risk and cost, and for holding at risk those targets that cannot be addressed by other means. As steward of the Nation's

strategic nuclear deterrent, we have two specific areas of focus—rationalizing our nuclear forces, and providing for a relevant nuclear stockpile in the context of The New Triad. USSTRATCOM's first priority will continue to be the maintenance of the absolute security, safety, and surety of the stockpile. At the same time we will continue to evaluate and provide a range of options, both nuclear and non-nuclear, relevant to the threat and military operations.

The New Triad concept presents an opportunity to reduce our reliance on nuclear weapons through the evaluation of alternative weapons, defensive capabilities, and associated risk. It is our intent to have the upcoming Quadrennial Defense Review address nuclear issues and the associated infrastructure to determine transformation requirements for our nuclear capabilities in the 21st century. We will look at rationalizing our nuclear forces as an element of the overall force structure and the proper tailoring of nuclear effects as part of the broad spectrum of national power. These assessments will be important to future operational planning as well as future budget plans.

Finally, The New Triad concept provides a framework in which to establish a new dialogue on the future role for nuclear weapons in our national strategy. The challenging security and threat environment of the 21st century signals the need for an informed national level discussion to hear the voices of government leaders, military, academia, and the public if we are to effectively establish a long-term nuclear investment plan.

Space

The importance of the space mission to our national security cannot be overstated. The U.S. economy, our quality of life, and our Nation's defense are all linked to our freedom of action in space. For example, satellites are at the heart of routine financial activities such as simple automatic teller machine operations or complicated international currency and stock market transactions. The telecommunication industry is heavily vested in space. Commercial airliners, container ships, trains, trucks, police, fire departments, and ambulances have also become highly dependent upon space-based global positioning systems to enhance their ability to safely deliver people, goods, and services. The fact is, our dependency on space increases every day—a fact not lost on our adversaries. This growing national dependence on space-based and space-enabled capabilities establishes a true imperative to protect our space assets and our ability to operate freely in and from space.

We currently enjoy an asymmetric advantage in space, but our adversaries are gaining on us. Our space support infrastructure is aging and, in some instances, on the verge of becoming obsolete. We will continue to face additional challenges as other nations exploit new technologies and capabilities in attempts to bridge the gap between them and us.

The space environment itself is also rapidly changing. For example, the number of objects-in-orbit increases every month, while the size of those objects decreases. This is challenging our space surveillance technology, developed in the latter half of the 20th century, because it was not designed to detect or track the current magnitude of new, smaller objects, including micro-satellites. This increases the chances of collisions, which threatens our manned spaceflight program; opens the door for unwarned action against U.S. satellites by adversaries; and limits our ability to protect our space assets.

We must do a better job of leveraging the capabilities of our space assets—in DOD, national, and commercial systems. We must also maintain the ability to protect our own space assets and capabilities, both actively and passively, while denying our adversaries the military use of space—at the time and place of our choosing.

In order to bring these elements of space control together, our near-term plan is to work with the various space programs to identify potential gaps and make sure existing information and applications are available and provided to authorized users on a global network. This plan will serve as the basis for a concept of operations to exploit information from our space assets, providing space situational awareness to the regional combatant commands.

Distributed Operations

For distributed, integrated operations, dominant situational awareness is an imperative—globally, regionally, and locally. It must exist across the full breadth and depth of operations, from planning and combat through post-conflict reconstruction and ultimately, peacetime.

For our forces to effectively employ collaborative capabilities and capitalize upon situational awareness, we must enable them to create pictures of the battlespace tailored to their specific needs—what we refer to as User Defined Operating Pictures. It is USSTRATCOM's job to provide the global capabilities to enhance situa-

tional awareness, facilitate collaborative planning, and provide a basic User Defined Operating Picture capability for all of the combatant commands.

Many of the capabilities required for agile, distributed operations will be facilitated by space and enabled by a global information environment with ubiquitous, assured access to information, when and where any combatant commander needs it. To achieve this vision, the old mantra to provide information on a "need to know" basis, must be replaced by a "need to share." Critical information that the warfighter didn't know existed, and the owner of the information didn't know was important, must be made available within a global information environment easily accessible to commanders at all levels.

Interdependent Capabilities

Our action plan for global command and control focuses on ensuring the all-source information needed for effective operations is available to all theaters. For the global Intelligence, Surveillance, and Reconnaissance (ISR) mission, that also means developing integrated and persistent systems capable of supporting precision targeting. USSTRATCOM has the lead for coordinating global ISR capabilities and will be working closely with the regional combatant commanders, Joint Forces Command, and the Services to develop the associated strategy.

The Department's net-centric global information services, currently in development, are essential to our global missions. These services will connect global and regional applications and improve both horizontal and vertical information integration.

We are developing a prioritized plan for transitioning away from stove-piped legacy systems to capabilities that support broader information and applications access. Included in this plan are actions focused on leveraging existing legacy applications and data by making them more broadly accessible. Each user will be allowed the flexibility to select from any available data source, anywhere on the network, those objects most useful to them at any particular time. Additionally, any new data source will be available the moment it comes onto the network, rather than requiring a modification to existing systems, as is the case today.

USSTRATCOM is an advocate for net-centricity. Our focus is on:

- Capability to enable our "internet-like" environment and access to information;
- Realization of a high-bandwidth, ubiquitous communications backbone to deliver information with high assurance and low latency; and
- Robust information assurance required to defend our networks and our information.

Creating a collaborative structure is more than just designing and disseminating tools—it is also about changing human behavior. Our objective is a global, persistent, 24/7 collaborative environment—comprising people, systems, and tools. Our future structure must support real time command and control at both the global and local levels as well as enable dynamic, adaptive planning and execution in which USSTRATCOM, the regional combatant commanders, and other geographically dispersed commanders can plan and execute operations together. Our collaborative environment must also provide the capability to "connect all the dots"—enemy dots, friendly dots, neutral dots, contextual dots—all the dots that matter—as they appear, rather than wait for a post-event analysis when all of the different data stores can be opened. With improved collaboration and shared awareness, we can more effectively conduct operations using the full spectrum of capabilities to achieve desired, focused effects against high-value targets.

In that regard, we are actively assessing the currently available collaborative environment and processes and investigating potential pilot programs to encourage organizational information sharing to build trust in shared information. Fundamental to this issue is the establishment of data tagging standards and associated information assurance policies.

With regard to sharing information, we are in some respects navigating uncharted waters. While the value of sharing information with allies, coalition partners, and other Federal departments and agencies is well understood, sharing information with industry or other private sources presents proprietary, intellectual property and privacy concerns which are not well understood. Such information has the potential to be of great value to USSTRATCOM and the regional combatant commanders in accomplishing our missions. We will be attentive to the actions currently being taken throughout the Federal Government in response to Executive Order 13356, "Strengthening the Sharing of Terrorism Information To Protect Americans," which may provide us valuable insight and guidance in this sensitive area.

BUILDING AN ASYMMETRIC ADVANTAGE

In addition to our role as steward of the Nation's nuclear stockpile and guardian of global deterrence, USSTRATCOM now has the responsibility for working across regional boundaries to address threats in a global perspective. To achieve the asymmetric advantage we desire requires us to build the interdependent, collaborative, operational environment we've envisioned. It is our responsibility to provide global services and global context to the regional combatant commands and their deployed forces so we are collectively a more effective force—for warfighting, peace, and all possible combinations of both.

New Command Structure

As the latest step in maturing our approach to fulfilling USSTRATCOM's global mission responsibilities we are implementing a new command structure. This structure is critical to the asymmetric advantage we seek, leveraging essential competencies of associated components and key supporting agencies through a distributed, collaborative environment.

Rather than creating additional organizational layers, we are bringing existing commands and agencies under our global mission umbrella through the establishment of Joint Functional Component Commands. These interdependent Joint Functional Component Commands will have responsibility for the day-to-day planning and execution of our primary mission areas: space and global strike, ISR, network warfare, integrated missile defense, and combating weapons of mass destruction.

USSTRATCOM headquarters retains responsibility for nuclear command and control. Additionally, headquarters will provide strategic guidance, exercise global command and control, and conduct strategic level integrated and synchronized planning to ensure full-spectrum mission accomplishment. USSTRATCOM will also advocate for the capabilities necessary to accomplish these missions.

This construct will allow us to leverage key, in-place expertise from across the Department of Defense (DOD) and make it readily available to all regional combatant commanders. Our vision is for the combatant commanders to view any Joint Functional Component Command as a means by which to access all of the capabilities resident in the USSTRATCOM global mission set. Anytime a combatant commander queries one of our component commands, they will establish strategic visibility across our entire structure through our collaborative environment. The fully integrated response USSTRATCOM provides should offer the combatant commander greater situational awareness and more options than originally thought available. Specific Joint Functional Component Command responsibilities include:

- *Space and Global Strike.* The Commander STRATAF (8th Air Force) will serve as the Joint Functional Component Commander for Space and Global Strike. This component will integrate all elements of military power to conduct, plan, and present global strike effects and also direct the deliberate planning and execution of assigned space operation missions. For plans not aligned with a specific mission set, the Joint Functional Component Command for Space and Global Strike is tasked to work in close coordination with USSTRATCOM headquarters as the lead component responsible for the integration and coordination of capabilities provided by all other Joint Functional Component Commands.
- *ISR.* The Director, Defense Intelligence Agency (DIA) will be dual-hatted to lead the ISR Joint Functional Component Command. This component is responsible for coordinating global intelligence collection to address DOD worldwide operations and national intelligence requirements. It will serve as the epicenter for planning, execution, and assessment of the military's global intelligence, surveillance, and reconnaissance operations; a key enabler to achieving global situational awareness.
- *Network Warfare.* The Director, National Security Agency (NSA) will also be dual-hatted to lead the Network Warfare Joint Functional Component Command. This component will facilitate cooperative engagement with other national entities in computer network defensive and offensive information warfare as part of our global information operations.

Our coordinated approach to information operations involves two other important supporting commands. The Director, Defense Information Systems Agency also heads the Joint Task Force for Global Network Operations. This organization is responsible for operating and defending our worldwide information networks, a function closely aligned with the efforts of the Joint Functional Component Command for Network Warfare. Additionally, the Commander, Joint Information Operations Center coordinates the non-network related pillars of information operations: psychological op-

erations, electronic warfare, operations security, and military deception. Both the Joint Task Force for Global Network Operations and the Commander, Joint Information Operations Center will be full members of the USSTRATCOM distributed, collaborative environment.

• *Integrated Missile Defense.* The Commander, Army, Space, and Missile Defense Command will head the Integrated Missile Defense Joint Functional Component Command. This component will be responsible for ensuring we meet USSTRATCOM's Unified Command Plan responsibilities for planning, integrating, and coordinating global missile defense operations and support. It will conduct the day-to-day operations of assigned forces; coordinating activities with associated combatant commands, other STRATCOM Joint Functional Components, and the efforts of the Missile Defense Agency. The Joint Functional Component Command for Integrated Missile Defense is a key element of the "defenses" leg of The New Triad concept.

• *Combating Weapons of Mass Destruction.* The Secretary of Defense (SECDEF) recently assigned USSTRATCOM responsibility for integrating and synchronizing DOD's efforts for combating weapons of mass destruction. As this initiative is in its very formative stages, we have yet to formalize any specific componency structure. However, we anticipate establishing a formal relationship with the Defense Threat Reduction Agency as an initial starting point.

This new componency structure is in its infancy and will take several months to fully realize. There are detailed issues to work through, including the proper distribution of subject matter expertise and an assessment of expanding relationships with other U.S. Government departments and foreign nations.

A final element of our evolving organizational structure involves developing relationships with the private sector to build upon efforts under the Partnership to Defeat Terrorism. This important partnership with the private sector supports many of our national objectives and crosses into relatively uncharted territory.

• *Partnership to Defeat Terrorism.* The United States has achieved success in the global war on terrorism by attacking terrorist infrastructure, resources, and sanctuaries.

Nevertheless, our adversaries continue to plan and conduct operations driven by their assessment of our vulnerabilities. The main vulnerability requiring our constant vigilance is the Nation's economy and one need look no further than the economic aftershock attributed to the September 11 terrorist attacks to affirm this assertion. The risk is accentuated given the global underpinnings of our economic structure. Even a small-scale terrorist attack against a lower tier provider in a distant land can have wide-ranging and pervasive economic implications.

Given the evolving understanding of terrorists use of global processes, the Partnership to Defeat Terrorism was created to intercede on behalf of combatant commanders, among others, and positively affect outcomes through connections with the private sector. Since November 2001, the Partnership to Defeat Terrorism has successfully combined private sector global processes with other elements of national power to help fight global terrorism as part of USSTRATCOM's global mission responsibilities. This fruitful relationship with the private sector has proven effective on a number of occasions and has garnered the support of influential leaders both within and outside government.

Yet, the Partnership to Defeat Terrorism is somewhat of an ad hoc process based on trusted relationships. As such, the value of the program is directly related to the availability of the participants. USSTRATCOM was recently contacted by a group of people from various non-military sectors, advocating the creation of a working group to formalize this ad hoc program to begin planning a more permanent approach for the long-term.

On a strategic level, the value of such an effort is the open realization that all elements of national power, which have not traditionally operated in a synchronized and coordinated role in national security, understand the urgent need for their involvement.

Full realization of the benefits inherent in the distributed, interdependent organizational structure described above requires an effective collaborative operation. A true collaborative environment provides us the asymmetric advantage necessary to deter and defeat the agile adversaries we face in the 21st century environment. In the future, these skills will take on even greater importance as we broaden our partner base within the U.S. Government, with coalition partners, commercial partners, academia, and others, including non-government organizations.

ACHIEVING THE STRATEGIC IMPERATIVE

Agile, responsive, distributed operations, enabled by meaningful information exchange, shared objectives, and shared situational awareness, are key to the successful performance of USSTRATCOM's global missions. We have assessed the capability gaps in our global mission areas and have developed action plans, working with our partner commands, to improve our collective ability to carry out operations at all levels.

USSTRATCOM's strategy is focused on:

- Stewardship of the Nation's strategic nuclear deterrent force;
- Defending against asymmetric approaches used by our adversaries, including weapons of mass destruction;
- Responding effectively in a rapidly changing combat operations environment;
- Achieving prompt, predictable, precision operations;
- Coordinating with U.S., multinational, interagency, and private sector partners in a collaborative environment;

Implementing this strategy relies on new and enhanced capabilities, including:

- Dominant situational awareness;
- A ubiquitous, assured, global information environment;
- Dynamic, persistent, trustworthy collaborative planning;
- User Defined Operating Pictures, using distributed, globally available information; and
- A culture that embraces "need to share" rather than "need to know."

We are not there yet. Working with our partner commands, we have developed plans to improve our global capabilities. We need your continued support to deliver the capabilities needed to combat the threats of the 21st century. We need your support for:

- Pursuit of high capacity, internet-like capability to extend the Global Information Grid to deployed/mobile users worldwide;
- Adoption of data tagging standards and information assurance policies to increase government-wide trusted information sharing;
- Technology experiments to enhance our understanding of the value of accuracy and stressing environments for current and future weapons.

Finally, as an element of our role as steward of the Nation's strategic nuclear capabilities, we need you to:

- Consider a new national dialogue on nuclear policy. This nation is ready for a genuine policy debate on the role of nuclear weapons within the context of the current global environment and the potential offered by The New Triad concept. We must build a long-term nuclear investment plan suited to national security goals.

USSTRATCOM recognizes what has to be done to be a global command in support of the warfighter. We are aggressively moving out on actions to ensure USSTRATCOM fulfills our full set of global responsibilities, supporting our national security needs in peace and in war.

Thank you for your continued support.

PREPARED STATEMENT BY GEN. LANCE W. LORD, USAF

INTRODUCTION

Mr. Chairman, Senator Nelson, and the distinguished members of the committee, it is my distinct honor and privilege to appear before you today and represent the almost 40,000 space and missile professionals in Air Force Space Command. I am pleased to serve with and join the acting Secretary of the Air Force, the Honorable Pete Teets here today.

Our Nation has developed the most capable space and air forces the world has ever seen. The contributions of our United States Air Force have been truly remarkable at a time when our Nation has needed us the most. Our great leaders and my fellow generals in the United States Air Force are certainly proud of each and every airman as they dedicate themselves to the defense of this great Nation. I look forward to reporting to you on the strong and confident state of our space and missile force, our well documented successes over the last year, our priorities for the coming year, and the challenges we are poised to tackle.

PROUD OF OUR JOINT TEAM OF SPACE PROFESSIONALS

Modern warfare is not conducted by one Service alone. I am truly grateful to my colleagues in the United States Army, Navy, Marine Corps, and Coast Guard. I am honored to be joined by the Commander of United States Strategic Command, General James "Hoss" Cartwright, United States Marine Corps. I am also proud to be joined by Lieutenant General Larry J. Dodgen, Commanding General, Army Space and Missile Defense Command; Vice Admiral Joseph A. Sestak, Deputy Chief of Naval Operations, Warfare Requirements, and Programs; and Brigadier General Thomas Benes, Director, Strategy and Plans Division, Plans, Policies, and Operations Department, Headquarters, U.S. Marine Corps.

Space capabilities are inherently joint, and we all know you cannot go to war and win in the modern era without the battlefield effects provided through and from space. Therefore, it is only fitting that we appear here together to discuss the importance of defending our Nation through space and Intercontinental Ballistic Missile (ICBM) operations. Our Air Force Space Command operations project global reach and power for all our combatant commanders and their joint warfighters. I applaud the effort of this committee to continue our discussions on the importance of National Security Space as a joint team. Space capabilities significantly impact the flow of national and international commerce and we need to understand the significance of this from the Main Streets of America to Wall Street.

I want to express my sincere gratitude to Senator Sessions and every member of this committee, for your continued support of military space, and the development of our Nation's space capabilities and professionals. The commitment and dedication of this committee provides critical support to our dedicated space and missile professionals and this fact does not go unrecognized in our military circles or by the American public.

SUPPORT TO OUR NATION'S GLOBAL WAR ON TERRORISM

I would like to start by briefly describing some of the capabilities Air Force Space Command provides daily in defending our Nation's interests at home and abroad while protecting the lives of our fellow soldiers, sailors, airmen, and marines. The road to space starts on both coasts at one of our Nation's two Space Launch bases, where we provide services, facilities, and range safety control to conduct launches of Department of Defense (DOD), NASA, and other national and commercial payloads. Once our payloads reach space, our satellite operators provide force-multiplying effects. Space capabilities are no longer nice to have, but are now indispensable to how we fight and win our Nation's wars.

Our people and space systems provide critical, in-theater, secure communications, warning of ballistic and tactical missile attacks and precise navigation for ground, air, and sea operations to name a few. From the earliest weather predictions to the latest Battle Damage Assessment, our national leadership depends upon space capabilities to plan and execute all operations across the spectrum of conflict. Our ground based radar and Defense Support Program satellites monitor ballistic missile launches protecting our Homeland and our forces deployed worldwide.

In keeping with our 23 year tradition of protecting and projecting America's interests in space, Air Force Space Command provides vital information on the location of satellites and space debris for the Nation, our allies, and the world. America's ICBM team also plays a critical role in maintaining world peace and ensuring our Nation's steadfast security. Our ICBM forces offer an extraordinarily capable and proven strategic deterrent with a readiness rate above 99 percent. We owe a debt of gratitude to our ICBM professionals: maintainers, operators, security police, and support personnel who serve in the northern tier states of our great Nation for everything they do each day to ensure our Nation's security.

Air Force Space Command is truly a "global command," from our continental United States (CONUS) based Launch Control and Space Operations Centers to our deployed airmen and systems worldwide. Our former Secretary of the Air Force, recently said, "We look at Space capabilities like oxygen. If you have it you take it for granted. If you don't have it, it's the only thing you want." We know you cannot survive without oxygen and our armed forces are realizing we cannot have success on the battlefield without space. Air Force Space Command maintains worldwide vigilance and global awareness around the clock, but we also provide tailored combat effects to our theater commanders and their joint warfighters.

During Operation Iraqi Freedom, American forces transformed modern warfare and the basic principles of war. Thanks to space and our evolving technology, a single bomber aircraft can deliver the same effect as hundreds of aircraft during World War II. Space has allowed us to advance the principle of maneuverability to an unprecedented level by allowing our forces to be faster, more versatile, and quicker to

react than ever before. Throughout the history of warfare, speed has always been the warrior's lifeline. Today, we rely on the speed of information and the data flow our space capabilities provide to, and in the theater of operations. Over 60 percent of the communications flowing into the area of operations at the height of Operation Iraqi Freedom traveled through satellites on orbit, and we provided 100 percent of the secure satellite communications.

In a matter of minutes, not weeks, hours or days as in past wars, commanders are able to find, fix, track, target, and engage adversaries while receiving more timely Battle Damage Assessments. The message is crystal clear from our comrades in arms, leaders like Lieutenant General Lance Smith, the Deputy Commander of United States Central Command, who stated, "You space [professionals] are providing us our lifeline. We use it. We take it for granted, but if we ever lost it; people would die." Lieutenant General William S. Wallace, who was the Commander of the Army's V Corps during the height of Operation Iraqi Freedom, echoed the importance of our space capabilities when he said, the communications provided by our satellites "were the lifeblood of the Division/Brigade in the attack."

One of the biggest problems we face as a military is the ability to conduct precision attack against moving targets. This problem is even more difficult when the weather does not cooperate and our targets are what we call "under cover" from air, space, sea, and even land assets at times. Our forces in the Pacific theater recently took part in an exercise to prove we could respond within hours anywhere in the Pacific theater in any type of weather condition, day or night to provide Admiral Fallon, the Commander of Pacific Command, with relevant combat capability. As with any successful exercise, there is an inherent capability to help dissuade potential adversaries. During Exercise Resultant Fury in November 2004, the target set was four to six mobile and drifting sea targets. A combination of our unmanned and manned aircraft provided persistent battlespace awareness allowing our Navy F–18 and Air Force B–52 aircraft to conduct unprecedented precision strike through the use of precision-guided munitions using our Global Positioning System Satellites on moving targets under significant cloud cover at sea.

This demonstration of all-weather precision strike against mobile maritime targets across the vast Pacific Ocean would not be possible without integrated teamwork across the air and space community and the flawless execution of our joint team members. The Pacific Air Force team demonstrated a new capability for the Commander of United States Pacific Command and the power of our space forces were heard loud and clear.

Not only are our space and missile capabilities available 24 hours a day to deter and defeat our adversaries when our Nation calls, but we also make the battlespace safer and more secure for our United States forces. Our space capabilities play a major role in the protection of our troops engaged in combat.

Lt. Col. Tony Logue, while serving as the Chief of Space Operations at Headquarters, Air Force Special Operations Command, made a tremendous impact upon Air Force Special Operation's units assigned around the globe. For 2 years, Lt. Col. Logue led the effort to improve situation awareness of pilots flying dangerous missions into some of the world's most hostile combat environments. He wrote and justified with compelling need the requirement for additional Blue Force Tracker equipment (a satellite based identifier which allows us to delineate friend from foe) in support of Operation Enduring Freedom.

Upon receipt of the Blue Force Tracker equipment, Lt. Col. Logue led a team to Afghanistan to install it and train operators on how to use it. His 4 person team completed installations on more than 30 aircraft in 5 locations, without impacting the high tempo of combat operations. Upon his return, he developed and implemented an innovative program to add Blue Force Tracker capability to all Air Force Special Operations aircraft. His planning and actions ensured all aircraft across Air Force Special Operations Command were ready for Operation Iraqi Freedom. His efforts resulted in an unprecedented level of situation awareness for Special Operations Forces at every level and consequently, increased the safety of flight and decreased the chances of a fratricide incident.

Blue Force Trackers are traditionally used with our ground forces and through precise and timely integration with our space capabilities and space operators on the joint operations team, we are routinely able to see through the "Fog of War." Together, we precisely locate our forces, preventing fratricide while enabling lifesaving support and necessary reinforcements when needed. Another tremendous capability provided by our space systems is the remarkable amount of time saved in locating pilots downed in hostile territory. As the Chief of Staff of the Air Force, General John Jumper likes to say, "Space takes the search out of search and rescue." By minimizing the time it takes to precisely locate our downed air crews, space capabilities allow us to save young American lives in harm's way.

Our space capabilities feed and sustain our day to day stability operations in Iraq and Afghanistan while keeping vigilant watch on the rest of the world for potential "hot spots." Space allows us to quickly switch from stability to battle operations. There's no better recent example than our contributions through space systems to Phase IV Stability Operations in Iraq. Operation Iraqi Freedom decapitated Saddam's regime in record time, but left areas of resistance in the Sunni Triangle.

Operation Vigilant Resolve featured 1,300 marines from the First Marine Expeditionary Force in Fallujah, a hotbed of insurgent activity. Marines repeatedly called in precision air strikes against individual buildings and structures harboring dangerous terrorists and insurgents. We used a combination of persistent intelligence, surveillance, and reconnaissance assets, on-call strike aircraft, and Global Positioning System satellites to create stunning precision strikes against individual structures in dense urban areas. The Predator Unmanned Aerial Vehicle (UAV) headed a list of high performing systems and I'm happy to report to you, the outstanding contributions of the Predator UAV were made available through constant secure satellite communications.

On one particular occasion, we targeted a vehicle clearly moving weapons between a residence and a small warehouse. US forces were watching this activity thanks to a Predator sensor transmitting through satellite communications. As we watched, the driver parked the vehicle full of weapons under the carport. We put a Hellfire missile over the wall of the house and under the carport. We eliminated the threat of the weapons with no damage to the house. Members of this distinguished committee, this overwhelming warfighting capability is made possible thanks to our space forces.

We are gathering lessons on how best to conduct urban warfare. However, we know one thing for sure, we need the persistent battlespace awareness, precision guided attack, and secure, reliable communications around the globe our space capabilities provide. The use of GPS aided Joint Direct Attack Munitions allowed for substantially less collateral damage. The unprecedented precision of this weapon worked in Fallujah and it is a great model for air and space support to future urban warfare.

We have many successful stories of Air and Space Power working together allowing the engagement of targets with dial up precision and immediate command and control. This makes our operations in sensitive urban areas more humane and less costly to innocent civilians while showing our enemies you can't hide from the United States Air and Space forces. As you are well aware, our Nation's space capabilities allow us to place fewer people in harm's way. Combined with our air, land, and sea forces, we provide enhanced lethal effects helping to bring a quicker end to hostilities.

We have embraced our role as a space faring nation and we must fully understand and appreciate our responsibilities to our joint warfighters in the Army, Navy, Air Force, Marines and in particular our Special Operations Forces who bet their lives on our capabilities. Space and missile capabilities are as important to our joint warfighters as electricity is to our individual homes and businesses.

There is absolutely no doubt in my mind, our space capabilities will continue to perform brilliantly throughout our operations in Afghanistan and Iraq, and help our Nation keep an ever vigilant eye on our Homeland Defense. The demand for space and missile capabilities is at an all time high. We are an integrated part of every major military operation being conducted worldwide.

In addition to being enormously successful warfighters, Air Force Space Command also experienced several recent successes in the space acquisition business. As the Chairman of the Joint Chiefs of Staff testified before the Senate Armed Services Committee last month, he stated, "Today, bandwidth demand exceeds our DOD space systems capabilities, and our warfighting requirements continue to increase at a very high rate." During Operation Iraqi Freedom we were able to acquire and make eight times the amount of communication bandwidth available to our forward deployed U.S. forces.

The Space and Missile Systems Center reports 7 successful EELV missions and an incredible streak of 40 successful, operational launches in a row. We have the healthiest Missile Warning constellation ever, and we have taken delivery of the next-generation Space Based Infrared System (SBIRS) Highly Elliptical Orbit satellite. We currently have 29 Global Positioning System satellites on orbit, certainly exceeding the 24 ball constellation requirement. The position, navigation, and timing data continuously flowing from the GPS constellation has allowed almost 70 percent of munitions used in Operation Iraqi Freedom to be precision guided. We are constantly working to improve upon our capabilities. We are working within the theater of operations to provide the ability to predict GPS accuracy and derive time over target, weapon systems implications, and probability of kill predictions.

AIR FORCE SPACE COMMAND PRIORITIES

The Acting Secretary of the Air Force, the Honorable Pete Teets, shared his priorities for National Security Space with this committee and Air Force Space Command's priorities are in lock step with our National Security Space priorities. I would like to outline my top priorities for Air Force Space Command in the coming year. In keeping with our command motto, "Mission First, People Always," our overall goals for Air Force Space Command remain unchanged. They are:

- To Achieve Mission Success in Operations and Acquisitions, and
- Provide for the Professional Development of our people while enhancing their Quality of Life

We fully understand our obligation to organize, train, and equip our space and missile forces while our Nation remains engaged in a global war against a very dangerous adversary. Therefore, we must prioritize our efforts to ensure we are generating the capabilities and effects our Nation and warfighters need most.

Our Priorities for 2005 are:

1. Ensure Space Superiority and Provide Desired Combat Effects for Joint Warfighting
2. Maintain a Safe and Secure Strategic Deterrent Capability and Provide Means for Prompt Global Strike
3. Continue Our Efforts to Develop Cost-Effective Assured Access to Space

We continually plan the pursuit of necessary, transformational capabilities and effects. We work ever diligently to expand and maintain effective partnerships throughout the Department of Defense and the National Security Space arena to help us in our pursuit of innovative solutions and transformational capabilities.

Air Force Space Command ensures our Nation's warfighters have the appropriate capabilities when and where they are needed at any point on the planet. We pride ourselves in providing these joint capabilities from space. Our space capabilities are used more today than ever before in the history of our military. Our Global Positioning System (GPS) satellites have become a national resource while providing the greatest free utility in the world. The ever-reliable, constant precision navigation and timing information from our GPS satellites is used worldwide and is intertwined throughout our global economy. An attack against this precious resource would be an attack against our way of life.

In our interdependent global society, we travel to the other side of the world, and expect our credit cards and phones to work. We expect a level of performance in our businesses and an increasing level of convenience in our mobile society. We have Marines using GPS coordinates to locate and track their position in relationship to the enemy. Our military has introduced the world to the concept of satellite-aided munitions. Space systems allow bombs to be delivered within meters of their desired impact points.

SPACE SUPERIORITY AND PROVIDING DESIRED COMBAT EFFECTS FOR JOINT WARFIGHTING

We can no longer expect to send our Service members into combat without our space capabilities being challenged. We cannot tell our President, or any members of this distinguished body, we don't know if our space assets will be attacked. The time for speculation is over. I know you are well aware of the numerous attempts during Operation Iraqi Freedom by our enemies to jam the signals from our GPS satellites. We were extremely fortunate to locate the sources and eliminate the rudimentary threat. Given the proliferation of commercial technology available today, the future threats to our space systems will be more complex and difficult to detect.

We must prepare to face future threats today. My top priority in Air Force Space Command is to ensure Space Superiority. This is at times a difficult concept to comprehend. We did not choose saber rattling words. We selected doctrinal terms; words we know are well understood in the Air Force and throughout the Department of Defense. The term Space Superiority is akin to Air Superiority. We would not dream of conducting air operations without first establishing and ensuring we had Air Superiority. We are not trying to dominate, but we must protect and project our interests in the space medium. Our reliance on space capabilities has grown as a Nation and as a member of a global economy. At the same time our vulnerabilities and the threats to our space systems and capabilities have dramatically increased. We no longer need to ask if an attack of our space systems will happen, but rather when, by what means and from where?

To better understand the growing threat to our space systems, we have conducted a series of high level war games to include the recently completed Schriever III

space warfare game at Nellis Air Force Base. The games are not completely predictive, but they are extremely insightful as we pit our space capabilities against capabilities an adversary may bring to bear. We use known technologies easily available to the rest of the world and combine this with the will to engage our space capabilities for advantage. The threats we face are very real and dangerous.

As our dependence on modern space capabilities grows, the need to establish and maintain Space Superiority also grows proportionally if not exponentially. It is time to proceed with the development of a more robust Space Situation Awareness architecture to ensure we adequately protect and defend our space capabilities. We all need to subscribe to a Defensive Counterspace mindset. We can't leave system anomalies uninvestigated. We must carefully track and examine the space environment to ensure we have high resolution knowledge of events. Finally, to ensure Space Superiority we must field Offensive Counterspace capabilities with temporary and reversible effects to deny an adversary the ability to exploit the asymmetric advantages space provides our Nation's Armed Forces and our global economy. Space capabilities provide a lifeline for this Nation. If we ever lost Space Superiority it would result in loss of life of our Armed Forces, lost economic viability and quite possibly a significant disruption to key national security objectives and interests.

SAFE AND SECURE STRATEGIC DETERRENT CAPABILITY

Maintaining a safe and secure strategic deterrent capability and providing our Nation a means for Prompt Global Strike is another top priority for Air Force Space Command. We continue to pursue independent nuclear (Land Based Strategic Deterrent (LBSD)) and conventional (Prompt Global Strike (PGS)) options along separate, but mutually supportive developmental paths. We are excited about the work underway in our LBSD Mission Area Analysis of Alternatives study. This landmark study will help determine the capability set required to fulfill future LBSD critical mission needs. We continue to explore a spiral acquisition approach to extend the life of the Minuteman III ICBM while providing enhanced capability for our national security. We plan to complete our Analysis of Alternatives and provide recommendations to the Milestone Decision Authority in the Office of the Secretary of Defense before the end of this year.

Space Superiority allows us to provide desired combat effects for Joint Warfighting. Space Superiority and maintaining a credible strategic deterrent force are the top two Warfighting priorities in our command. The United States Air Force's involvement in space started and grew from our early ICBM and Intermediate Range Missile programs. Our rich past in the development of space and missiles gives power to our future.

COST-EFFECTIVE ASSURED ACCESS TO SPACE

We must continue our efforts to develop Cost-Effective Assured Access to space. Responsive launch capabilities have formed the foundation of our Nation's space sector for decades and we must continue this tradition of excellence with one addition. We must focus our attention on providing cost-effective solutions to accessing space.

The Acting Secretary of the Air Force, the Honorable Pete Teets, mentioned the end of an era in our launch vehicles in his testimony. The Atlas III performed brilliantly during its final launch last month and the final Titan IV vehicles are being processed for their last launches later this year. We are closing the books on these very capable and reliable boosters, and we are ready to accept the next generation of extremely capable and reliable launch assets in the Evolved Expendable Launch Vehicle (EELV) with both the medium and heavy launch classes. The future of our Nation's space faring status hinges on our Assured Access to Space. This administration and the Department of Defense is committed to securing this much needed launch capability to ensure our Nation continues to lead the world in transportation to space for military, commercial, and manned space launches.

INNOVATIVE SOLUTIONS

While Air Force Space Command continues to defend the United States of America through the day to day control and exploitation of space, we provide space power to help achieve national security and Joint Warfighting objectives. I can proudly report we are successfully accomplishing our assigned missions with an increased focus on integrating our capabilities and effects with our air, land, and maritime forces. In a world of constant change and new challenges, we cannot lose sight of the importance of improving our capabilities and the effects we provide our joint warfighters. Our Acting Secretary of the Air Force has encouraged us to seek innovative solutions to some of our most difficult problems in the national security arena.

JOINT WARFIGHTING SPACE

We are intensifying our focus on providing the warfighter with more operationally responsive space capabilities. A major first step for us to achieve an Operational Responsive Space capability is our Joint Warfighting Space (JWS) concept. JWS will provide dedicated, responsive space capabilities and effects to the Joint Force Commander in support of warfighting objectives. The JWS concept seeks both immediate and near-term initial operating capabilities to meet pressing national security needs.

At first glance, we are very excited about the increase in space capabilities available through our Joint Warfighting Space concept. We are evaluating responsive launch capabilities to meet requirements in a matter of hours. Air Force Space Command is taking the lead in integrating small and microsatellites with other operational platforms on the ground, in the air, or in near space.

We are evaluating the ability to dedicate assets to real time target location, identification, and tracking, predictive awareness during a crisis with a persistent capability available to the Joint Force Commander. We are committed to fully investigating the military utility of small satellites. At first glance, there is a tremendous amount of development time saved by using a common micro or small satellite bus (spacecraft structure). We will continue our military utility analysis through a series of planned demonstrations, lab experimentations, and wargame exercises.

We have several Near Space demonstrations planned that we believe will lead to initial Joint Warfighting Space capability. Joint Warfighting Space consists of Near Space and on orbit space assets. We continue to work with our partners in the research and development community to provide future operational capabilities using the TacSat demonstration initiative and the Falcon Space Launch Vehicle which recently entered into design phase.

OPERATIONALLY RESPONSIVE SPACE

A robust Operationally Responsive Space (ORS) program will provide us with a rapid reconstitution capability and the ability to swiftly augment existing space assets. We continue to work with our partners in the research and development community to provide operational utility of Small Satellites through our TacSat demonstration program. Payloads and spacecraft developed on a quicker timeline, a responsive range and associated infrastructure, and an existing responsive launch vehicle are the three main components to Operationally Responsive Space.

We are actively working to advance the technology of our Small Launch Vehicles. We certainly have a need throughout the national security sector for a more responsive small launch capability. A small launch capability could be used for the deployment of a responsive space payload or when combined with the Common Aero Vehicle (CAV), a near-term conventional Prompt Global Strike capability. The follow-on to Small Launch Vehicles is the Affordable Responsive Spacelift vehicle. We have an approved way ahead for the Operationally Responsive Space Small Scale Affordable Responsive Spacelift Hybrid and plan to demonstrate a partially reusable system within the next several years. This will be a key demonstration and will definitely move us further down the developmental path.

We are very excited about exploring capabilities in the area known as "Near Space" at an altitude between 65,000 to 325,000 feet. From our preliminary analysis, we believe there's substantial military utility in augmenting our current aerospace capabilities with fielded capabilities in Near Space. These Near Space platforms are not intended to replace air or space assets, but rather to help augment and integrate additional capabilities.

We have already demonstrated military utility in expanding the range of Army radios used for contact between ground forces and to conduct Close Air Support operations. By using affordable platforms like weather balloons, blimps, or air ships, we can help provide much needed persistence and direct support to our theater commanders and their joint warfighters.

COMMON AERO VEHICLE

As I mentioned earlier, another innovative solution we are diligently working to develop is our Common Aero Vehicle (CAV) and the Force Application and Launch from CONUS (FALCON) Demonstration Program. This is an incredible capability to provide the warfighter with a global reach capability against high payoff targets. The CAV matched to a responsive launch platform would provide a truly transformational capability to anywhere in the world regardless of the level of access. The CAV capability could be matched against an anti-access environment and still deliver a conventional payload precisely on target within minutes of a valid com-

mand and control release order. This is the type of Prompt Global Strike I have identified as a top priority for our space and missile force.

MODERNIZATION AND READINESS

We no longer have the challenge of stressing the importance of space capabilities. Our senior commanders around the joint community, regardless of their service affiliation or background understand, you cannot go to war and win without space. The difficult challenge before us today, as a Nation and a military, is that we now maintain our steadfast readiness in support of our ongoing global war on terrorism. To ensure success, we must modernize the very space capabilities and assets our armed services and our Nation depend upon.

Our Global Positioning System satellites have revolutionized modern warfare. We are able to provide our warfighters and our national leaders unprecedented accuracy and precision strike capabilities through the use of our on-orbit assets. We must take all appropriate measures to ensure we field a capability that can withstand the robust challenges of the future. We need the capabilities provided by the GPS III program. A jam resistant, modernized version of the world's greatest free utility must be developed and delivered to ensure we have the most precise and secure positioning, navigation, and timing capability not just for our military forces, but for our Nation and our global economy.

The Transformational Communications Satellite will employ Internet Protocol networks and high-bandwidth lasers in space to dramatically increase warfighter communications and connectivity. The Air Force (in partnership with NASA and the Department of Commerce) continues development of the National Polar-Orbiting Operational Environmental System, which offers cutting edge meteorological capability.

We have refocused the Space-Based Radar effort to develop a system that meets user needs for both the joint warfighting and intelligence communities. We are sending one of our most capable general officers and visionary leaders, Brigadier General "Tom" Sheridan to head up the new Space-Based Radar program office. There is no doubt in my mind, restructuring of the Space Radar program office guarantees the right leaders will be in position to develop this indispensable capability for our Nation.

Finally, we are turning the corner in the Space-Based Infrared System program, a critical warfighter need. The Space-Based Infrared System will provide an enormous leap in capability over our aging, but very dependable Defense Support Program satellites. Our Defense Support Program has been Air Force Space Command's "Old Ironsides," extraordinarily dependable and battle proven. Our missile warning capabilities have kept soldiers, sailors, airmen, and marines deployed around the globe safe from unwarned attack. The next generation Space Based Infrared System will continue our proud tradition of providing direct support to our joint warfighters worldwide.

We will continue to develop the necessary capabilities and tighten our grip on the space acquisition process. We are already benefiting from the initiatives started by the acting Secretary of the Air Force over the past several years. We have solidified our requirements throughout our major space programs by instituting an urgent and compelling need requirements process. This process ensures only essential requirements that are both truly needed and funded are added to a program in development and will help us avoid "requirements creep" in our acquisition process.

I am truly honored and fortunate to serve with Lieutenant General Brian Arnold and his team of space professionals at the Space and Missile Systems Center in Los Angeles, CA, who are applying the lessons learned and making our development and acquisition team even better.

CHALLENGES AHEAD

We are on the right track to addressing the concerns in our space acquisition business. We need to ensure technical issues are researched and a solid technical risk mitigation plan is created and followed. We must ensure our program managers have an adequate management reserve of resources to handle developmental problems. We must give our program managers the training, tools, and resources to be successful and that's clearly a top priority for our Air Force Space Command team.

How we acquire our space capabilities is distinctly different from the acquisition of other Department of Defense capabilities. Because we procure small numbers of units, we do not have the ability to reduce quantities acquired; therefore, any overruns can only be addressed by extending the schedule and ultimately delaying the capability. Almost 70 percent of our Life Cycle Costs for Space Programs are incurred in the development phase alone. Another unique aspect to space is by placing

our capabilities on orbit it gives us just one shot to be successful. We are unable able to take a "fly, fix, fly" approach. We take a "test as you fly" approach. It is absolutely critical to understand these profound differences in the acquisition of space capabilities when compared to the procurement of other weapons system and Department of Defense capabilities. These various factors combine to create some tough challenges for us in the future.

We exist in a global, interdependent economy and we cannot neglect how powerful space capabilities have become in our global society. A resourceful enemy will look at our centers of gravity and try to attack them. Terrorists around the world are not aiming their actions at our military alone. They have declared war on our way of life and not against our military force in a traditional sense. Our enemies can bring crippling destruction to our Nation in a matter of days, or even hours, and our space capabilities are not immune to attack. Our adversaries understand our growing global dependence on space capabilities, and we must be ready to handle any threat to our space infrastructure. The strategic challenges we face are different and more difficult than past threats.

Other nations and their militaries understand the importance of our space capabilities in how America wages modern war. The threats against our space capabilities are building and we must be ready and able to face the challenges poised by these evolving threats.

SPACE PROFESSIONAL DEVELOPMENT

During World War II, General George C. Marshall was asked if America had a secret weapon to win the war. "We do indeed," he replied, "The best damn kids in the world." He was right. Today's airmen, soldiers, sailors, and marines are the secret weapons of the Latest Greatest Generation. The future of our young space force hinges on the development of our most precious and valuable resource; our people. We look to the challenges before us with the greatest amount of confidence, because we truly have dedicated and highly skilled space professionals in place; ready to serve the needs of our Nation. The biggest threat to our space capabilities and personnel is complacency. We have extraordinarily capable systems and people, but we must continue to invest in our future.

Our Air Force leaders have made "Developing and Maintaining Our Space Professionals" a top priority for our Nation. Personnel knowledgeable on the medium of space and highly skilled in their respective fields of operations, developmental engineering, acquisition, and research are indispensable to our success today and will only grow in importance. The dedicated space professionals I have the privilege to serve with are some of the best men and women America has to offer. The future of military space is bright and we need to make sure we give the next generation the proper development to become the space experts for the future.

I was truly honored and pleased to appear before this committee last summer to give you our update on the development of our Nation's space professionals. We have made some tremendous strides in establishing a Space Professional Development Strategy and I would like to thank this committee for your support.

Space Professional Development must be equally applied across our Reserve, Guard, civilian, and active duty personnel (both officer and enlisted alike.) Furthermore, this is a national skill set we intend to build and it can not be limited to an individual Service or governmental agency. Given the overwhelming demand and growing importance of our Space Professionals there is one key ingredient to our future success: teamwork. The synergistic effects of pooling our governmental space expertise together far outweighs the sum of the individual parts. The Air National Guard, Air Force Reserve, and our civilian professionals are indispensable to our Air Force Space Command missions. We will continue to build upon our Space Professional Development successes with a strategy for ensuring the development of our Space Professionals in our Air Reserve component.

We have a transcending responsibility as leaders to provide for the professional development of our people. Our senior leaders in the Department of Defense, Air Force, and Air Reserve component clearly understand the commitment this requires. The Space Professional Development program is on track and already providing outstanding results. We still have some hard work ahead of us, but our dedication and energy is well focused on this vital program.

CONCLUSION

Our most recent operations in Afghanistan and Iraq prove our Nation relies on capabilities coming from and through space, more than ever before. We have many people to thank for the fielded capabilities our warfighters are using today to pros-

ecute this dangerous war against terrorism. We owe a debt of gratitude to a number of influential leaders in the Air Force space and missile community over the years.

I can only hope our Nation's history will accurately capture the incredible leadership of the acting Secretary of the Air Force, the Honorable Pete Teets. General Jumper and I have been truly blessed to work with such a great American and visionary space leader. There is no better example of his legacy than the assistance and leadership he has provided Air Force Space Command in the development of our space professionals. We understand the significance of developing our space professionals, and rest assured we are dedicated to this cause.

Our Nation cannot rest on the asymmetric advantage we have today in space. We must move out and "Command Our Future" to make sure we continue to provide the world's greatest space and missile capabilities to our joint forces operating in harm's way around the globe. We are committed to developing our space professionals and I am proud to represent Air Force Space Command here today. Once again, I am honored to appear here before this distinguished committee.

Senator SESSIONS. Senator Nelson?

Senator BILL NELSON. Do you want me to start questions?

Senator SESSIONS. Yes, I——

Senator BILL NELSON. Okay.

Senator SESSIONS.—I let Senator Inhofe take my time.

Senator BILL NELSON. Well, I don't mind deferring to you.

Senator SESSIONS. No, no. Go right ahead.

Senator BILL NELSON. This is bipartisanship at its best. [Laughter.]

Mr. Secretary, why don't you repeat the administration's budgetary proposal for the AEHF and the TSAT.

Secretary TEETS. Okay.

Senator BILL NELSON. That's AEHF.

Secretary TEETS. Yes. On AEHF, the President's fiscal year 2006 budget request is for $1,201,000,000. What we are in the process of doing is fielding a constellation of three AEHF Satellites. We have, with this program, encountered some schedule and cost difficulties over the course of this last year, generated, in large part, by difficulties in implementing the key management system—that is to say, the secure communications capability. Very frankly, this was a case of a problem in an interface between two major organizations—the Air Force developing the AEHF Satellite, and National Security Agency (NSA), in providing the requirements for secure communication capability. This problem has been dealt with by General Hayden, Director of NSA, myself, and General Arnold, out at Space and Missiles Center. We have corrected the problem. We have put into place a solid plan, and we're delivering on it. But it has caused delay and a cost increase to the program.

With respect to TSAT Communications, our budget request is $835.8 million. With that money we will bring online an order-of-magnitude increase in bandwidth capability and, perhaps even more importantly, will bring online Internet-access capability. This will truly be an Internet in the sky that can service warfighters globally. It'll also have the capability for this enormously high bandwidth telecommunications so that we can transmit imagery, information, and very high-bit-density information.

Senator BILL NELSON. That would be in 2013?

Secretary TEETS. Yes, sir.

Senator BILL NELSON. No doubt, you've heard of Murphy's Law.

Secretary TEETS. I have, indeed.

Senator BILL NELSON. So how are we not blinded?

Secretary TEETS. The way that I—the way that we have, I'll say, banked an off-ramp is that if, at the end of the next year to year-and-a-half, in that time frame, if we have not been making proper advancement on retiring risk and maturing the technology associated with TSAT, we will acquire a fourth AEHF Satellite system, and we will field it in a timely way that can sustain the capability that exists.

I might just mention to you that we are right at the leading edge of a transformation in communications satellite capabilities. If you look at our capabilities today, when we launch our Wideband Gapfiller Satellites—and I mean that literally within this next year—we will increase our bandwidth capability by an order of magnitude. When we then move from AEHF and Wideband Gapfiller capabilities to TSAT Communications, we will achieve another order of magnitude of bandwidth capability. So I think that we are on a solid path. We've tried to develop a program plan that recognizes that there are some technology risks, and in the event that we run into a snag, we have off-ramps.

Senator BILL NELSON. So the decision point on a fourth AEHF would come, you said, in a year to a year-and-a-half.

Secretary TEETS. Yes, sir.

Senator BILL NELSON. My advice would be that you better have it within a year so we are ready for the next budget cycle.

Secretary TEETS. I think that——

Senator BILL NELSON. Because if you wait a year and a half, then we've lost 2 years, instead of one.

Secretary TEETS. Yes, sir.

Senator BILL NELSON. What we don't want to be in is the situation where we don't have a fourth AEHF, and now TSAT is getting delayed, and suddenly we're blind and we can't hear.

Secretary TEETS. Yes, sir. I concur with what you're saying. We will need, by next year's budget cycle, to know, with confidence, that TSAT is moving along well, or we should bank the coals on TSAT and order another AEHF.

Senator BILL NELSON. Go ahead, and I'll come back. Well, let me just ask one more.

Senator SESSIONS. Sure.

Senator BILL NELSON. When does the fourth AEHF—when does it have to be bought before there's a production break?

Secretary TEETS. It depends on how much the first three slip, to be honest with you. But if you look at our current program plan, which has slipped significantly due to this cryptology problem that I mentioned earlier—if we stay on the plan that we currently are on, we will need to make that decision a year from now to avoid a production break.

Senator BILL NELSON. My feeling about this is, this is something you can't fool around with. You have to have your eyes and ears up there in the sky. I know this is a $400–$500 million item for a fourth satellite, but you think of all the gadgets that are going to rely on this stuff being up there, that would be awfully rough, to make the wrong decision on this.

Secretary TEETS. Yes, sir. I understand what you're saying, and I think a prudent plan is in place to exercise that potential.

Senator SESSIONS. Secretary Teets, you note, in your prepared statement, that it is our policy to "develop the ability to protect our space assets and, if necessary, prevent potential adversaries from using space."

Secretary TEETS. Yes, sir.

Senator SESSIONS. That would give them an advantage, if they can have the same capabilities that we have. You note that the Department is developing a range of capabilities to meet current and future potential threats. You mentioned, specifically, the counter-communications system, which jams satellite-based communications. What other capabilities are we developing to, in your words, prevent potential adversaries from using space?

Secretary TEETS. Sir, those capabilities, other than the land-based satellite jammer, are classified kinds of activities. We're doing research and development work along those lines, but I think it best to not get into details in an open hearing.

Senator SESSIONS. Well, I would certainly respect that. I would just say that that's a real issue of importance to us. Could you, any of you, share with us a scenario that would not be inappropriate to share in this hearing, where we might need to take action to defend our space capabilities or to defend against an enemy's space capabilities?

General CARTWRIGHT. A way to approach this is to approach it from a holistic approach, the training, the tactics, techniques, and procedures and doctrine of our space force, our cadre, and making sure that they are trained to, one, understand and interpret the data that we have coming back that would give us an indication of whether or not we have a space event that is somewhat hostile, or could be characterized as hostile, is a critical piece of this; designing and protecting our infrastructure in a way that it is not susceptible to being interfered with. This goes beyond just the intentional regime to being able to understand, in space situation awareness, what's going on around you, designing your fleet so that you have an awareness, not just a kinetic effect, but just interference with each other as we put systems up and, is this intentional, or isn't it?—and trying to design our systems to be able to do that.

Scenario-wise, the idea that potentially our systems could be interfered with in some hostile manner, and making sure that we design the system both to realize and understand what's going on, and then design the approach that's just layered. Just like any other element of warfare, what you'd like to do is extend out the decision cycle so that you can start with just diplomacy and negotiation, and try to work your way up in ratcheting your capabilities.

I'll turn it over to General Lord but I think a layered approach that acknowledges that there are many segments to this problem.

STATEMENT OF GEN. LANCE W. LORD, USAF, COMMANDER, UNITED STATES AIR FORCE SPACE COMMAND

General LORD. Senator, I think one point to remember is, we experienced war in this environment, if you will, in Operation Iraqi Freedom, with attempts to jam the GPS from the ground. What we

were able to do, because of a variety of techniques and tactics, work this problem explicitly, and I can——

Senator SESSIONS. Could I interrupt just——

General LORD. Yes, sir.

Senator SESSIONS. Would you tell us what would have happened—for example, what capabilities we would lose if they were to successfully jam them. Maybe not everything can be said in this room, but some of the things that are pretty obvious, the capabilities that we'd lose if they successfully could have jammed our GPS system.

General LORD. It would have been, really, a serious situation without the position, navigation, and timing signals available to our forces in conflict and in contact in Operation Iraqi Freedom—precision effects, GPS direct attack munitions, for example, all the other navigation work that's done, all the timing that's done on particular effects in the theater would have been negated.

So, the point being, sir, is, we have to not only have a way to protect the capability to deliver that signal, but we have to have a stronger signal strength on the satellite to transmit to the Earth, so that if somebody tries to jam that, then they have to raise their signal, so we can identify that and deal with it.

We had an effective team work with GPS interference in navigation tools so that we could identify where the jammers were and we could route around that. We let General Cartwright know and be able to advise the other folks how to work in that environment. Lastly, we were able to employ a tactic called GPS Enhanced Theater Support, where we were able to make sure that when the GPS satellites broke the horizon and were in view of our forces in the theater, they had the most accurate timing and information available on the satellite. So they had—we had driven all the errors, as much as we could, out of the system out, so that the satellites were the most accurate when they were in view of the theater. We are able to do that——

Senator SESSIONS. Is this the satellite that allows a Joint Direct Attack Munition (JDAM) bomb—munition—to be dropped and hit within 30 feet of any spot——

General LORD. Yes, sir.

Senator SESSIONS.—consistently——

General LORD. It's just with the——

Senator SESSIONS. Without that satellite capability, the "smart munition" is seriously degraded.

General LORD. It depends on the munition and how it's integrated with the fusing techniques, et cetera, because some bombs have an inertial nav system that's inherently accurate, but GPS gives them that extra feet of accuracy so that your precision effect is really exactly what you want to achieve. So, we think that——

Senator SESSIONS. What about communications? What kind of theater communications depend on satellite and—systems to be effective, if you can share——

General LORD. In Operation Iraqi Freedom, 60 or 80 percent of the bandwidth was commercial-leased, and the MILSTAR constellation protected communications over our satellite constellation that we operate for General Cartwright was really the darling of the combat, with the capability to deliver air-attack orders, ground-

maneuver schemes, et cetera, over this protected network to provide the combatant commander in the theater very accurate communications. So it was a combination of both military and civil that worked in that war.

Senator SESSIONS. So, without being able to utilize our satellites, if those satellites should be taken out or jammed in some effective way, our ability to use the GPS system and our communications system would be substantially degraded. Under our current military doctrine, we depend on both of those to be effective. Is that——

General LORD. Absolutely.

Senator SESSIONS.—correct?

General LORD. You're right, sir.

Senator BILL NELSON. May I follow up on that?

Senator SESSIONS. Yes, please.

Senator BILL NELSON. With the next generation of the GPS satellites, what kind of improved capabilities do they have?

General LORD. We're working them now, sir, Senator Nelson, with our GPS–2RM, which is the first satellite we'll launch in the next series, which should go, here, within the next 15 or 20 days from Patrick. It will have an increased power capability and another additional code onboard the satellite. We get to GPS–2F, which is another system, and then on to GPS–3 by the end of this decade and early part of the next decade, with more signal strength onboard, more anti-jam capability, to do just what we talked about, to be able to push that signal to everybody so that it can't be jammed or spoofed.

Senator SESSIONS. Secretary Teets, sort of to follow up on Senator Inhofe's question, funding for counterspace activities in 2005 to defend, I guess, our system—amounts to about $350 million. Of that amount, approximately 78 percent goes toward space situational awareness, 14 percent toward defensive counterspace, and 8 percent toward offensive counterspace. Compared to the funding for satellite and launch programs, $350 million does not seem like it does justice to the importance of those two areas. Are you—you indicated, I think, earlier, that we may be spending more in the future. Do you think—where are we on that? Are we spending enough? Do we need to enhance our capabilities at a faster rate?

Secretary TEETS. Sir, I think, in balance, we are spending the right amount. I think we need to recapitalize our asset base. We have, in our constellation of national security space satellites, a number of satellites that are now—have been on orbit long enough to be able to vote. They were designed for perhaps 6-, 8-, 10-year life, and we have some that are now over 21 years old. They are performing well, but they won't last forever. So, it is important that we have a flow of continuing satellites to repopulate the constellation. They are expensive, I do agree with that. I recognize they're expensive. But, on balance, we recognize, in a growing sense, the need for us to focus on this issue of space control, which, in point of fact, needs to be informed by better knowledge of space situational awareness. We do know there are 10,000 objects around the Earth in orbit now, but we don't know an awful lot about many of them. We are focusing, as a first priority, learn more about what's there so that we can take some action, if necessary.

Then, second, we want to be able to take some smart measures to defend ourselves and seal some of the current vulnerabilities in our space assets.

Lastly, then, we have research and development ongoing for some capability to deny an adversary their use of space.

General CARTWRIGHT. Could I add just two——

Senator SESSIONS. Please do, yes.

General CARTWRIGHT.—two aspects?

The first is that we have a ground surveillance infrastructure that needs to be recapitalized and upgraded, and that's part of this program. We have to make sure that we do that, because it has a certain capability that gives us wide-area, large ability to catalogue. We need to improve that so we're not looking at areas that are as ambiguous as miles, but down to very small areas. The second is a command-and-control system that integrates all of this so the warfighter gets the benefit of the knowledge of this situational awareness, and it gets distributed out. We can't forget those two pieces, because they tie back to the user's side of this equation, whether it be the warfighter or others, that need to manage the system on orbit.

So, in addition to what's on orbit, there is a ground piece of this, and a command-and-control piece that we have to keep our eye on.

Senator BILL NELSON. I'm going to go vote while he continues, and then I'll come back and do my questions.

Senator SESSIONS. Well, wait just a second.

Senator BILL NELSON. How much——

Senator SESSIONS. My question is, how many votes is this? All four votes, isn't it? "Encourage Senators to stay in chamber for all four votes. Time limits will be strictly adhered to," this memo says. It will be the first time—that means it will be more seriously adhered to than normal. [Laughter.]

Senator BILL NELSON. If it's four votes——

Senator SESSIONS. Do you think we ought to take a break and just come back?

Senator BILL NELSON. The big chairman is going to call the full committee at 4:30.

Senator SESSIONS. 4:30?

Senator BILL NELSON. So——

Senator SESSIONS. All right, let's see if we——

Senator BILL NELSON.—we have a problem.

Senator SESSIONS. Yes, we do. Why don't you pick up here——

Senator BILL NELSON. Well, if we have——

Senator SESSIONS. You take your time——

Senator BILL NELSON.—four votes, there's nothing we can do about it.

Senator SESSIONS. No. It would leave us about 15 minutes, about 10 more minutes, I guess.

Let's take—I'll take a few more minutes, if—and you can go or stay. We have 10 more minutes on this vote.

Senator BILL NELSON. All right. I'll meet you over there.

Senator SESSIONS. Gentlemen, just the way we see the schedule, this first vote will be a little longer, probably, than the others. So, we'll probably have about 8 or 10 minutes. Then it'll take us about a 30-minute recess, if you don't mind—if any of you have critical

things you have to do, we would certainly understand if you need to excuse yourself. I—the other hearing the chairman has is not something that is mandatory that we attend.

I guess, General Dodgen, you think about the guys on the ground there, in previous wars we've tried to disrupt communications by intercepting the guy on the horseback with the note. I think that cost Jeb Stuart some of his reputation. [Laughter.]

Then you have telegraphs we've tried to intercept, pigeons and communications. But, I mean, wouldn't it be naive of us to think that our capabilities in space are, sort of, religiously protected from warfare? Isn't it really true that it is critical to our communications system that helps our warfighter, and, if we were to lose that, we would be damaged. If our enemy had that capability, they would be greatly advantaged. Does not that just mean that we just, whether we wish to or not, have to consider that soldier that we put on the ground in harm's way and how we can provide the best communication and protection for them?

STATEMENT OF LTG LARRY J. DODGEN, USA, COMMANDER, UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND

General DODGEN. Senator, to follow on with the soldier aspect of what General Cartwright said, we are rebuilding the Army, reshaping the Army, and transforming the Army, and we're making it much more responsive and more flexible for a variety of missions. It's the future combat system that will be coming onboard. We will be totally dependent upon very clear situational awareness of, and persistent surveillance of, the battlefield. Then we'll be dependent upon communications, very capable communications that will allow that persistent surveillance to get to every—literally every combat vehicle that will be on the terrain. That's why the Army has said, in the prioritization drills, that we need to get to TSAT, we need to get to that type of capability so that we can bring that type of imagery to every combat vehicle, because we'll be operating in a much broader area than we ever have before. We'll be relying on our combat formations to do more with less because of that situational awareness. If we don't have those capabilities, then we'll be at some risk of being in places where we may have overmatch, and we don't want to fight the war that way. We'd much rather fight the war using our weapons systems and our joint fires to overmatch in places of our desire. So, it's very critical to us, I think, to have the surveillance systems to clearly see the entire battlefield. I think space systems are very much a vital part of that, given terrain features. We need to be free of geography for that. Then the communications for that broadband to go down to every—literally every combat vehicle on the battlefield will be very important to us in the future.

Senator SESSIONS. So, even more than today, you expect that the ground combat future systems will be dependent on satellite and communications and space capabilities, and that disrupting that would even have a greater impact on our newly-created and newly-designed combat systems than even it would today?

General DODGEN. Absolutely, Senator. I'm concerned about us being denied the capability of space, and I'm concerned about grow-

ing capabilities that may be in our opponents' hands. Both of those things, they're a great concern for the future.

[The prepared statement of General Dodgen follows:]

PREPARED STATEMENT BY LTG LARRY J. DODGEN, USA

INTRODUCTION

Mr. Chairman, Senator Nelson, and distinguished members of the subcommittee, it is my distinct honor to appear before you today to discuss the Army's use of space as a key enabler to accomplish its missions and objectives both now and into the era of the "Future Force." I express my sincere appreciation to this committee for your continuing support of the many endeavors of our Army and particularly today's topic—the Army's continued efforts and progress in space. The Army is a full member of the Joint Team and we appreciate the opportunity to be included in the ranks with Secretary Teets, General Lord, Vice Admiral Sestack, and Brigadier General Benes as joint advocates of the space planning process and continued advances in our Nation's ability to operate in space. The Army is committed to working closely with the other Services, the Executive Agent for Space, the Joint Staff, and the Office of the Secretary of Defense (OSD) as space is absolutely critical to Army transformation. The Army will increasingly rely on space-based capabilities that must be responsive, timely, and assured to joint warfighters.

SPACE SUPPORT—A CORE WARFIGHTING COMPETENCY

During the past decade, the global security environment has changed a great deal. Today, many nation-states are no longer constrained by spheres of influence as in the Cold War. The dispersion of power and widespread instability combined with the direct threat to our homeland and worldwide interests, present new challenges for the Army, the joint community, and our Nation. The enemies we face today are not necessarily a nation-state. They can also be a terrorist cell, able to strike almost anywhere and nearly any time. Our response to these challenges continues to be seen in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). These operations continue to reinforce the critical importance of space capabilities to the Army, the other Defense services and agencies, and the joint warfighter.

As recently stated by our Secretary of Defense (SECDEF), "space and information are not only enablers, but core warfighting competencies." Space support to military operations is not a recent development. For more than 30 years, the Army has tapped the unparalleled potential offered by space-based systems to the modern battlefield. In the 1970s, the Army exploited the tactical applicability of national space systems at the corps level to improve our battlefield intelligence capabilities. The Tactical Exploitation of National Capabilities (TENCAP) program is a longstanding success story of the Army leveraging the intelligence community space investments for tactical military benefits. Throughout the early years, exploitation of space-based assets fell to TENCAP and communication communities while national systems remained focused on strategic issues. Although Army TENCAP made tremendous strides in leveraging national systems for the tactical user, it was not until Operation Desert Storm (ODS) that key leadership realized the extraordinary value of space-based, beyond line-of-sight intelligence and satellite communications (SATCOM), as a combat multiplier. The use of the Global Positioning System (GPS), near-real-time missile warning, tactical weather information, unclassified imagery, and long haul communication satellites truly brought space directly to the battlefield. Today, as we have for the past 30 years, the Army continues to strive to normalize space-based capabilities into our traditional warfighting concepts to achieve seamless support to combat operations.

Since ODS, space-based capabilities have become more entwined in the fabric of Army warfighting. Ongoing combat operations in Afghanistan and Iraq are demonstrating the operational importance of space to the joint warfighter. Making space relevant to tactical forces has gained primary emphasis along with providing and expediting the delivery of space-based capabilities, products, and services to warfighters. Space systems extend the range and capabilities of communications and enhance situational awareness beyond any terrestrial capability. It literally allows us to "do more with less" as we better use our forces in modular formations to cover larger areas than in the past. This is especially critical in asymmetric formations such as Iraq. Space systems continue to provide better intelligence and synchronization in combat operations by enabling collection of new types of data and information. In ODS, command echelons of division and above were the only ones that could access space-based TENCAP and INSCOM capabilities. Now we can pro-

vide support to our joint warfighters at the tactical level. Army space support teams now have the tactical capability to leverage satellite communications, commercial imagery, and enhanced situational awareness in support of deployed forces. Direct links now provide timely and assured data from national agencies and ground stations to the battalion level. Future work is needed to ensure these links are survivable in tomorrow's operational environment.

As our reliance on responsive, timely, and assured access to space-based capabilities increases, so does our vulnerability to attack and disruption. The ground segments of our space systems are especially vulnerable to a conventional attack. It is absolutely essential that both space-based and ground segment capabilities are protected against our future adversaries' attempts to attack these capabilities and to deny us our technological advantage. Space situational awareness is an important step to protecting our space assets from attack and in denying space-based products to our adversaries.

The global growth of commercial space systems provides state and non-state actors access to products and services that begin to approach those of our own. These potential adversaries are seeking to lessen the advantages we enjoy by accessing space-based communications and imagery offered by third-party entities. In order to retain our advantage, we may choose to deny an adversary access to these space-based services.

THE ARMY'S ORGANIZATIONAL SPACE STRUCTURE AND KEY OPERATIONAL SUPPORT

Within our Army, the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT) is the specified proponent for space. In addition to the Title 10 Army responsibilities, this command also serves as the Army Service Component Command to the U.S. Strategic Command (STRATCOM). Tasked as the service space proponent and working in coordination with other members of the joint community, USASMDC/ARSTRAT is at the forefront—supplying vital space capabilities to our joint warfighters. In addition to delivering and integrating space products and trained professionals into joint warfighter operations, USASMDC/ARSTRAT also conducts an extensive variety of space mission related research and development activities. This capability is one complement to the organic TENCAP equipped Army intelligence and tactical signal force structures.

Soldiers and civilians serving with USASMDC/ARSTRAT's 1st Space Brigade (Provisional), the Army's first and only space brigade, provide access to products and services that are absolutely essential in all phases of combat operations. The brigade's three battalions—the 1st Satellite Control Battalion, the 1st Space Battalion, and the 193rd Space Support Battalion, Colorado Army National Guard, support combatant commanders by providing satellite communications and force enhancements. During the ongoing OEF and OIF campaigns, the USASMDC/ARSTRAT's Army Space Support Teams (ARSSTs) supported the Coalition Force Land Component Commander, an Army Corps and Division, a Marine Expeditionary Force, and the Coalition Provisional Authority. The ARSSTs are on-the-ground space experts, pulling down key and critical commercial imagery, forecasting the impact of space weather on satellite communications, position, navigation and timing, and radio intercepts, and providing responsive space support to their units. This responsiveness and on-the-ground expertise were invaluable to combatant commanders and their planning staffs. TENCAP and INSCOM have increased their support from space-based assets by providing enhanced systems and more direct interface to the tactical level.

The USASMDC/ARSTRAT Operations Center, located in Colorado Springs, Colorado, supports space experts deployed throughout the operational force and reduces our forward deployed footprint. This center maintains constant situational awareness of deployed elements, continuously responds to requests for information, and provides the essential reach-back system of connectivity with technical subject matter experts. Regional Satellite Communications Support Centers and Defense Satellite Communications Systems Operations Centers located in several locations in the U.S. and overseas, provide reliable and responsive SATCOM support. In addition to ensuring space-based force enhancement, USASMDC/ARSTRAT also provides space-based ballistic missile early warning and missile defense support from within the theater or region. The 1st Space Brigade's Joint Tactical Ground Stations Detachments, operated by Army and Navy personnel, monitor enemy missile launch activity and other infrared events of interest and share the information with members of the air and missile defense and operational communities. Presently, an array of space-based and missile defense resources including forward-deployed Soldiers, civilians, and equipment, continue to support our joint warfighters in Afghanistan

and Iraq. Space capabilities have become and will continue to be inextricably linked to warfighting.

THE ARMY'S SPACE SUCCESSES

As I appear before this distinguished committee today, Army professionals are using the ultimate high ground of space to provide products and services that are significantly more capable, abundant, and tightly integrated into all phases of combat operations. I would like to highlight a few of the Army's fielded operational systems and personnel that are providing essential space support to the combatant commanders and warfighters.

Joint Blue Force Situational Awareness (JBFSA)

Space capabilities save lives by providing critical linkages within the current and future JBFSA architectures. Situational awareness is particularly vital given the challenges of conducting operations in urban areas, as is currently the case in Iraq. The Army is the lead service for JBFSA and has the greatest number of soldiers and systems to track on the battlefield. JBFSA assets, such as the Force XXI Battle Command Brigade and Below, the Movement Tracking System, and the Grenadier Beyond Line-of-Sight Reporting and Tracking System, help deliver timely situational awareness and have gained broad endorsements from tactical units for helping to prevent friendly fire incidents. The Army is currently devoting considerable effort to fully incorporate the role of blue force tracking (BFT) in identifying friendly forces during combat. We have also successfully demonstrated the capability to integrate the various JBSFA systems, space-based and line-of-sight, to develop a common operating picture into one enterprise system. This achievement, especially important until an integrated set of JBFSA systems is developed, is a meaningful step to support enhanced situational awareness.

Mission Management Center (MMC)

The MMC facilitates the dissemination of near-real-time space-based data in support of JBFSA. The USASMDC/ARSTRAT MMC, located in Colorado Springs, serves as the critical link between warfighters, national agencies, and a variety of dissemination architectures.

Spectral Operations Resource Center (SORC)

The quality of image resolution and speed of its delivery has improved substantially over the years. During ODS, commercial resolution was approximately ten meters and filling requests took days or weeks. During OIF, USASMDC's SORC (Forward) was able to provide its customers with downlinked commercial imagery of approximately one-meter resolution within hours of receiving a request. Manned by both Army and Air Force personnel, the SORC (Forward) facilitated the downlink of commercial imagery, providing the joint warfighter detailed spectral products to make crucial operational decisions.

Tactical Exploitation System (TES)

The Army's TES as a forerunner to the Distributed Common Ground Station-Army (DCGS–A) provides tactical and joint warfighters the ability to receive, process, and exploit signals and imagery intelligence data from selected national, theater, and tactical sensors. Using TES, the time required to gain access to theater and national imagery has been substantially reduced. As a result, an integrated multi-source intelligence picture from "space-to-mud" is organic to all corps and divisions and is moving to the brigade level, with the DCGS–A which enables combatant commanders to gain improved situational awareness and enhance their ability to shape the battlefield. Elements of the TES are deployed in OIF and OEF in the Stryker brigades and selected Reserve units called to active duty.

USASMDC/ARSTRAT's Reagan Test Site (RTS)/U.S. Army Kwajalein Atoll (USAKA)

RTS is a unique contributor to the national space control mission through its space situational awareness data. RTS is one of only four Department of Defense (DOD) radar sites that provide unique capabilities to monitor objects in deep space. Additionally, RTS is the sole contributor of radar metrics on approximately one-third of the satellites in the geosynchronous belt. The collection of timely and accurate metric data is critical to the space control mission. The RTS maintains a vigilant 15-minute recall, 24 hours a day, for providing critical radar metric and imagery data on new foreign launches from Asia. Due to its geographic location, RTS has first visibility on most launches from Asia.

These systems, assets, and their operators as well as other initiatives leveraging U.S. space capabilities are key contributors in both holding and improving the asymmetric advantages that exploiting space brings to the joint fight.

REALIZING THE POTENTIAL OF SPACE—PEOPLE

Of course, without well-trained and motivated Army professionals, space superiority cannot be realized. As I stated earlier, the successful conclusion of the first phases of OIF was supported by well trained space professionals serving in Army units around the globe who used the superior technology at their disposal to provide vital and timely operational support to combatant commanders.

As outlined before this committee in July 2004, combat operations are no longer limited to land, sea, and air. It is clear that we will increasingly rely on the "high ground" of space as an essential capabilities integrator. Today, the Army considers space to be a vertical extension of the battlefield essential to joint warfighting. Technology in the hands of capable professionals, who are trained to harvest the potential of space, has superseded the necessity to mass against an enemy force. Instead, space-based capabilities enable us to mass the combat power of our forces at the time and place of our choosing. As a result, an understanding of space systems and capabilities is becoming an increasingly important part of the professional soldier's skill set across all Army mission areas.

The Army recognized this need in 1998 when it created Functional Area (FA) 40—Space Operations within our commissioned officer corps. USASMDC/ARSTRAT is the Army's personnel proponent for FA 40 officers. There are more than 150 FA 40s in the Army today, serving in 29 different Army and Joint commands and DOD organizations across tactical, operational, and strategic echelons. These space professionals are today's Army space cadre and form the core for the future cadre. They are trained, educated, and gaining experience every day. They are performing remarkably as indicated by continuous praise from our warfighting commanders.

Promotion rates for space cadre lieutenant colonels and colonels during fiscal year 2004 are above the Army average. FA 40s are encouraged to complete advanced degrees and 70 percent of our officers have done so—60 percent of the advanced degrees are in space related fields of study. We currently have 14 FA 40s that have graduated from space programs at the Naval Post Graduate School (NPS) or the Air Force Institute of Technology. Today, seven FA 40s are enrolled at NPS. Once sufficiently trained through the 11-week Army Space Officer's Operations course, FA 40 officers are responsible for formulating policy, developing operational concepts, developing technologies, and planning, evaluating, and implementing the tactics and techniques for the operational use of space systems.

The Army's Space Cadre is supporting the fight in both OEF and OIF. Twenty-six FA 40s have deployed to the two theaters with six currently serving from the Division to Theater command level. In addition to the outstanding support they provide today, the Army is realizing future benefits as we integrate and institutionalize the lessons our FA 40s learn regarding how to best integrate space for tactical commanders.

As our Army transforms, our space concepts and organizations are transforming as well, requiring significant increases in authorizations for FA 40s in our tactical echelons. Over the past few years, we have developed organic Army Space Support Elements (SSEs) which we will be embedding within Army Divisions/Units of Employment (UEx). The 3rd Infantry Division was our first Division to transform and stood up the initial SSE in June 2004. Over the next few years, all 10 Divisions (UEx) are being embedded with SSEs as the Army continues to transform. The Army Space Cadre will be the means to bring dedicated space expertise to UEx Divisions. In total, the Army could be adding up to 80 FA 40 authorizations as a result of the ongoing Army transformation.

SPACE FORMAL UPDATE

In July 2004, before this distinguished committee, I informed you that the Army was commencing Phase I of IV in the Cadre Force Management Analysis (FORMAL) which will define how other officers, our noncommissioned officer and enlisted force, and Army civilians will be addressed as part of our future Space Cadre. FORMAL completion is scheduled for August 2005 and we have progressed to Phase III, which is scheduled for completion this May. To recap, Phase I developed the Army unique Space Cadre definitions. Phase II identified 1,546 potential Army Space Cadre positions based on the definition developed during Phase I. During Phase III, we will refine the cadre and develop a comprehensive Army policy that incorporates the five personnel life cycle functions envisioned for the Space Cadre. The 5 life-cycle functions are accessing, training, professional development, structuring, and sustaining.

During the final phase, necessary combat enhancement elements such as doctrine, organizational structure, training, and leadership development will be finalized and implemented.

For both present and future members of the Space Cadre, formal education and training continues to evolve. Students are trained in the planning of space operations, analyzing friendly and enemy force space capabilities and limitations, and determining the impact of space weather on satellites; communications; position, navigation and timing; and intelligence, surveillance, and reconnaissance in support of a Joint Force Commander. The demand for training brought the Air Force and Army together to offer better training opportunities to the Space Cadre of both services.

FUTURE ARMY SPACE REQUIREMENTS

Now and in the future, the Army's primary interest in space will be the role that space serves as an enabler of 21st century land warfare. Continued technological advances and new capabilities in space systems will enable the information dominance essential to the transformed Army land force envisioned for the future. The task ahead is to hold and improve the asymmetrical advantages space capabilities bring to the joint fight. The most important space-based capabilities the Army needs to leverage to maintain dominance with respect to ground operations relate to intelligence, reconnaissance and surveillance, satellite communications, JBFSA, weather, terrain and environmental monitoring, position, navigation and timing, missile warning, and space control. These capabilities enhance the paradigm of full spectrum dominance that is the cornerstone of future joint warfighting.

To meet these vital requirements, it is essential that space systems, currently planned for fielding under the purview of the DOD Executive Agent for Space, become reality. The Army needs enabling technologies which enhance situational awareness off the ramp, allow us to look deep, and communicate rich situational awareness while on the move. Planned space-based assets such as Space Radar and Transformational Satellite (TSAT)-communication systems, if developed to be tactically relevant, will revolutionize how we use space in support of ground operations. The Army needs a space capability designed and developed from the onset that significantly improves the situational awareness, lethality, and survivability of the tactical warfighter by providing responsive, timely, and assured persistent surveillance and communications. These systems must be dynamically taskable and have the ability to provide actionable intelligence to the warfighter at multiple locations.

Tactically responsive capabilities with persistent surveillance and enhanced protected wideband communications will improve the situational awareness, lethality, survivability, and operations tempo of the Army's Future Force. The Army continues to work closely with the DOD Executive Agent for Space to ensure transformational capabilities such as theater downlink and dynamic tasking in support of the theater warfighter are fulfilled.

CONCLUSION

The Army knows the value that space capabilities bring to the battlefield—space is the ultimate high ground. In future conflicts, the Army envisions that as an interdependent member of the space community, we will rely on space products and services provided by DOD, other government agencies, our allies and coalition partners, and commercial space systems to enhance situational awareness and joint battle command. We will also contribute Army capabilities, technologies, and trained and ready personnel to this joint effort. The resulting fully integrated joint capability will provide depth, persistence, and responsive capabilities for commanders at the strategic, operational, and tactical levels. There is no doubt that space systems and well-trained and experienced space professionals give us an information environment advantage over our adversaries. While we have done much thus far, we must continue to increase and improve our space capabilities to serve the needs of the future.

Thank you for the opportunity to appear before the committee and for your interest and support of our Army's space programs and their current and future requirements.

Senator SESSIONS. Admiral Sestak, do you want to comment on that subject or——

Admiral SESTAK. Yes, sir.

Senator SESSIONS.—perspective?

Admiral SESTAK. From the Navy's perspective, being at sea, where you can't run fiberoptics, it's pretty critical. We launched the first satellite in 1948. We actually bounced a radio wave off the moon from Honolulu back to Washington, DC, just to see the importance of satellite communications. It was probably the first time we had a DOD system deliver on schedule and on time. [Laughter.]

Except for Mr. Teets' tenure, of course. [Laughter.]

That said, to get back to General Cartwright's issue, when he had the J–8 job before where he is, the general, he ran a war game with modeling. Some of it was in response to a congressional report that mandated a study, on what would be the impact of an explosion Electromagnetic Pulse (EMP), in space, which is one form of trying to deny us space. The scenario, without going into specifics of it—and I'm sure General Cartwright remembers it well—had three carrier battle groups off a certain nation, and they tried to measure the impact upon us during that scenario. It was measurable. We worked through some of these issues through different means, and not just, as people tend to think of kinetic weapons; but there were procedures to follow, and there were diverse spectrums where we switched to different frequencies—UHF to EHF or HF; and we switched weapons from JDAMs to laser-guided. So his point of different means to address such threats is well taken.

We then stepped back in the Navy following a directive from the JROC to do a study—which is commencing with DARPA and the Navy—to try to assess how we, in the Navy, with regard to this particular issue, can try to address this through diverse means.

So are we concerned? Yes, sir. I'm concerned, because when this soldier next to me goes ashore, the hope is that he is going to be able to say, "I'm calling for fire," and to just push the button that goes up to the TSAT and comes down directly to the warfighter sitting off the coast on a carrier, or a Guided Missile Destroyer (DDG), and it goes directly into the IP address of a Tomahawk missile and launches. Being able to use that Communications Intelligence (COMINT), where we can be over any country legally, in peacetime as well as war, just like we can do on the seas today, to be offshore is really the marriage of the future between the "comms" of the seas and space. Being able to control, by whichever means—tactics, Concept of Operations (CONOPs) hardening—is very important to us in the future.

[The prepared statement of Vice Admiral Sestak follows:]

PREPARED STATEMENT BY VADM JOSEPH A. SESTAK, JR., USN

Mr. Chairman, distinguished members of the committee, I am honored to appear before you today to address Navy space activities. As Deputy Chief of Naval Operations for Warfare Requirements and Programs, we provide the substantive analysis, the "warfighting story," and supporting capabilities investment plan to the Chief of Naval Operations to ensure naval forces remain operationally relevant today and in the future.

Integrating space capabilities throughout the naval force is fundamental to our Sea Power 21 vision. The objective of Sea Power 21 is to ensure that our Nation possesses credible combat capability on scene to promote regional stability, to deter aggression throughout the world, to assure access of joint forces and to fight and win should deterrence fail. Sea Power 21 guides the Navy's transformation from a threat-based platform centric structure to a capabilities-based, fully-integrated force. The pillars of Sea Power 21 Sea Strike, Sea Shield, and Sea Base are integrated by FORCEnet, the means by which the power of sensors, networks, weapons, warriors, and platforms are harnessed in a networked combat force. It is this networked

force that will provide the access with the strategic agility and persistence necessary to prevail in the continuing war on terror, as well as the speed and overwhelming power to seize the initiative and swiftly defeat any regional peer competitor in combat operations.

The Navy of the future must be capabilities-based and threat-oriented. While the fabric of our fighting force will still be the power and speed needed to seize the initiative and swiftly defeat any regional threat, we believe FORCEnet's pervasive awareness (C^4ISR) will be more important than mass. Because of its access from the sea, the Navy and Marine Corps are focusing significant effort and analysis in support of joint combat power projection by leveraging this traditional access provided by the oceans through Seabasing, with the access now provided by space and cyberspace through FORCEnet. It is the synergistic access provided by these great "commons"—the sea and space and cyberspace—that is the revolution of the future.

To this end, the technological innovations and human-systems integration advances in future platforms remain critical. Our future warships will sustain operations in forward areas longer, be able to respond more quickly to emerging contingencies, and generate more sorties and simultaneous attacks against greater numbers of multiple aim points and targets with greater effect than our current fleet. However, the future is about the capabilities posture of this fleet, which is why the future is also about establishing C^4ISR as a warfighting weapon and integrator and understanding the impact of changing C^4ISR investment strategies on the warfight.

THE NAVY'S INVESTMENT

In the last year, we have realigned the Navy staff to establish C^4ISR as a warfighting weapon and integrator of other Sea Power 21 Pillar efforts (Sea Base, Sea Shield, and Sea Strike). We have also established an Analysis Center of Excellence to form the leading edge of mission level analysis and align our modeling analysis—including the accurate modeling of space and cyberspace networked systems, and how they contribute to warfighting effectiveness—under the Sea Power 21 FORCEnet Pillar. I am particularly enthusiastic about the ongoing assessment of space capabilities with regard to their contribution to Maritime Domain Awareness (MDA), a new operational concept that we have been working closely with the U.S. Coast Guard and others to develop so that we can better defend the homeland against those who attempt to use the seas to transport terror to our shores, as well as to help forgo threats early forward overseas. MDA will enable identification of threats as early and as distant from our borders as possible to determine the optimal course of action. Armed with this better awareness and visibility, we will provide an active, layered system of defense that incorporates not only the maritime domain, but space and cyberspace as well.

The Navy's space investment portfolio reflects our partnership with the Department's Executive Agent for Space and the rest of the National Security Space community—as well as our maritime responsibilities. We rely on the Air Force and National Reconnaissance Office (NRO) to acquire most of the major space platforms, collaborating on the required capabilities, and then we buy the user equipment for the fleet. We also take the lead in tackling maritime challenges through our participation in the Science and Technology/Research and Development (S&T/R&D) process.

The Navy's major space segment responsibility to the joint community is the acquisition of the Mobile User Objective System (MUOS). The MUOS contract was awarded to Lockheed Martin on 24 September 2004 and is fully funded in the fiscal year 2006 budget request to meet all threshold requirements with an Initial Operational Capability (IOC) of 2010. MUOS will provide "communications on the move," through double canopy foliage and in the urban environment to small antennas used by bandwidth-disadvantaged users. MUOS is the common denominator for command and control providing the capability to communicate from tactical to theater levels, to allies and coalition partners and between defense and non-defense agencies.

MUOS is critical to satisfying the demand for tactical satellite communications. During Operation Enduring Freedom, UHF Follow-On (UFO) and Leased Satellite 5 (LEASAT 5) supported only 80 percent of narrowband tactical UHF satellite communication requirements. Additionally, in the 2010–2012 timeframe, LEASAT 5 will reach end of life and UFO is expected to reach an unacceptable level of performance. Complete loss of these UHF satellite communication resources would have a significant impact on combat operations if not replaced by MUOS. Today, UFO supports approximately 500 accesses worldwide. Based on evolving future warfighting concepts in support of the Defense Planning Guidance (DPG), access requirements have grown by at least a factor of four. MUOS will provide a minimum of 1,997 world-

wide accesses. As Lockheed Martin refines its design, we expect this capacity to grow.

INNOVATION

The Navy continues to invest in its Tactical Exploitation of National Capabilities (TENCAP) Program. Navy TENCAP's R&D process includes matching innovative responses to emerging Fleet requirements and mission capability gaps identified within the analytical Naval Capability Development Process (NCDP). This R&D process emphasizes the following rigor: (a) rapid prototyping (12–24 months); (b) testing under field conditions; and (c) rigorous, independent assessment of results. Over the past 24 years, Navy TENCAP has completed 110 R&D efforts with 54 percent resulting in new operational and improved ISR capabilities for the fleet and joint forces all for a cost less than $20 million per year.

Additionally, the Naval Research Laboratory (NRL) built tactical satelite-1 (TACSAT–1) as part of the Office of Force Transformation Operationally Responsive Space initiative, and it is ready for launch this year on Space-X's Falcon launch vehicle. TACSAT–1 uses a commercial MicroStar spacecraft to carry several sensor payloads into low earth orbit. The payloads are designed to allow machine-to-machine collaboration between Air and Space assets for geo-location, as well as specific sensor discrimination capability. Even more significant, TACSAT will demonstrate tactical control of payload and dissemination of data through SIPRNET—a truly netcentric thrust. For TACSAT–1, NRL is working in partnership with the Air Force Space Command, NRO Office of Space Launch, and NASA. The Air Force is leading subsequent TACSAT demonstrations, on which Navy will also have secondary payloads; TACSAT–2's Navy payload is focused on the Maritime Domain Awareness challenge. This partnership is a significant step forward to leverage small satellite technology to design more responsive space capabilities.

SPACE CADRE

The key to success is the mix of operational experience and space savvy found in our Navy Space Cadre. As members of the National Security Space team, we participated in the development of the National Security Space Human Capital Resources Strategy and the establishment of the Space Professional Oversight Board, the Senior Officer Forum for the discussion and resolution of matters concerning space professional development within the Department of Defense.

Navy Space Cadre officers are assigned to NRO, the National Security Space Office, USSTRATCOM, many Joint Program Offices, and throughout the fleet. Their operational expertise provides critical insight into how space can optimize warfighting capabilities. To further improve the management of our space cadre, we have designated VADM McArthur, Commander, Naval Network Warfare Command, as the Navy's Space Cadre Functional Authority, providing strategic guidance on priorities for the development and employment of the Navy Space Cadre. He recently released the Navy Space Cadre Human Capital Strategy, which outlines our vision and way ahead.

The Navy Space Cadre Advisor is working closely with his Service counterparts to meet both Navy and National Security Space goals. The Naval Postgraduate School (NPS) Space Systems Operations and Space Systems Engineering curricula continue to provide the Navy and other Services graduate education, post-graduate (Engineer) degrees, and doctoral degrees. In addition, the Navy has developed a Space Certification at the NPS, with courses available online. We also created a formal Educational Alliance with the Air Force through a memorandum of agreement between NPS and the Air Force Institute of Technology (AFIT), with the goal of leveraging strengths and eliminating duplication in space education.

SUMMARY

Our mission remains bringing the fight to our enemies. The increasing dependence of our world on the seas, coupled with growing uncertainty of other nations' ability or desire to ensure access in a future conflict, will continue to drive the need for naval forces and the capability to project decisive joint power by access through the seas, space, and cyberspace.

Accordingly, we will continue to fight the global war on terror while transforming for the future fight. We will continue to refine our operational concepts and appropriate technology investments to deliver the kind of dominant military power from the sea envisioned in Sea Power 21. We will continue to pursue the operational concepts, such as MDA, even as we invest in technology and systems to enable naval vessels to deliver decisive, effects-based combat power in every tactical and operational dimension. We understand that space capabilities will be critical to our ef-

forts and must be integrated throughout the naval force and we understand that because the future of the Navy is tied to space, we must succeed in growing and maintaining our space cadre. We also look forward to the future from a strong partnership with Congress that has brought us many successes today.

My highest priority is to transform Navy organizational processes and culture to fully integrate the warfighting capabilities that space systems present to our warfighters. To that end, Navy intends to be a full joint partner in space.

Senator SESSIONS. My staff says I only have 3 minutes. We'd better stop now.

General DODGEN. Senator, if I could give you just a——

Senator SESSIONS. Well, it's—yes.

General DODGEN.—if I could just give you a quick—about the pace of how we're moving on this. We went into Operation Iraqi Freedom with a—and it discusses Blue Force Tracking—we went into Operation Iraqi Freedom with a few hundred devices. We now have, in the part of that conflict, we went to thousands of devices; we are now to tens of thousands; and, over the next few years——

Senator SESSIONS. Devices, what——

General DODGEN. These are small devices that let—operating in communications through space, let the commanders know where their forces are.

Senator SESSIONS. Yes.

General DODGEN. Complete Blue Force situational awareness. That's growing rapidly, and that's probably a good example of the pace at which we're moving.

Senator SESSIONS. I would agree.

Gentlemen, I'm sorry. We'll—if you can stay, I think there's some other matters we would like to discuss. If any of you—it's such that you're not able to stay, I would certainly understand that. We will return in—these are four 10-minute votes. Sometimes people give up on a vote, but it's unlikely, so it'll probably be at least 30 minutes before we get back.

We are adjourned for the time being. [Recess.]

General, we will get started again. I thank you very much for your patience. It's—this time of the year, with the budget, about—and we have 50 hours, but the hours only count during debate; they don't count during votes, and I—we'll probably—we may have a hundred or more pending amendments to vote on. Hopefully, some will go away. Besides that, they bunch them, periodically, and so we just did a bunch.

I think what I could summarize, the testimony before we left, is that domination of space is critical to our defense needs. The way we fight wars, we utilize the space, and we could never allow our soldiers to be subjected to the kind of capabilities that we are able to employ on the battlefield. That would place them at a greater risk than we would accept. So I do believe it's critical that we be honest and direct and commence the necessary programs to ensure that that remains the case, as it is today.

I am a little troubled by the funding level that I asked about earlier, Mr. Teets, on the—what would appear to be the relatively small amount of money spent on offensive and defensive counterspace. Perhaps that's not enough, and we ought to be looking at that to make sure that we are moving forward.

I also think, without going into any details, that we can't be squeamish about this subject. We might as well be honest about it.

They—when you have soldiers at risk on the battlefield, pilots at risk in the air, sailors at risk on the sea, we can't allow political correctness or other type concerns to deflect us from thinking clearly about where we need to go and what we need to do.

So, I want to encourage you in that. That would be one of my main concerns, and we'll be pursuing it as we go forward, as I chair this subcommittee, to make sure that we are not being reluctant to propose, from your perspective, anything necessary to maintain our capabilities, and expand them.

Mr. Teets, you, I believe, one time graded yourself as—on contracting and management—contracting, I guess—as a C-plus. There are a lot of times I would like to have had that grade, but the——[Laughter.]

How do you see—what lessons have you learned in contracting and in management that you might like to share with us? I know the Government Accountability Office (GAO) is of the opinion that sometimes if we wrote the contract better going in, we'd be better off as we managed the contract as we go forward. Do you have any comments on how we can avoid the cost overruns, the—missed time deadlines, through contracting or other actions we might take?

Secretary TEETS. Thank you, Mr. Chairman, for the question. The answer is, yes, I do have a good number of thoughts along those lines, and most of the thoughts have been embedded into this new acquisition policy for space systems, called 03–01, and they include such things as making certain that you have the systems engineering necessary for one of these complex systems done early on, making certain that you put the key decision points on the program, that are fundamental acquisition-program milestones, at the right place for a program that is largely research and development, not production. All of those changes have been codified and put into this acquisition policy 03–01.

Another item that I have been discussing at considerable length is the need for us to have, embedded within our programs, sufficient program-managers reserve so that when problems arise, as inevitably will arise—you can't go through a leading-edge technology-development program, which is what all of our space systems are—you can't go through that without encountering some unexpected problems. When you do encounter the unexpected problems, you can't wait for funds to be reprogrammed or moved from one program element into another program element, or wait to solve the problem. Help is needed in a rapid way if you're going to properly respond. Yet the system that we have—and I'm not laying this, by any means, all at the feet of Congress—I would tell you that the system we have doesn't seem to have any discipline for allowing program managers to have reserve, and then have access to it. I can't tell you how frustrating that kind of a situation is. Because the first thing a program manager needs is to have a resource to apply to a problem when it arises in a development program. So, I've been working hard to try and figure out a way to get that done. This year——

Senator SESSIONS. Could you give us an example of when that kind of thing, that reserve—how it could help the program?

Secretary TEETS. Absolutely. What can easily happen if you don't have a Reserve to apply when a problem arises, you will have to defer work on the program downstream. You can't bring in any extra—any additional resource. All you can do is recognize that the end of the fiscal year is coming, and you're—you will then delay the program, essentially, while you fix the problem. What that leads to is schedule disruption. It gets the various elements of a major development program out of synchronization, because you'd establish the program in a way that had those synchronized. It generates a certain amount of chaos in the development program that ends up snowballing on you.

What I've been trying to do is find ways to establish meaningful reserve. This year, in the NRO budget, I have actually proposed that the NRO director have a significant program reserve. Whether I'm allowed to—whether that's authorized and appropriated is yet to be seen, but——

Senator SESSIONS. So it would—should the DOD request it when they propose a program, and put it in their request——

Secretary TEETS. Yes, I think——

Senator SESSIONS.—or is it something that Congress ought to add on its own?

Secretary TEETS. Well, I think—as a matter of fact, I think the DOD should allow creation of Reserves. Then you can't move them around. You have to recognize that that program reserve is intended for application to the program when problems arise, and can't be tapped when some other program somewhere else runs into a snag. That has to be honored. There has to be integrity in the system to allow that to happen.

Now, another major item that we've been working hard on, and I think we're getting better at, is independent cost estimating. It's true that we have had difficulty in properly estimating the cost of a program, and we suffer from the problem of trying to cram too much program into what might be thought of as an optimistic contractor estimate.

We had an excellent panel formed, under the leadership of an old friend of mine by the name of Tom Young, who came in and did—with a group of very talented people, did a thorough review of where we were on SBIRS, where we were on Future Imagery Architecture (FIA), where we were on EELV, several other programs, and they came back and gave us their view of the situation. One of the things they emphasized was the need for us to have better independent cost estimates earlier on in the program. We've tried to institute that——

Senator SESSIONS. How do you——

Secretary TEETS.—as well.

Senator SESSIONS.—get an independent cost estimate?

Secretary TEETS. The right way to get an independent cost estimate is to have a group of people who are professionals in the field, who are augmented by technical people, who come in and do an independent review. That is to say, they're off the program, they're—they come in and do an independent review, and then create a cost estimate that is unbiased, it's not driven by programmatic needs; it's just an honest assessment of that program,

and it's a combination of technical, as well as cost-estimating techniques.

Senator SESSIONS. Before—it would be before the program starts or in the middle of it or anytime it's appropriate?

Secretary TEETS. Generally speaking, what you want is an update to the independent cost estimate at every major milestone decision point. When you go to a key decision point in the program, you want the milestone decision authority to be informed by a new independent program assessment, including that cost assessment.

That's what we've started to implement in this 03–01 acquisition policy that I referred to. It's going to take time to show its value. The fact is, the seeds of the problems that we are seeing on SBIRS and FIA were shown in the 1990s. The programs were not established with adequate systems engineering up front, they were not scoped to have the proper test program built into the programmatic flow. Optimistic—very optimistic contractor estimates for performance in both of those cases, SBIRS as well as FIA—and those are two different, but very large independent prime contractors—those estimates that were provided in those proposals were unrealistically optimistic. They were cost-reimbursable contracts, bid in a competitive environment—highly competitive environment, and the costs were optimistically bid and then accepted.

Senator SESSIONS. So, should—can that be handled by DOD policy, or would it need legislation——

Secretary TEETS. I believe——

Senator SESSIONS.—or congressional——

Secretary TEETS. No, in this case——

Senator SESSIONS.—partnership——

Secretary TEETS. With the exception of the item—that I mentioned on reserve, in this case the independent cost estimates, the systems engineering up front, the key decision points that are tailored to a research and development program, all of that is codified in this policy, 03–01, and at the NRO in something we call NRO Directive 7. Those have been meshed to gain best-practice information from both organizations.

I think all of that is in place, but the gestation time for that to take effect is a long time. Programs like Space Radar and TSAT System are, in fact, now being brought into existence under this new codified 03–01 acquisition system and, I think, downstream, we'll be the beneficiaries of acquiring under this new system of acquisition.

We have to recognize that we're not at the end of our problem list on either SBIRS-High or FIA, and we're going to have to live with it until those programs come to completion.

Senator SESSIONS. It makes sense to me, and I would just suggest that, if we do need congressional action, I think we should have some hearings on this and consider it. GAO has expressed concern throughout the government, not just DOD, in contracting procedures. In August, they raised concerns about the inadequacy of DOD's Space Acquisition Workforce. It seems to be a growing trend to have contractors oversee more of the work to make up for the lack of government personnel, and that may be a problem.

I've learned, if you have a family member in the hospital, if you don't take an interest in their condition, the doctors sometimes get

confused or they—the different ones, and you have to—if you build a house, I don't think you can just turn it over to the architect; you have to be engaged or—because you have a greater intensity of interest in having it be successful and meet your specifications than anybody else in the world would have.

Secretary TEETS. Yes, sir.

Senator SESSIONS. I don't oppose private contracting, because they can create teams and handle peak work levels and do things in a way that government employees have a difficulty doing. But I guess my question to the panel would be—and let's just do this briefly, and I might ask you to submit more for the record—is this a concern? Do we need more skilled people capable of managing this?

General Lord?

General LORD. Senator Sessions, I'll answer the question and I'll follow on with what Mr. Teets said. Developing the acquisition professionals in the space acquisition business is a priority of Mr. Teets and certainly one that we share. I know that our other colleagues do agree with us. What we've done at our Space and Missile Systems Center in Los Angeles, we're keeping our program managers longer was one of the things that Mr. Young noticed the first time he took a look at us, that we had program managers who didn't stay around long enough to lead a program to success. So we've agreed on a minimum 4-year tour——

Senator SESSIONS. What was it before that? I mean, how long did you stay——

General LORD. Well, in some cases we had—in some major programs, we'd have four or five program managers in a period of 5 or 6 years, which is just absolutely the wrong way to do business. We've put our foot down, and now we're—we have 4-year minimum tours for our program managers, we have our——

Senator SESSIONS. Can you extend that if——

General LORD. I can, depending on what's going on. Our SBIRS program manager, for example, Colonel Randy Weidenheimer, I didn't say he would be the program manager for life, but he's going to get the program, and he'll keep working that as long as we need him to. Randy's doing a wonderful job, I think, given what Mr. Teets said, that he inherited a program that had some flaws in it, and we're working those. But the pressure is to put the right people in at the right place, train them, have the systems engineering schools that they can help understand, and then have the right amount of engineers in the systems at Los Angeles so that we can do that. Mr. Teets is——

Senator SESSIONS. Are these civilian and—I mean——

General LORD. We have a mixture of military and civilian engineers. We're 100 percent manned——

Senator SESSIONS. Government employee——

General LORD. Yes, sir.

Senator SESSIONS.—civilians.

General LORD.—100 percent in our civilian engineers in the Space and Missile Systems Center in Los Angeles against their authorizations. That number's probably close to, I would say—I don't know exactly—I think it's close to maybe 750, 800, maybe even a thousand civilian engineers at Los Angeles.

Now, our military component is smaller than that, but we have key management positions, where we're manned now, or will be by the summer, at about the same authorization rate the rest of the Air Force is, because engineers in the acquisition business are really golden nuggets, and we try to spread them around. We have some great ones, and we're going to get up to the same level as the rest of the Air Force. So we want to go even further. We're taking actions to selectively man, where we can, in the space acquisition business.

So professional development of our acquisition cadre is an important part for us.

Senator SESSIONS. You believe you are making progress——

General LORD. We're making progress, but we're competing in an environment where there's a lot of other competition for engineers, and we want to make sure we have the best and brightest that we can get our hands on in the Space and Missile Systems Center.

Senator SESSIONS. Well, it strikes me, if we have a multi-billion-dollar procurement program that's critical to our national defense, we may have to provide unusual compensation capabilities to the defense management to keep the people you need. Have you considered whether or not some change in our——

General LORD. There's been options like that——

Senator SESSIONS.—personnel system might be helpful, or——

General LORD. Yes, sir, there's been opportunities to—and I'll have to provide it for the record; I don't know exactly what the bonus is now for some engineers, and we'll provide that to you.

[The information referred to follows:]

The Critical Skills Retention Bonus was offered in fiscal year 2003 to the following Air Force Specialty Codes (AFSCs): 32E (Civil Engineer), 33S (Communications and Information), 61S (Scientific Research), 62E (Developmental Engineer), and 63A (Acquisition Program Manager). The goal of the retention bonus was to retain officers in the target AFSCs with 4–13 commissioned years of service by offering 1 to 4 year contracts with a payout of $10,000 per year, not to exceed $40,000. In fiscal year 2003, officers who were eligible were required to make their decision to accept the bonus by 31 August 2003. New contracts have not been awarded since 31 August 2003 and the last payment to those originally accepting the bonus will expire on 30 September 2006.

The retention bonuses offered to critical skills in fiscal year 2003 had a positive impact on retention when compared to projected non-bonus Cumulative Continuation Rates: Scientists, 5.9 percent increase over projection, an additional 28 officers retained; Engineers, 13.8 percent increase over projection, an additional 173 officers retained; Acquisition Program Managers, 10.5 percent increase over projection, an additional 86 officers retained; and Communications-Computer, 6.7 percent increase over projection, an additional 134 officers retained.

This program proved valuable and should be a consideration in developing force shaping initiatives in the future.

General LORD. But we have used that as an incentive to attract people and make sure they stay in that business. But we're looking at all the options.

Senator SESSIONS. I notice you indicated that you share the concern and—just briefly.

General CARTWRIGHT. I think you've hit the key issues. It's the stability of the workforce. It's the training and then the refreshing and constant interface. Because this is a dynamic field, the rules, the laws, the regulations change on a regular basis. The technologies change very quickly. If you don't have a workforce that's engaged and stable, you lose the benefit.

Senator SESSIONS. I'll ask the other—General Cartwright and the others, military witnesses—what about the Space Radar? Can you give us an appreciation for its utility and where we are on that?

General CARTWRIGHT. I'll start off and give you a thumbnail of how I see the utility of radar from space and how it's evolved. It's more in the context of a warfighter approach. If you go back, in particular, to the first Gulf War, one of the takeaways out of that war was that we needed to be able to take the night away from the enemy and be able to operate 24 hours a day. We came out of that war looking at both taking the night from the enemy and bringing precision to the war. Those were the two big takeaways, from my perspective, out of that activity.

As we moved into the Bosnia and Kosovo era and some of the work that we did there, the next major activity we really felt like we needed to take away in the scorecard for the enemy was weather. That was reinforced again in this most recent conflict.

When you look at taking the night and weather away from the enemy, you start to want to use more than one phenomenology to see what's going on. Electro-optical or just pure vision becomes challenged, obviously, in the night, and particularly in the weather. Radar gives you a way of having the opportunity to dictate the tempo of the conflict on your terms, because you're not held up by night and you're not held up by weather. Eventually—I'll extend this out one more iteration, which is that we have to start to take away the advantage of mobility and deception from the enemy. Again, having more than one phenomenology to look at in a very wide area, country size, and understand what's in front of you and not be hindered or dictated by natural phenomenon or by the enemy's ability to run and hide, will be critical to the way we fight battles in the future.

Senator SESSIONS. They understand when our capabilities are at their minimum, and tend to make their movements and actions during those periods.

General CARTWRIGHT. They are not unintelligent in that area.

Senator SESSIONS. Secretary Teets, we've been concerned about the cost of this program. You've restructured it, I understand, some, and how are we doing with that? Is there any cost-sharing that we can obtain, or the DOD could obtain through the Intelligence Community, to help afford this program?

Secretary TEETS. Yes, sir. What we have done is really responded to a directive that is cosigned by both the Secretary of Defense (SECDEF) and the Director of Central Intelligence (DCI), which came out after a number of Space-Based Radar Summit meetings that we held among people who are involved in both the warfighting community, as well as the intelligence-collection community. This particular memorandum that I'm referring to really dictates the desire of both the DCI and the SECDEF to field a national Space Radar system, one that will serve the needs of both the Intelligence Community and the warfighting community downstream.

So, what we've done is put together a program that—for example, the President's request in 2006 is $225 million, and what we are going to spend a significant portion of that on is this demonstration satellite that I mentioned in my oral statement, which

would fly in 2008, or actually two satellites that would fly in 2008. These satellites would be about a quarter-scale, roughly speaking, a one-fourth scale model, of the full-blown operational satellite that would come online in about the 2015 time frame. What we're trying to do on the cost equation is mature the technology early, use the transmit-receive modules that would ultimately be used on the full-blown system, but do it early, and have the Intelligence Community and the warfighting community work together to develop the concept of operations for how this system would be used—how would it be tasked, how would you disseminate the data that you receive from it, how would synthetic-aperture radar imagery get to imaging analysts while surface moving-target indication information would get to combatant commanders in theater—develop all of that concept of operations.

What we've said is, before we spend a very large amount of money on a full-blown operational system, let's show you—and show ourselves, too, by the way—but let's show ourselves and Congress that we can deliver this system at a predictable price, we can work together to develop this concept of operations. Then there's a separate tasking, in this memo that I referred to, which charges the Under Secretary of Defense for Intelligence and the Deputy Director of Central Intelligence for Community Management to work together to find the right formula for sharing the funding, starting in 2008. So, in 2008, I do believe that there will be a jointly-funded Space Radar Program that will come to Congress.

Senator SESSIONS. Anyone want to make a brief comment on the priority that we ought to give to this, how critical that is to the warfighter, and——

General CARTWRIGHT. I'll throw at least initial comments in here. To me, again, owning to the tempo of the fight, being able to do it day, night, all weather, is critical. There are other capabilities that radar, as a phenomenology offered to us in the realm of precision, both for locating a spot on the Earth and for describing it, that you cannot get from electro-optical, which is the way we do business today. As we move to more precise weapons, lower collateral damage, and a better understanding of the environment that we operate in, radar is going to be critical to us in that environment. Having that available and taskable by the warfighter is going to be very important, as it will also be to the Intelligence Community.

Admiral SESTAK. Mr. Chairman?

Senator SESSIONS. Admiral Sestak?

Admiral SESTAK. Just a short vignette. I talked to you about a scenario that was run by the General in the next decade, where three aircraft carriers had to show up at a conflict. This analysis shows that having five aircraft carriers show up, let's say, at "D Plus 20," was interesting, but irrelevant. Having two or three carriers there with this space capability was totally relevant, on D-Day, to that fight.

What the U.S. Navy, same as my brethren services, are going to face in the next decade against certain regional adversaries is pretty much a "saturation" tactic by them. For us, it's a lot of mines to impede us closing them, a lot of submarines, but it's also a lot of arrows going to be shot at us at sea—theater ballistic missiles—

as well as at our service brethren sitting in several overseas bases. There are not enough of our arrows to shoot down their arrows. There just aren't.

To be able to have a space-based capability that can be overhead, day in and day out—in peacetime, watching where they move what we call Transportable Erector Launches (TELs)—and then be able to say, when the flag goes down, that I can shoot the archer, I can take him with that quick-response missile is exactly what we need to do—which space radar can help with enormously. So, the only thing we would need hard-kill for—which is still important—is to have a nominal number of arrows to shoot the arrows down that were fired from bunchers not destroyed—a greatly mitigated threat. It's absolutely critical in future conflict for us, from the sea.

Senator SESSIONS. Would you care to express an opinion as to, in the panoply of matters we are spending money on in space, how high you would rate Space Radar?

Admiral SESTAK. I would rate that capability as extremely high. Warfare in the future is about speed. Every war we've fought since World War II has been one where U.S. industrial might—such as in Operation Desert Storm, Korea in 1951, and World War II—we had time to build up. Even in this last war, it took us several months to get everything over there, and then we attacked. Imagine if we had had that capability of speed, of being able to see and know what Saddam was doing in 1990, before he came into Kuwait. Maybe we wouldn't be there today.

So, this capability to see, to know, and to act quickly because of intelligence from space is absolutely of a heightened concern.

One last thing. The global war of terror and September 11 showed us something. We haven't had to worry about any adversary coming against our shores from the seas since the British of 1812. September 11 has changed this tremendously. To some degree, we can protect the airways better, because we know that every plane has to be on a certain pathway; and if they're off that, alarms go off.

People or items coming from the seas are many—56,000 ships every year come into U.S. ports that are over 10,000 tons, never mind the smaller ships. Which one of those ships coming from across the sea has something in it we don't want to pull into our port?

The ability of a space-based capability, along with other sensors we have under the sea, to fingerprint precisely certain critical vessels coming across, is an additional attribute that this space capability gives us to control the strategic approaches by pervasive awareness from overhead, as well as from under the sea. Fingerprinting.

Senator SESSIONS. Thank you.

I think that states a strong case for Space Radar, and we need to be sure, as we go forward, our budget properly reflects that.

Perhaps our service witnesses could share with us the extent to which we have learned lessons from this Iraq campaign, or Afghanistan campaign, and—What can we do better? Are there some things that Congress needs to do to help you meet your goals?

General Cartwright, do you want to start off? We've talked about some of it, I know, but if there's something specific, it would be an opportunity to—we'd appreciate hearing from you.

General CARTWRIGHT. I mean, I'll go back to the space situation awareness. It has become such a critical enabler for our warfighters. I speak from a purple uniform right now, as much as from a Marine uniform. To stay on a path that keeps our focus there so that we understand what's happening in space, since it is so critical, so that we can move from being able to assess what happens in very large volumes, but not with any great granularity, taking several days to know whether something ran into something else, was interfering with something else, or just disappeared. Today, there's so much ambiguity in an area that is so critical to the way we do business, that remaining focused in space situation awareness in the next few years is, to me, a critical enabler. Getting those capabilities into a command and control system that takes that awareness, not just to some headquarters, but down to the warfighters, so that they know when GPS is going to be available and how accurate it is, and they understand when their communications are being interfered with by solar activity or by an enemy. To me, that's going to be a critical enabler, and I want to stay focused in that area. It is resourced now. I'd just urge us to keep it resourced and move forward in that area.

General LORD. Senator Sessions, thanks. Very good question. I want to say, with the support of this committee, certainly with respect to space professional development, I think that's helped us create an important advantage for us in this business. It certainly, I think, paid off in Operations Enduring Freedom and Iraqi Freedom. Not only do we have the good hardware, but we have good people who understand the environment of space and our commitment to their educational and professional development helped us integrate space in a seamless way. We're not perfect yet. We have to continue to grow our people in the right kind of way so they're the bona fide warfighters and can stand shoulder to shoulder with their colleagues in the Army, Navy, Air Force, Marine Corps, and Coast Guard and be an equal partner in the air, land, sea, and space business. I think that's starting to really take hold. Because of your support, and the committee's support, we've been able to make some great strides there, and will continue. So I would, sir, ask you to just keep the pressure on us with respect to space professional development.

Senator SESSIONS. Thank you.

General Dodgen.

General DODGEN. Sir, I would highlight three things. First of all, I echo what General Lord said about the people. Space experts are going to be on the battlefield from now on in the Army's combat formations. We had gone from support teams, which went on call, to now we're in the process of putting organic space experts in each one of our division-level formations.

The second thing I would highlight to you is that we had some issues with our missile warning in Operation Iraqi Freedom. There were classes of missiles that the current constellation DSP did not see. So, we need better infrared capability that SBIRS will provide us. The effect of not having that constellation up there to give you

that missile warning is that you become dependent upon your radar resources to pick these things up, and you lose in a battle which is—and particularly with short-range missiles—is only seconds long, you lose some of those seconds. So that warning from space will be critical to us as we go forward.

The last thing I would tell you, that I think we did for the first time in this fight that worked pretty well and we need to mature at the joint level, is the notion that, as space becomes more complicated, that we have a single space-coordinating authority which coordinates our efforts in space, understands our vulnerability, protects what we have, and limits our—the effects of our enemy. I think that's important, that we continue that at the theater level, and even at the global level.

Senator SESSIONS. Thank you.

Admiral SESTAK. Sir, I have just two. The first one is that I would think of the TV series "M*A*S*H." All those casualties are coming in, and the physicians are going around trying to find who to take care of first. That's part of the problem that we saw in the war, and that we definitely will see next decade with the space surveillance radar. We're going to have a lot of information; but how much of it is knowledge? We need data triage. We need machine-to-machine automatic target recognition, automatic mensuration; that is, the ability to say, "These are the important targets and this is definitely a tank or a TEL." We can have this great space capability system up there, but we all know, having operated out there, that our minds can only take so much data . . . it needs knowledge presented to it. I need that automaticity in these networks Mr. Teets and others talked about. Without that, we are just getting information into the M*A*S*H tent, but we're not taking care of the important targets first on their way out.

Second, I won't forget the day I got underway on a battle group. I'm literally 2, 3 hours out from Norfolk, headed to the Persian Gulf, a couple of years ago, when my intelligence officer walked in and said, "I just want you to know, 10 minutes ago two aircraft took off from this airfield in this country in the Persian Gulf." I said, "Why do I care what's happening 8,300 nautical miles away, when I won't be there 2 weeks from now?" He said, "Because we're the first battle group to ever have a direct downlink from a satellite that was able to have the signal intelligence intercept that they were getting underway. When you're in the Gulf, those two aircraft will be over top of you in 10 minutes."

So what's important as we begin to look at things like TACSAT, being able to have more responsive systems go up, is, our ability to get it directly by the warfighter. It's good to send it down and get it processed, data triage, but time is also important, and that downlink, increasingly, to that warfighter forward—from Unmanned Aerial Vehicles (UAVs) to national satellites—to TACSATs—is critical in this fight.

Those are the two I'd take away, sir.

Senator SESSIONS. Well, it is certainly a complex thing. I agree that discriminating between lethal attackers and innocents in time is critical. I've often thought about it. As we get more capable and we have more information, it's even harder to determine what's friendly and what's not. I don't envy you in that regard.

Secretary Teets, do you have anything to share with us? We'll keep the record open so that anyone who wants to submit written questions will be able to do so. We'll also make part of the record your statements that you've given us. But do you have any final comments before we break?

Secretary TEETS. No, sir. I would only, in closing, thank you, once again, for the support of this committee. I think your attitude, that has been very evident today, is extremely helpful, and I appreciate very much the openness with which you are willing, and obviously eager, to discuss this entire space-control issue. I do think it is a paramount issue, and we need your continued support to push this agenda forward. We thank you very much.

Senator SESSIONS. Thank you.

Well, from this hearing, I think few could dispute that our military capability depends on space control, and, therefore we need to be investing in things that will allow us to continue to have that control and improve our capabilities.

If there's nothing else, thank you very much for your excellent testimony. It has helped us a lot, and we look forward to continuing to work with you.

We are adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

GENERAL SPACE POLICY

1. Senator SESSIONS. Secretary Teets, is it U.S. policy to disrupt adversary satellite-based communications only in a temporary, reversible manner?

Mr. TEETS. U.S. space policy states that we are committed to he exploration and use of outer space for peaceful purposes. These peaceful uses include intelligence and military-related activities. In the event that an adversary is using space in a manner hostile to U.S. national interests, we chose to deny the adversary this use. We reserve the right to employ a range of options which range from diplomatic through military. The Secretary of Defense (SECDEF) is tasked to develop a range of options from temporary/reversible to permanent/non-reversible denial of an adversary's use of the space system and/or service.

2. Senator SESSIONS. Secretary Teets, can we accomplish the space control mission solely through reversible effects?

Mr. TEETS. The objective of the U.S. space control mission area is to gain and maintain space superiority. Space Superiority is comprised of three critical elements. We must have complete Space Situation Awareness (SSA) to fully understand what is happening in space, we must be able to defend our space assets against hostile attack and the environment, and when required, we must have the ability and resources to deny our adversaries the use of space. While our focus is on temporary, non-destructive means, we reserve the right to use destructive force if it becomes necessary.

3. Senator SESSIONS. Secretary Teets, are there any scenarios where we might have to consider destructive effects?

Mr. TEETS. Yes, it may be necessary but only after other options are considered. The U.S. will employ a range of options to achieve space superiority in a time and place as needed. These options include both diplomatic as well as military with the military options ranging from temporary/reversible to permanent/non-reversible. The decision is based on which option will best achieve the combatant commander's required effect. All U.S. military planning must be in accordance with The Law of Armed Conflict; space control planning is no different. Before implementing a plan to destroy any portion of a space system (ground, space, user) the planners will ensure that it meets both the necessity and proportionality principles associated with the Law of Armed Conflict. That is, that the destruction is required to meet the combatant commander's intent, the degree of force does not exceed that required to accomplish the mission and that the military advantage justifies the potential civil

loss. Our current destructive capabilities are focused on the ground and/or user segment of the space system using conventional munitions.

4. Senator SESSIONS. Secretary Teets, commerical imagery satellites, owned by other countries or a consortia of other countries, could conceivably provide to potential adversaries the location of U.S. forces during a crisis or conflict. Would we permit these commercial satellite companies to pass such information?

Mr. TEETS. Protecting U.S. and allied forces from overhead reconnaissance is a growing concern of ours. Commercial imagery is available to anyone with internet access and a credit card. Our approach for addressing this issue is multi-pronged. National remote sensing policy focuses on establishing agreements to limit the distribution of remote sensing information for U.S. licensed remote sensing operators in times of crisis. We are working with other governments to encourage them to put in place similar mechanisms for their commercial/civil operators. In addition, other diplomatic options can be pursued if necessary. On the military side, we continue to perform research and development on capabilities to deny remote sensing in accordance with our National space control policy should diplomatic options fail.

5. Senator SESSIONS. Secretary Teets, the United States' Global Positioning System (GPS) system provides position and navigation information to anyone that has a GPS receiver, including potential adversaries. What is U.S. policy with respect to denying this information to adversaries, or those cooperating with adversaries, during times of crises or conflict?

Mr. TEETS. In accordance with presidential directive, the U.S. policy is to deny to adversaries position, navigation, and timing services from the GPS, its augmentations, and/or any other space-based position, navigation, and timing systems without unduly disrupting civil, commercial, and scientific uses of these services outside an area of military operations, or for homeland security purposes.

6. Senator SESSIONS. Secretary Teets, in Operation Iraqi Freedom, over 80 percent of our military satellite communications was provided by commercial carriers, many of which are owned by non-U.S. consortia. What are the national security risks of relying on commercial providers for military communications?

Mr. TEETS. Commercial satellite systems are an integral part of our space capabilities just as commercial aircraft play a vital role in our ability to transport troops and cargo when needed. Our challenge in the use of commercial space capabilities is to strike a proper balance between the risk in the use of commercial communications satellites and the cost of operating only military satellite communications to meet our needs. We are well aware of this balancing act and are aggressively refining strategies to ensure we find the proper balance. To address these opportunities and potential threats, a Department of Defense (DOD) Commercial Satellite Communications (SATCOM) study was established in 2004 where DOD worked directly with the satellite industry to improve policies, programs, protection, and processes relating to the commercial SATCOM services supporting U.S. Government. As part of this effort, I hosted a meeting for the CEOs of our commercial SATCOM service providers and other key DOD SATCOM leaders. The meetings focused on the vital role that commercial SATCOM plays in our current expeditionary force structure.

7. Senator SESSIONS. Secretary Teets, should we consider the development of a National Commercial Satellite Communications policy similar to the existing National Remote Sensing Policy?

Mr. TEETS. Current national space policy (PDD/NSC–49) directs DOD and other U.S. Government agencies to "purchase commercially available space goods and services to the fullest extent feasible." We see no requirement for a comprehensive, interagency National Space Communications Policy.

At the same time, DOD is proactively working to amend the current, "ad-hoc" approach to leasing commercial SATCOM with a more strategic approach for acquiring services to support a variety of missions. The DOD Executive Agent for Space recently co-sponsored a comprehensive DOD Commercial SATCOM study. This study was conducted in conjunction with U.S. Strategic Command (USSTRATCOM) and the Office of the Assistant Secretary of Defense for Networks and Information Integration. The study examined protection operations and acquisition practices associated with DOD use of commercial SATCOM networks. As a result of this study, Acting ASD(NII), Dr. Wells, signed a memorandum on "Policy for the Planning, Acquisition and Management of Commercial Satellite Communications Fixed Satellite Services" on 14 December 2004. This policy seeks to establish a capabilities-based, best practices strategy that provides more competitive, rapid, and reliable access to commercial satellite communications resources.

In accordance with this action plan, the study co-sponsors are working closely with DISA to establish new contract criteria for the protection of commercial SATCOM networks, based upon "best practices" for information sharing, physical protection, and cyber security. The National Security Space Office also is incorporating commercial requirements and capabilities in its update of the Transformational Communications Architecture.

8. Senator SESSIONS. General Lord, General Dodgen, and Admiral Sestak, there seems to be general agreement that it is a good idea to develop an operationally responsive space capability to provide warfighters with the ability to rapidly launch small, militarily useful satellites capable of supporting a specific theater of operations. How would each of your respective services employ such a capability in support of the warfighter?

General LORD. Air Force Space Command is currently developing an Operations Concept for Joint Warfighting Space (JWS). Under this concept we will employ small satellites known as Tactical Satellites (TACSATs) that feature tailored payloads dedicated for the Theater Commander's specific needs. These TACSATs will have standardized platforms and payload interfaces for rapid mating and testing of payloads. Various payloads/platforms will be kept as War Reserve Material (WRM) near the launch pads, analogous to pre-positioned munitions on flight lines. The WRM concept, rapid mating and test, rapid launch capability, and priority mission planning will enable an initial on-orbit capability within 72 hours of call-up. We are planning a series of TACSAT flights starting later this year to demonstrate this responsive capability.

General DODGEN. A good example of how we would use such a capability is the TACSAT, which is an experimental program that may provide a capability to rapidly augment an existing constellation of spacecraft, and/or to rapidly deploy space assets with payloads tailored to specific requirements of combatant commanders. Such a capability could assist in achieving persistent surveillance, precision targeting, communications, 360 degrees of situational awareness, and the possibility of dynamic re-tasking. Technology advancements in small satellites along with small responsive launch offer the potential of cost-effective, tactical space systems.

Admiral SESTAK. Small satellite constellations could provide additional options to the Battle Group Commander. These options could responsively fill capability needs or gaps, such as persistent intelligence, surveillance, and reconnaissance (ISR) and communications relay, in a quick reaction manner. For specific problems, it could also help us achieve efficiencies by optimizing space capabilities in a responsive manner for limited timeframes.

For instance, in the months leading up to Operation Iraqi Freedom, the Navy was concerned about Iraqi use of mines to potentially disrupt and delay joint access to the area from the sea. The sheer number of ISR requirements and competition inherent for use of National Technical Means (NTM) make it difficult to achieve the level of persistent ISR needed to detect mine laying operations prior to a conflict. With an operationally responsive space capability, the battle group commander could request launch of a constellation of small satellites optimized against a specific threat (e.g. mines) to achieve Maritime Domain Awareness. The battle group commander could expect the small satellite constellation to be operational in a matter of weeks and to have direct tasking of the payload.

9. Senator SESSIONS. General Cartwright, what progress has STRATCOM made toward development of a requirement document and a concept of operations to support this capability?

General CARTWRIGHT. STRATCOM is in the initial stages of writing a Space Support Joint Capabilities Document to address responsive space capabilities within the context of Joint Doctrine. The ongoing National Security Space Office Responsive Space Operations Architecture Development Study will also provide key insight to the analysis necessary for developing the responsive space attributes and capabilities required to support the joint warfighter.

QUESTIONS SUBMITTED BY SENATOR JAMES M. INHOFE

SPACE SUPERIORITY

10. Senator INHOFE. Secretary Teets, General Cartwright, General Lord, General Dodgen, and Admiral Sestak, in 2001 the Space Commission reported "an attack on elements of the U.S. space systems during a crisis or conflict should not be consid-

ered an improbable act." These types of attacks could include but would not be limited to:

1. Jamming the signal links between satellites and ground stations.
2. Permanently or temporarily degrading satellites with lasers.
3. Degrading or destroying satellites or ground systems with electromagnetic pulse (EMP) attacks.
4. Conducting cyber attacks to disrupt computer systems used to control satellite functions and to collect, analyze, and distribute information.

The United States has had an ever-evolving reliance on space operations to support military and national objectives, beginning with 1991's Persian Gulf War. Since then, space systems have been heavily utilized for navigation, communication, weather, missile warning, and targeting information. It is my understanding that approximately 60 percent of the precision-guided munitions dropped over Afghanistan during the first 2 months of Operation Enduring Freedom were GPS-directed Joint Direct Attack Munitions (JDAMs). I have also been informed that commercial satellites are providing more than 70 percent of the military's communication network during Operation Iraqi Freedom. Non-U.S. companies, I might add, own most of these satellites.

It seems to me that with the ongoing and escalating use of space assets we need to ensure that we have superior systems that are heavily defended against attack. I don't have to point out that the threat to our space capability need not come directly from the enemy we engage. The enemy we engage can buy the threat from a third-party.

What are we doing to ensure that our space capability is indeed superior, and just as importantly, how do we limit any attack on what we have come to rely on as a critical information provider to defeat the enemy? In other words, should the U.S. do more in the way of counter-space operations?

Mr. TEETS. The U.S. can no longer consider space a sanctuary and we are taking steps to ensure we are prepared to be meet the increasing threat. The National Security Space Community has reviewed and updated emergency response procedures and contingency plans to address existing and emerging threats. We are improving space situational awareness for enhanced warning and assessment of potential threats. Space operators and end-users are being educated on the full range of threats to space systems. We have taken addition steps and they are outlined in more detail in our May 2004 report to Congress titled "Efforts to Address Vulnerabilities in Space Systems."

General CARTWRIGHT. Our space related assets are true global enablers. STRATCOM has an assessment underway to identify space control capability gaps and redundancies as well as the potential approaches necessary to guarantee our continued ability to operate freely in space. This assessment will also help rationalize ongoing space control policy development efforts and provide a basis to help focus future science and technology and acquisition programs.

General LORD. Operation Iraqi Freedom demonstrated the importance of space systems to military operations. However, the advantages of space-enabled warfare are also evident to our adversaries. Space can no longer be treated as a sanctuary. Defensive counterspace operations need to be a key consideration in the development, acquisition, and operation of every space system. For example, the Air Force has reviewed and updated emergency response procedures and contingency plans to address existing and emerging threats. The Air Force is also developing a comprehensive attack detection and characterization program that will increase space situation awareness significantly and allow us to mitigate the effects of an attack on less protected systems. Our space operators and end-users are being educated on the full range of threats to space systems. More specifically, the Air Force has established a Space Aggressor capability and a Space Test and Training Range capability to conduct threat and protection training in a realistic, yet secure environment. We have taken additional steps and they are encompassed in more detail in the DOD Executive Agent for Space May 2004 Report to Congress entitled "Efforts to Address Vulnerabilities in Space Systems."

General DODGEN. Counter-space operations are becoming increasingly important to warfighting. The increasing reliance on space capabilities demands that we protect these potential vulnerabilities. Protection must be examined in a holistic view—protection of on-orbit assets, protection of the links to ground systems, and protection of the ground systems. Besides protecting the ability of U.S. and coalition forces to leverage these critical space capabilities, we must remain vigilant to deny the enemy's use of various space capabilities that could be used against our forces, if required. Preventing the enemy from using space capabilities can range from diplomatic and economic measures to military ones. We must have the military capa-

bility to deny the enemy use of space capabilities in cases of last resort. These capabilities must strive to be temporary and reversible in nature. The ability to deny the enemy the use of space also requires a robust and near real time space surveillance capability that provides as complete space situational awareness as possible. Our counter-space approach must be a balanced but comprehensive one, integrating defensive and offensive capabilities and tactics to maintain our warfighting dominance.

Admiral SESTAK. Navy mitigates the effect that an attack might have on our space capabilities by building redundancy into our operational procedures so we can shift to a different means of transferring data if the space segment suffers an outage for any reason (hardware failure, adversary denial, etc.). SATCOM is a ship's lifeline after it pulls away from the pier, but if there is a hardware failure on a commercial satellite, for example, Navy ships have alternate means of communication in different frequency bands such as SHF (DSCS and Wideband Gap Filler) and EHF (MILSTAR and AEHF). Even if a Navy ship lost all satellite communications it could still communicate, albeit at a reduced level, using HF communications.

All of the four mission areas of Space Control are important to ensure freedom of action in space for the U.S. Consequently, a balanced investment portfolio for SSA, Protection, Prevention, and Negation is needed to ensure maximum effectiveness.

CHINA'S GROWING ANTI-SATELLITE THREAT

11. Senator INHOFE. Secretary Teets and General Lord, as a follow-up, a growing concern of mine is China's increased space capability. China is spending large sums of money on jamming and intercept technologies, as well as laser technology that can blind electro-optical sensors or attack our GPS satellite constellation. Reports also highlight that China is thought to be on a path toward a direct-ascent (ASAT) system that could be fielded in the 2005–2010 timeframe. What are we doing to counteract these advances by China? In other words, what redundancies are we developing into our systems to prevent the success of these Chinese initiatives?

Mr. TEETS. The National Security Space Community continues to monitor threat assessments provided by our intelligence community. As the threat changes/evolves we adjust current operations and our acquisition programs as deemed necessary. We are facing a much different threat today than we did during the first 50 years of space operations and are taking appropriate measures to ensure our continued operations. The Air Force is investing in programs to improve our space situational awareness to allow us to better understand if we are under attack. We are developing enhanced capabilities to make it more difficult for an enemy to jam GPS or our satellite communication links. We continue to enhance force protection at our ground stations while maintaining a requirement for alternate control facilities to minimize the impact if one of the ground sites is attacked. In addition, space operators and end-users are being educated on the full range of threats to space systems. We have taken additional steps and they are outlined in more detail in our May 2004 report to Congress titled "Efforts to Address Vulnerabilities in Space Systems."

General LORD. The importance of space to our military operations and the threat to space systems have evolved significantly over the first 50 years of space and missile operations and we are taking appropriate measures to ensure our continued operations. In concert with the rest of the National Security Space Community, the Air Force continues to monitor threat assessments provided by our intelligence community. As the threat changes and evolves, we adjust current operations and our acquisition programs as deemed necessary. The Air Force is investing in programs to improve our space situation awareness to allow us to better understand if we are under attack. We are developing enhanced capabilities to make it more difficult for an enemy to jam GPS or our satellite communication links. We continue to enhance force protection at our ground stations while maintaining a requirement for alternate control facilities to minimize the impact if one of the ground sites is attacked. In addition, space operators and end-users are being educated on the full range of threats to space systems. Additional steps to protect our space systems can be found in the Department of Defense Executive Agent for Space Report to Congress entitled "Efforts to Address Vulnerabilities in Space Systems."

SPACE ACQUISITION

12. Senator INHOFE. Secretary Teets, when it comes to further acquisitions of space assets, I, and I am sure many of my colleagues would agree that we have to continue to exploit space to meet our national security objectives. From strategic

missile warning, to assured communications, navigation, intelligence, and surveillance, modern, more technologically advanced systems are being developed. Yet these systems have run into problems with costing, delivery schedule, and technical performance.

The Government Accountability Office (GAO) issued a report in June 2003 entitles, "Military Space Operations: Common Problems and Their Effects on Satellite and Related Acquisitions." Are you familiar with this report?

Mr. TEETS. Yes.

13. Senator INHOFE. Secretary Teets, the report specifies that most satellite programs cost more than expected and take longer to develop and launch than planned. It identifies the causes for these shortcomings as:

1. Inadequate requirements definition and requirements instability
2. Poor investment practices
3. Poor execution of acquisition strategies
4. Immature technologies

The report also listed several contributing factors. I understand that you have modified the space acquisition process in an effort to address the report's conclusion.

What positive results have you seen thus far based on the modifications you implemented for the space acquisition process, based on the findings of this GAO report? What, if any, additional adjustments are needed to further correct issues associated with this acquisition process?

Mr. TEETS. As the MDA, I am responsible for managing the program baselines to satisfy user requirements. We are working with the user community to more closely coordinate activities under JCIDS 3170 and NSS Acquisition Policy 0301.

I updated the National Security Space Acquisition Policy 03–01 this past December to incorporate lessons-learned and to position Key Decision Point (KDP) reviews such that they will provide more relevant information to the Milestone Decision Authority (MDA) at the time of the reviews. I implemented similar changes to NRO policy to more closely align the two acquisition processes. The updated policy ensures that critical program events occur prior to the KDP. For example, the system design review should be completed prior to program initiation (Phase B) since it establishes the baseline to begin preliminary design. In addition, Requests for Proposals (RFPs) are not releasable until after the Defense Space Acquisition Board (DSAB) and Milestone Decision Authority (MDA)-approved acquisition strategy.

Part of the space acquisition process is an Independent Cost Assessment Team (ICAT). While cost estimating is not an exact science, we've put in place a system to ensure past experience and solid costing methods are used and will lead to realistic cost numbers to aligning the design reviews with the Key Decision Points (KDP), NSS 03–01 requires that an initial requirements documents The Independent Cost Estimate (ICE) is effective in giving the program's MDA a comprehensive estimate. All elements of cost are considered when deciding when or if to proceed with a space system. The ICE is a requirement for each DSAB meeting when the MDA approves the program's entrance into the next phase of the space acquisition process.

The independent cost estimates are produced by an Office of Secretary of Defense (OSD)-led team that includes members from the Air Force cost community as well as members from the National Reconnaissance Office (NRO) and other Services' cost groups. A System Program Office (SPO) cost estimate is required as well. Both estimates are briefed to the MDA at the DSAB.

I understand the GAO's concern on technology development requirements prior to key decision points. We share their desire to set a minimal threshold of maturity for allowing technologies into a program. Of equal importance, we must leverage cutting edge technology in order to meet the needs of the warfighting community. We must achieve a balance and I think the policy addresses this concern by formalizing an independent review of the System Program Office (SPO)—generated Technology Readiness Assessment (TRA). This means that the Component S&T Executive will provide an additional look at the technical level of maturity and provide an assessment to the MDA along with the exhaustive peer review that is part of the IPA process.

It will take time to accurately assess the benefits of the modified space acquisition process. The systems that are growing up under the new process won't be fielded for a number of years. However, more frequent engagement of leadership earlier in the acquisition process and specific requirements prior to moving into phases are definitely positive steps towards addressing the challenges with space acquisition. The policy also allows for Program Managers and Program Executive Officers to

conduct program reviews outside of the DSAB process at the request of the DOD Space MDA or designee.

Whereas, currently, there are no further adjustments to the acquisition process, we will continue to focus on ways to improve. One future adjustment that would certainly help is a change in budgeting for space systems that recognizes the differences in acquiring space systems. This could be a management tool as I have talked about before—management reserve or a different appropriation other than missile procurement. This is a dialogue that needs to continue with Congress and within the DOD.

Another related activity I initiated is development of a highly trained space cadre. This activity recognizes the need to establish and maintain a reliable source of experienced space personnel in the DOD and industry. No matter how good the acquisition review process becomes, it is more important to have people able to execute acquisition strategies, and recognize and develop good investment practices at the program level. Given the proper resources, this day-to-day work between government and industry has the greatest impact on the government's ability to successfully execute major space acquisition programs.

With our improved acquisition decisionmaking policy and a system for space cadre development, we can focus on program execution. We need to reinforce more discipline in the program baselining process and our ability to get reliable program execution data back to program management in a timely fashion. This includes our ability to generate more accurate Integrated Master Schedules and the metrics that convey program performance. We feel that better program execution and management will lead to fewer rebaselinings and baseline breaches.

THE CONCEPT OF SMALL SPACE

14. Senator INHOFE. General Lord, closely aligned with my previous question to Secretary Teets is the belief by some experts that our space programs are so big, so complex, that they inevitably will lead to cost overruns and delivery delays along with performance issues. That due to the sheer size of the programs, any shortcomings will have a huge impact not only on that program but also on follow-on programs or programs being developed in parallel. One alternative to the acquisition approach we have typically used would be an initiative known as "Small Space," where relatively inexpensive, smaller, simpler, satellites would be orbited quickly, in an almost "just in time" sequence. Less expensive vehicles would be used to launch the satellites for military or crisis applications.

Proponents of "Small Space" believe the benefits would include an expanded industrial base because of more satellite launches, reduced vulnerability due to a single satellite failure or attack, and improved responsiveness to the warfighter because of a more flexible launch process. How viable is such a low cost launch approach to the acquisition process, in your personal professional opinion?

General LORD. All indications thus far are that a low-cost approach using "Small Space" is viable. We are working towards a low cost, responsive space launch capability. Under a joint AF/DARPA program, we are developing launch vehicles that would be able to launch small satellites for under $5 million per launch. Our Air Force Space Command's Space and Missile Systems Center is actively involved in that development program. They are also leading a launch vehicle demo program that features a hybrid between a reusable first stage and an expendable second stage to reduce launch costs by an estimated factor of 3X–6X as compared to current medium launch vehicle costs. Both of these programs will leverage from spiral development, where lessons learned are incorporated as incremental steps to affordable launch vehicles.

15. Senator INHOFE. General Lord, how do we balance the needs for this "Small Space" approach, against the costs and technical challenges of developing, manufacturing, launching, and servicing large, complex systems?

General LORD. Air Force Space Command sees "small space" satellites and payloads playing an augmentation and a rapid reconstitution capability role to "big space," as well as providing the potential for risk reduction prototypes or demos for larger strategic space systems. This concept allows us to rapidly provide capability when and where needed to prevent "gaps." This is analogous to Navy PT boats augmenting battleships. "Small space" will not replace "big space" assets but will make capability gap coverage more affordable.

"SMALL SPACE" AND THE WARFIGHTER

16. Senator INHOFE. General Cartwright and Admiral Sestak, I am particularly concerned about how our Space Initiatives will aid and benefit our troops on the ground, giving us an advantage that cannot be compromised. Do you believe that "Small Space" programs may have better or more responsive military applications than we currently possess with larger systems?

General CARTWRIGHT. There is evidence that "Small Space" may be ideally suited as a potential surge capability for the warfighter. Lessons learned from recent conflicts indicate that, an operationally responsive tactical satellite supporting a single function, and/or tailored to a specific regional mission, could benefit deployed forces.

Admiral SESTAK. "Small Space" programs offer the potential for responsive military application and will complement the capacity, longevity, and reliability of the larger space systems. "Small Space" programs will offer an additional option from national to organic sensors to fill capability needs or gaps such as persistent ISR and communications relay in a responsive manner for the military commander. They can help us achieve efficiencies by optimizing space capabilities for a particular problem in a responsive manner for a limited timeframe.

Precisely because of their responsive nature, "Small Space" programs will not be able to replace the larger space systems. We will continue to depend on the large capacity, endurance, and reliability of larger systems to provide indications and warning, ISR, communications, Meteorogical and Oceanographic (METOC) and Position, Navigation, and Timing (PNT) through peace time and crisis. Not only are the long-dwell times available from the "large" programs critical, but the broad range of capabilities offered by them will enable DOD to move toward net-centric operations.

QUESTIONS SUBMITTED BY SENATOR JOHN THUNE

SPACE-BASED RADAR PROGRAM

17. Senator THUNE. Secretary Teets, as we advance battlefield technologies we also open the door to advancing civilian dual use technologies that can help in a myriad of situations. I will watch with great interest the development of the Space-Based Radar (SBR) program. There is no dispute that this new system will prove to be a great asset to both our Intelligence Community and our warfighters. But this same technology—perhaps on a shared basis—can produce many valuable applications for civilian government agencies, academic, scientific, and industrial interests. These other applications may include topographic mapping, coastal zone management, agricultural/water/timber analysis, or oil/gas exploration. Will you take into consideration the potential benefits of providing at least some shared civilian use of the SBR system, and if so how?

Mr. TEETS. Space Radar data and products will have tremendous applications for civil agencies across the spectrum of academic, scientific, and industrial uses. Space Radar will accommodate civil requirements within the community structures for meeting user global information needs. The program's initial capabilities document which sets forth high level requirements for the Space Radar system will be coordinated through the Civil Applications Committee as part of the review process inherent to achieve DOD and national approval. This will ensure partnership of civil agencies in setting Space Radar requirements. Also, we are currently assessing the utility and policy implications of using the system for civil applications including counterdrug, disaster response, and homeland defense.

18. Senator THUNE. Secretary Teets, is there a real potential for cost savings to DOD if we find that other government agencies like the United States Department of Agriculture (USDA), Department of the Interior, and especially the U.S. Geological Survey (USGS), can possibly devote some of their budget resources to a program where they can also draw clear benefit?

Mr. TEETS. Including civil agency partners in the Space Radar program would provide DOD and the National community with opportunities to further share the cost of the Space Radar program in a responsible way with those agencies that will benefit from its enhanced capabilities. In line with cost sharing opportunities, DOD and the National Community are working closely together in an effort to review the governance and cost responsibilities for the Space Radar program in the future. Adding civil agencies to this effort would broaden the opportunities inherent in any such discussion. I would welcome the opportunity to discuss a cost sharing agreement with other government agencies such as the ones you mention. In fact, the SECDEF and DCI have recently affirmed their support for one common Space

Radar capability. As part of this commitment, they have agreed to review the cost sharing approach in the fiscal year 2008 budget.

19. Senator THUNE. Secretary Teets, don't we have the technical capability and safeguards to provide some civilian use of SBR, perhaps by adding a separate, dual-frequency capability, yet still protect the classified aspects and military/intelligence uses of this platform?

Mr. TEETS. Space Radar has the ability through community tasking management processes to accommodate both DOD/National classified information needs and civil unclassified requirements. The community structures that exist today and as they will evolve to in the 2015 timeframe will enable both sets of requirements to be met within a common operating process. Policy or material mechanism may be instituted over time to make the provision of unclassified civil information from the Space Radar system transparent to the user. Space Radar is in the concept exploration phase of acquisition, which is the time to study these requirements. We can look further at the technical aspects of adding a separate, dual-frequency capability, once the requirements have been vetted. We will continue to ensure the protection of sources and methods consistent with prudent guidelines and trusted technology.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

ADVANCED EXTREMELY HIGH FREQUENCY SATELLITE AND TACTICAL SATELLITES

20. Senator BILL NELSON. Secretary Teets, on March 11, 2005, the committee received the report on TSAT acquisition strategies to reduce operational risk. That report estimates that with the current MILSTAR communications satellite and the three planned Advanced Extremely High Frequency (AEHF) satellites, coverage can be maintained through 2017 over 75 percent of the world. This estimate is based on the assumption that the MILSTAR satellites will live longer than the design life. The report also assumes that TSAT will launch in 2013. The Air Force senior warfighter forum decided that they would accept this program and "a potential gap in the fielding schedule" in order to enable the delivery of T-Sat capability. What is the length of the "gap," and when does the "gap" get too long?

Mr. TEETS. The third AEHF satellite is scheduled to launch in 2010. If a fourth AEHF were procured it would launch in 2011. The first Transformational Satellite Communications System[1] (TSAT) launch is currently scheduled for 2013 and will complete the 4-satellite constellation required to fully meet AEHF capabilities. This creates a 2-year gap in the fielding of the complete AEHF capability. While no capability gap is desirable, this 2-year gap is acceptable, given the estimated life of the combined MILSTAR-AEHF constellation. The acceptability of a larger capability gap would have to be assessed by the Senior Warfighters' Forum (SWarF).

21. Senator BILL NELSON. General Cartwright, General Lord, General Dodgen, Admiral Sestak, how much risk is acceptable?

General CARTWRIGHT. It is critical to have and maintain the capability to deliver integrated net-centric communications across functional areas with adequate bandwidth to support our deployed forces and strategic missions. Potential degradation in the number of protected circuits and or loss of medium data rate capacity, could create operationally unacceptable conditions.

General LORD. The current plan for three AEHF satellites and five MILSTAR satellites can be deployed to provide coverage for the most critical areas. The extended Data Rate (XDR) capability "gap" will be in the area with the lowest operational risk. Therefore, the Senior Warfighter Forum determined that the transformational capabilities provided by TSAT outweigh the risks resulting from a possible gap. If delays in the TSAT program caused the XDR capability "gap" to increase significantly, STRATCOM would convene another senior warfighter forum to reassess the risks.

General DODGEN. The "gap" in the fielding schedule results from a portion of the Earth not being covered by the advanced extremely high frequency (AEHF) constellation as a result of the decision to move to TACSAT vice launching a fourth AEHF satellite. The first TSAT will close the AEHF ring, but requires a 2–3 year period between the launch of the third AEHF satellite and the first TSAT to achieve this capability. The Military Satellite Communications (MILSATCOM) Senior Warfighter Forum accepted this risk and gap because of the vastly increased capability that TSAT brings to the warfighter, including greater than 20 times the ca-

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[1] not to be mistaken with the Science & Technology demonstration platform TACSAT

pacity (28.5 Gbps system-wide), beyond line of sight comm-on-the-move, optical cross links, IP routing, etc. To mitigate the risk, in the interim, during the gap period, an AEHF satellite can be relocated if the situation requires this capability over an area of the earth not covered by the constellation. It should be noted that while the longevity estimate indicates that MILSTAR and AEHF can be maintained through 2017, MILSTAR will be a very aged satellite at that time, and AEHF, while a valuable transitional capability will not meet the transformation needs of the warfighter in the 2015–2025 time frame. Operating at the lowest common denominator a combined MILSTAR/AEHF constellation provides less than 300Mbps of circuit based, medium data communications. Both MILSTAR and AEHF are built to satisfy a relatively static, circuit based, post World War II, linear battlefield. TSAT is being designed to serve DOD's transformed modular, mobile, net-centric warfighter. ASD(NII), the Joint Staff, COCOMs, Services, and Agencies are united in unanimously supporting the first TSAT, and accepting risk in the period between the last AEHF launch and the first TSAT launch.

Admiral SESTAK. The level of risk for launching TSAT is considered acceptable because of the legacy our spacecraft manufacturers have developed over the past 30 years. Spacecraft are lasting longer than their design life and critical component redundancies are standard in every design. The satellite communications needs of our warfighters continue to exceed the supply of existing satellite constellations. The TSAT system will provide such a large increase in capacity, the combatant commanders are willing to accept this reasonable risk caused by the delayed launch.

22. Senator BILL NELSON. Secretary Teets and General Cartwright, the AEHF satellite is significantly more capable than MILSTAR, and TSAT is significantly more capable than the AEHF satellite. I understand that everyone wants the most capability, but is there a way to minimize the risk associated with the plan for AEHF and TSAT without delaying TSAT?

Mr. TEETS. The current approach is the lowest risk considering available funding. The SWarF unanimously voted to support this approach based on the critical warfighter requirements for the TSAT capability and the sound risk mitigation approach being taken for TSAT.

General CARTWRIGHT. STRATCOM is not an acquisition decision authority. I respectfully defer to the acting Secretary of the Air Force.

23. Senator BILL NELSON. Secretary Teets and General Cartwright, what is the risk if MILSTAR fails?

Mr. TEETS. The level of risk depends on the location and capabilities of the affected MILSTAR satellite. In the worst case, a failure could either expand the existing tactical protected communications (Medium Data Rate) coverage gap, or open a temporary gap in strategic (Low Data Rate), world-wide protected communications. In either case, operational workarounds such as constellation reconfigurations or rerouting of data can mitigate these impacts.

General CARTWRIGHT. The amount of risk would be a function of the number and location of failed satellites within the overall MILSTAR architecture and the time period in which the failure is theorized to transpire. Resultant coverage gaps would impact a variety of users depending on where the remaining satellite coverage is placed. The number of AEHF satellites on-orbit would also offset the failed MILSTAR induced coverage gaps. Under any scenario, the remaining MILSTAR and AEHF satellites would be re-positioned to maximize coverage.

24. Senator BILL NELSON. Secretary Teets and General Cartwright, what if there are only three AEHF satellites when this failure occurs?

Mr. TEETS. With three operational AEHF satellites and the remaining MILSTAR satellites continuing to function, a single MILSTAR failure would have short term (e.g., hours to days) operational impact. However, we could minimize the long-term impacts with operational workarounds.

General CARTWRIGHT. The amount of risk would be a function of the number and location of failed satellites within the overall MILSTAR architecture and the time period in which the failure is theorized to transpire. Resultant coverage gaps would impact a variety of users depending on where the remaining satellite coverage is placed. The number of AEHF satellites on-orbit would also offset the failed MILSTAR induced coverage gaps. Under any scenario, the remaining MILSTAR and AEHF satellites would be re-positioned to maximize coverage.

25. Senator BILL NELSON. Secretary Teets and General Cartwright, has there been a decision to not buy the fourth AEHF satellite?

Mr. TEETS. The decision to buy the fourth AEHF satellite will be revisited in fiscal year 2005.

An Interim Program Review was held in October 2004 to assess the progress of the TSAT program. Based on the results of that review and recommendations from the 16 Sep 04 Senior Warfighter Forum—where combatant commanders expressed unanimous support for TSAT development instead of procuring AEHF #4—the decision was made to stay with the baseline TSAT program. This decision is reflected in the fiscal year 2006 President's budget request.

If, at the end of the next year to year and a half, we have not been making proper advancement on retiring risks and maturing the technologies associated with TSAT, we will acquire a fourth AEHF system.

General CARTWRIGHT. STRATCOM is not an acquisition decision authority. I respectfully defer to the acting Secretary of the Air Force.

26. Senator BILL NELSON. Secretary Teets and General Cartwright, when must a decision be made to buy the fourth AEHF satellite without a break in the production line?

Mr. TEETS. A production break could be avoided if a decision were made in time to allow for budgeting of Advanced Procurement funds in the fiscal year 2007 budget.

General CARTWRIGHT. STRATCOM is not an acquisition decision authority. I respectfully defer to the acting Secretary of the Air Force.

27. Senator BILL NELSON. Secretary Teets and General Cartwright, in what budget year must this decision be reflected to avoid a production break?

Mr. TEETS. A production break could be avoided if a decision were made in time to allow for budgeting of Advanced Procurement funds in the fiscal year 2007 budget.

General CARTWRIGHT. STRATCOM is not an acquisition decision authority. I respectfully defer to the acting Secretary of the Air Force.

28. Senator BILL NELSON. Secretary Teets and General Cartwright, when this decision has to be made will you be completely confident that the first TACSAT will launch no later than 2013?

Mr. TEETS. The Department believes the Transformational Satellite Communications System[2] (TSAT) program is progressing to meet emerging warfighter needs and will launch on time based on the careful planning we have done for this program. From a technology standpoint, we will be confident of a successful TSAT launch once our final technology maturation testing and system design review is complete. From a programmatic standpoint, we have high confidence in the TSAT program of record. It is sufficiently funded; the upfront systems definition and risk reduction are structured to capture lessons from previous programs; the acquisition strategy includes significant technology maturation activities with comprehensive technology demonstrations; and technology off-ramps, which still significantly enhance warfighter capability, are available to meet schedule if advanced technology is not ready to fly.

General CARTWRIGHT. STRATCOM is not an acquisition decision authority. I respectfully defer to the acting Secretary of the Air Force.

29. Senator BILL NELSON. Secretary Teets and General Cartwright, given that every recent satellite program has experienced substantial cost and schedule delays, even the ones that were supposed to be easy such as Wideband Gap Filler, why take the risk of giving up the fourth AEHF satellite?

Mr. TEETS. The Senior Warfighter Forum unanimously voted to support the TSAT baseline program. This was based on the critical warfighter need for the capability provided by TSAT, and the worldwide EHF coverage supplied by the MILSTAR constellation along with the three planned AEHF satellites.

General CARTWRIGHT. STRATCOM is not an acquisition decision authority. I respectfully defer to the acting Secretary of the Air Force.

30. Senator BILL NELSON. Secretary Teets and General Cartwright, the AEHF satellite provides secure, reliable, survivable communications. Clearly TACSAT, if successful will provide increased capacity and capability. On the other hand, what happens if TACSAT is delayed 2, 3, 4, 5 years or more? Why not buy the fourth AEHF satellite and offset the possibility that TACSAT might be late?

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[2] not to be mistaken with the Science & Technology demonstration platform TACSAT.

Mr. TEETS. The SWarF unanimously voted to support the TSAT[3] baseline program based on the fact AEHF cannot support communications on the move (COTM) and other critical warfighter transformational capabilities. The worldwide coverage provided by the three AEHF satellites in combination with the existing MILSTAR satellites is expected to extend through 2017. This helps mitigate the coverage risk associated with a possible delay in the TSAT first launch.

General CARTWRIGHT. STRATCOM is not an acquisition decision authority. I respectfully defer to the acting Secretary of the Air Force.

SPACE POLICY

31. Senator BILL NELSON. Secretary Teets, the U.S. national security space policy is currently under revision. While the policy was expected to have been released at the end of 2004, we understand that it may not be released until late spring or early summer. When will it be finished? What are the issues that are unresolved?

Mr. TEETS. We continue to work closely with the National Security Council (NSC) to update this important foundational policy document. The NSC has forwarded the draft policy for coordination between the deputies of the appropriate departments and agencies. Once the entire coordination process is completed, the document will be forwarded to the President for signature.

32. Senator BILL NELSON. General Cartwright, what is/was STRATCOM's role in developing the new national security policy?

General CARTWRIGHT. STRATCOM has been working closely with the OSD, Joint Staff, and other key players to provide the warfighter perspective since the process began in June of 2004. We at STRATCOM, in turn, have consulted with our associated Service components, ensuring them direct insight and an opportunity to contribute to this important process.

33. Senator BILL NELSON. Secretary Teets and General Cartwright, current U.S. policy requires constant access to space operations, including denying the use of space to adversaries. Currently the means employed to deny access to space by adversaries are temporary and reversible effects on adversaries' space systems including ground elements. Do you support the current policy that actions against space systems should be temporary and reversible?

Mr. TEETS. Current U.S. space policy emphasizes the use of temporary and reversible effects but does not limit our options. During past conflicts, adversary communications have been interrupted by the physical destruction of the ground antennas associated with the space system. This remains an option today. The U.S. will employ a range of options to achieve space superiority in a time and place as needed. These options include both diplomatic as well as military with the military options ranging from temporary/reversible to permanent/non-reversible.

General CARTWRIGHT. Yes. STRATCOM supports the inherent right to self defense and the policy that actions against space systems be temporary and reversible.

34. Senator BILL NELSON. Secretary Teets and General Cartwright, what are the dangers associated with kinetic, anti-satellite weapons? Would you oppose the development of such weapons?

Mr. TEETS. We proved in the 1980s that we can develop a kinetic antisatellite weapon. Because of the concerns associated with debris clouds in orbits used by other nations, the U.S. does not maintain an operational program. However, we must be prepared to employ a range of options for defending our national security. Secretary Rumsfeld stated it best in his February 2002 testimony before the House of Representatives.

> "It is incumbent on the [U.S.] armed services to remain open to a wide range of possible capabilities and systems that will enable us to deny our adversaries the advantages gained from space that could be used in a manner hostile to the United States, our citizens, or our national interests. The force structure of the armed services is and will continue to be fully compliant with our international obligations, treaties, and our right to self-defense as spelled out in the U.N. Charter."

He went on to explain that any capability proposed by the military would be provided to the President and Congress for subsequent approval and funding. The DOD continues to subscribe to this policy today.

[3] not to be mistaken with the Science & Technology demonstration platform TACSAT.

General CARTWRIGHT. One danger associated with kinetic, anti-satellite weapons is potential fratricide. Orbital debris caused by a high impact anti-satellite weapon could corrupt an operational orbit and create risk of hitting our own satellites. As we consider various methods for defending our ability to operate freely in space we must be mindful of the potential ill effects on our own space systems.

SPACE SITUATIONAL AWARENESS

35. Senator BILL NELSON. Secretary Teets, General Cartwright, General Lord, General Dodgen, and Admiral Sestak, there is a consensus that U.S. space situational awareness, while good, needs to be substantially improved. What programs are your highest priorities to improve space situational awareness?

Mr. TEETS. The U.S. does currently posses the best space situation awareness capability in the world. We are faced with several challenges to maintain and improve this capability. We have aging systems that provide critical capability, which we must either upgrade or replace. Our other challenge is presented by the fact that more countries are becoming space-faring countries and satellites are becoming more capable. Technology advancements make it possible for these satellites to be smaller and more maneuverable than before, thus stressing our assets beyond their current capabilities. We have worked over the past couple of years to develop a well-balanced space situation awareness architecture. Our priorities include updating and replacing our aging ground-based radar and optical systems for both increased capability and longer lifetimes, and fielding operational space-based systems to improve our detection, timeliness and characterization capabilities. In addition, we must better ingrate our current surveillance and reconnaissance capabilities with the information available to us from the intelligence and space environment communities through an updated command, control, and information system currently under development for STRATCOM.

Our fiscal year 2006 budget reflects the Department's priorities. The budget includes a request for upgrading selected sensors in the Space Surveillance Network, design/development work for new space based sensors, and funds to integrate these sensors into a space C2 system. This request will fund development of sensors and C2 to provide timely detection of threats and information about orbiting objects we do not have today. In keeping with this budget we have the following program on the horizon:

- SB Space Surveillance: Provides timely and accurate information on objects in deep space (Program adjustment currently on UPL);
- S-Band Fence: Detects small objects in near earth and manned spaceflight areas in a timely manner;
- SSA Command and Control: Develops data fusion, data exploitation, and presentation prototypes for eventual integration into the Combatant Commanders Integrated Command and Control System infrastructure;
- Haystack Ultra-Wideband Satellite Imaging Radar (HUSIR) Upgrade: Improves Space Situational Awareness by providing detailed space system characterization of Low Earth Orbit objects;
- Orbital Deep Space Imager: Improves Space Situational Awareness by providing detailed space system characterization for deep space objects.

General CARTWRIGHT. STRATCOM's priority is to advocate for capabilities that enhance interoperability within and among individual systems to fuse all sources of information (e.g., ISR and weather). It is important to ensure optimum coverage by sensors and to maximize information collection and dissemination in support of all facets of the space control mission area.

General LORD. Our fiscal year 2006 budget request includes foundational development for this mission area. In the future, we will be building on this foundation. This vision includes pursuing a robust Command and Control/Information Management (C2/IM) infrastructure to autonomously report changes. We also require a small object detection capability, more search based capabilities, and the ability to characterize space systems across ground, link, space, and launch to determine capabilities of satellites that are being placed in orbit. As we grow this mission area, we expect to see budget requests that are in line with this overall concept. In addition to the budget request, we are pursuing service life extension programs (SLEP) for our existing sensors (for example, the Eglin and Globus II radars as well as the Ground-Based Electro-Optical Deep Space Surveillance (GEODSS) System) and have several projects being worked:

(1) SSA Command and Control (C2): Develops data fusion, data exploitation, and presentation prototypes for eventual integration into the Com-

batant Commanders Integrated Command and Control System infrastructure.

(2) Space Based Space Surveillance (SBSS): Track and search based operations that will provide timely and accurate information on objects in deep space.

(3) Space Fence/S-Band Fence: Search based operations that will detect small objects in near earth and manned spaceflight orbits in a timely manner.

(4) Haystack Ultra-Wideband Satellite Imaging Radar (HUSIR) Upgrade: Adds W-band capability to achieve significantly improved imaging resolution for detailed space system characterization of Low Earth Orbit objects. We are also partnering with DARPA on the Deep View program to extend that improved imaging resolution to Deep Space orbits out to Geosynchronous altitudes.

(5) Orbital Deep Space Imager (ODSI): Improves Space Situation Awareness by providing detailed space system characterization for deep space objects.

General DODGEN. The Army's highest priority in SSA is the Space Surveillance Network (SSN) contributing sensor array at Kwajalein. Uniquely situated in the South Pacific, Kwajalein is important to contributing to near earth and deep space surveillance, satellite tracking, and new foreign launches. SMDC/ARSTRAT will continue to provide support to the SSN through operations at Kwajalein.

Admiral SESTAK. Our highest priority among all of the Space Control initiatives is SSA. We strongly concur with General Cartwright's [STRATCOM] comments on SSA before the Senate Armed Services Subcommittee on Strategic Forces for fiscal year 2006 budget hearing on 15 March 2005 when he said: "The first is that we have a ground surveillance infrastructure that needs to be recapitalized and upgraded and that's part of this program. We have to make sure that we do that, because it has a certain capability that gives us wide area, large ability to catalog. We need to improve that so that we're not looking at areas that are as ambiguous as miles, but down to very small areas. The second is a command-and-control system that integrates all of this so that the warfighter gets the benefit of the knowledge of the situation awareness and it gets distributed out. We can't forget those two pieces because they tie back to the user's side of this equation, whether it be the warfighter or others, that need to manage the system on orbit. So in addition to what's on orbit, there's a ground piece of this, and there is a command-and-control piece of this that we have to keep our eye on."

As an integral part of upgrading SSA from the ground, Navy is most familiar with and particularly supports the Air Force S-Band Fence upgrade. This upgrade offers a significant and cost-effective increase incapability.

In addition, Navy has requested a Space Control Architecture be developed for the Joint Capabilities Integration and Development System (JCIDS) process, in order to determine how specific investments in Space Control intelligence, surveillance, protection, and negation will contribute to an overall system architecture.

SPACE ORGANIZATION

36. Senator BILL NELSON. Secretary Teets and General Cartwright, an important recommendation of the 2001 Space Commission was the need to integrate black and white space. Since 2001, Secretary Teets, you have worked very hard to carry out this integration. Do you continue to believe that this integration is important and what are the advantages gained by integration?

Mr. TEETS. Yes, I strongly recommend that a single individual continue to hold the dual positions of Under Secretary of the Air Force and Director of the NRO, as well as the responsibility as DOD Executive Agent for Space. The advantages gained by integration are: better coordination among the government organizations providing and using intelligence; authority to oversee the direction of planning, programming, and execution of funds spent on space systems used by the Pentagon and the Intelligence Community; greater "unity of effort" between black and white space programs; better positioning to apply lessons learned across the space arena; greater insight to develop a unified science and technology roadmap; ability to develop an overarching human capital strategy; and a wider understanding of industrial base issues.

General CARTWRIGHT. A net-centric global information system, employing agile distributive operations, is the way ahead in transitioning to more effective joint warfighting. Integration between black and white space is key to the ultimate success of such a system. Transitioning from "need to know" to "need to share" proto-

cols will allow the warfighter access to a greater spectrum of national expertise and capability.

37. Senator BILL NELSON. Secretary Teets and General Cartwright, what still needs to be done to fully integrate black and white space?

Mr. TEETS. I am proud of the accomplishments we have made in National Security Space. We took several disparate organizations and integrated them in a way that better serves our Nation, and we also demonstrated and improved the capabilities our space systems provide on and off the battlefield. However, National Security Space remains a work in progress. We need to continue modernizing every major space system and providing new or enhanced capabilities, while sustaining existing constellations that provide critical capabilities and intelligence to joint warfighters.

General CARTWRIGHT. Joint warfighting requires agile, distributed operations in today's world. The greatest challenge to distributed operations is the "need to know" caveat. This issue leads to the joint warfighter not knowing that a critical piece of information is readily available and the existing owner of that information not recognizing its importance. Fundamental to this issue is the establishment of data tagging standards and associated information assurance policies. We must transition to a net-centric global information system that allows each user the flexibility to select from all appropriate data sources. The continued path of integration between "black" and "white" space helps toward that goal.

38. Senator BILL NELSON. General Lord, General Dodgen, and Admiral Sestak, from the service perspective has the integration of black and white space been successful and what changes should be made or further actions taken?

General LORD. We have undertaken several initiatives to meet the Space Commission's recommendation for a closer integration of Air Force and National Systems. Establishing the Under Secretary of the Air Force as the DOD Executive Agent for Space provided centralized guidance and direction. Additionally, dual hatting the Under Secretary of the Air Force as the Director of the National Reconnaissance Office consolidated the top leadership to bridge the gap between these two premier space organizations. Senior level discussions between the Air Force and National Systems agencies are streamlining black and white space support to the warfighter and the intelligence community. For example, the future launch of the first Space Based Infrared System (SBIRS) Highly Elliptical Orbit (HEO) sensor will support not only missile warning but provide technical intelligence and battlespace characterization as a major contributor to the Defense Intelligence Agency's mission. We continue to look for opportunities to transition and horizontally integrate the Air Force's and the NRO's current and future systems into a common national security space plan.

General DODGEN. The efforts to integrate black and white space for the benefit of the joint warfighter are welcome from the Army's perspective. Any changes should focus in two areas—decrease the latency of black-space-derived information in reaching the warfighter and increase the ability to share this information with the widest possible military audience.

These two areas must be balanced by the imperative to protect the sensitive information gathering methods.

Admiral SESTAK. The integration of black and white space, made possible by organizational and policy changes as well as technological developments, has paid huge dividends to the Fleet. We have significantly shortened the warfighter's decision cycle by emphasizing tactical and operational level requirements in addition to traditional strategic level requirements. Advances in processing and real-time information transfer have increased warfighter situational awareness and made possible the successes of joint operations over extended geographical distances from our shores.

39. Senator BILL NELSON. General Lord, General Dodgen, and Admiral Sestak, an additional recommendation of the Space Commission was that there should be an Under Secretary of Defense for Space. In lieu of that recommendation, Secretary Rumsfeld designated the Under Secretary of the Air Force as the DOD executive agent for space. In your views has this been successful?

General LORD. Yes. The relationship established by the Secretary aligns the Executive Agent for Space at the right level. This organizational alignment has worked well in allowing a collaborative exchange between all elements that make up the National Security Space team. Establishing the Under Secretary of the Air Force as the DOD Executive Agent for Space affords the position the ability to provide DOD guidance and direction recommended by the Space Commission.

With regards to Space Professional Development, the Executive Agent for Space position is extremely valuable in ensuring all Services chart a similar path building

on their core competencies while gaining valuable information by sharing best practices. The most notable example is Former Secretary Teets personally chairing the Space Professional Oversight Board (SPOB) which brings the Services together quarterly to address the actions defined in the DOD National Security Space Human Capital Resource Plan. As a result of Secretary Teets' leadership, we jointly built comprehensive programs to address each Service's needs regarding education, training, and expertise. Specifically, the SPOB ensured that the offerings of the Naval Postgraduate School and the Air Force Institute of Technology regarding space engineering and operations were complementary and capable of satisfying each Service's unique space education requirements. The SPOB was also a key advocate of transitioning the Air Force's Space Operations School into the National Security Space Institute charged with satisfying all Service requirements for Space Professional Education and Advanced Space Training. The Executive Agent for Space position has been extremely successful in ensuring the Services jointly address all the recommendations of the Space Commission including, but certainly not limited to, those regarding Space Professional Development.

General DODGEN. Bringing the roles of Director, National Reconnaissance Office (DIRNRO), Under Secretary of the Air Force (USECAF), and DOD Executive Agent (EA) for Space together has had positive impacts in the fielding of space-based capabilities to the joint warfighter. By bringing these roles together under one office, we see a synergy of efforts that was not possible under the previous construct.

Admiral SESTAK. Due to the lengthy life cycle of space system acquisition, it is too early to evaluate the impact that the DOD Executive Agent for Space had. The DOD Executive Agent for Space is meeting the "majority of the Navy's needs, particularly in the areas where Navy has common needs with other Services through comprehensive and collaborative processes to give all stakeholders an equal voice. Combining this strategy with a strong JCIDs process will be the key to meeting joint warfighter requirements.

40. Senator BILL NELSON. General Lord, General Dodgen, and Admiral Sestak, how does each military service remain an active player in space?

General LORD. The Air Force remains an active player in space by virtue of our day-to-day duties. We are committed to providing space superiority to the warfighter and the Nation. Our Nation demands capabilities coming from and through space, now more than ever. Our Joint Forces Commanders know we cannot go to war and win without space capabilities. Our space capabilities have revolutionized modern warfare with GPS giving unparalleled accuracy for 70 percent of the munitions used in Operation Iraqi Freedom (up from 30 percent in Operation Desert Storm); unprecedented secure global satellite communications having 8 times more bandwidth than just a few years ago, a robust weather constellation giving our warfighters premiere worldwide terrestrial and space environment information; the healthiest ever missile warning constellation providing real-time defense for the U.S. and our Allies; our ICBM forces offer an extraordinarily capable and proven strategic deterrent with readiness rates above 99 percent; we continue our impressive streak of 40 successful operational space launches in a row leading to over $3–$5 billion in savings.

In addition, we are taking necessary steps to build a community of space professionals to take us into the future. Former Secretary Roche took a major step when he named the Commander of Air Force Space Command as the Space Professional Functional Authority (SPFA). In this role, I ensure the Air Force is taking all necessary steps to build a community of Credentialed Space Professionals capable of designing, acquiring, operating, employing, integrating, and sustaining the transformational space systems of the future. We are able to break down many of the barriers that could have limited the role the Air Force would play in future space systems. For example, about half of the personnel assigned to the National Reconnaissance Office are Air Force members. Through the SPFA role we are better able to ensure our people get both NRO and AFSPC experience so they are better able to represent total space needs to and from all the Services and Agencies. This space professional community is building upon our current successes to design, acquire, operate, integrate, and sustain our future transformational space systems.

The Air Force is an active player in the development of the National Security Space Plan as well as the leader in developing and operating our Nation's space systems. The National Security Space Plan ensures all systems, programs, and agencies are integrated to provide coverage of critical capabilities. Our continued participation in these National forums as well as development of critical systems ensures that we remain an active player in space.

As the Air Force's lead Major Command for space, we focus on our three priorities for 2005:

1. Continue our emphasis on ensuring Space Superiority and providing desired Combat Effectiveness for Joint Warfighting.
2. Maintain a safe and secure Strategic Deterrent Capability and provide means for Prompt Global Strike.
3. Continue Efforts to develop Cost-Effective Assured Access to Space.

As we move towards achieving these goals, Space Superiority continues to emphasize our desire to provide combat effects and capabilities to the joint warfighters. There are a number of efforts underway to enhance our SSA, Defensive Counterspace (DCS) and Offensive Counterspace (OCS) mission areas. Currently, we are working with the National Security Space Office to develop desired survivability levels, protection strategies and tactics, and techniques and procedures for each of these mission areas. We continue to remain active in monitoring and characterizing the space environment in order to effectively define and depict the "battlespace" picture, assess potential future adversary capabilities and vulnerabilities, and develop future capabilities to deny an adversary's freedom of action in space, or their ability to deny the United States and its Allies their use of space.

General DODGEN. Army leadership must commit to developing validated "capability needs" for space capabilities. These validations must be vetted by Army leadership and planned for integration with Army capabilities as a whole. We then pass these same requirements to the national security space office where we have significant Army presence in assigned positions. At the same time, our Army validated requirements are submitted to the joint community through coordination with U.S. Strategic Command and through insertion in the Joint Capabilities Integration and Development System. Here, they are worked by joint Functional Capabilities Boards and, when appropriate, sent before the Joint Requirement Oversight Council. Therefore, Army and joint requirements converge to simultaneously satisfy the needs of land warfighting dominance and the joint warfight.

Admiral SESTAK. The Navy participates in the full spectrum of space-based systems development beginning with capability-based assessments using modeling and simulation to determine operational and maritime requirements. The Navy then actively works with the Joint community in the definition of system requirements and ensures these requirements are accurately captured and documented using the JCIDS. The Naval Research Laboratory conducts scientific and technical research and development (S&T/R&D) into capabilities to meet our maritime requirements in areas like Maritime Domain Awareness and ship tracking. The Navy's TENCAP Program also conducts R&D to improve utilization of existing space systems, the results of which can also influence future systems.

This S&T/R&D work feeds into the acquisition process where Air Force, in its role as Executive Agent for Space, is the primary purchaser of satellites with the Navy an active partner in space systems requirements development. The Navy is the program manager and acquisition lead for the Mobile User Objective System (MUOS) that will replace the UHF Follow-on narrowband SATCOM constellation for the Joint community. In addition to MUOS, the Navy acquires user terminals for space systems and prepares its platforms for integrating space products into the network via FORCnet. The space-based capability is then delivered to the fleet, and operators trained for maximum utility. Lessons learned from real world operations feed into the cyclical process of assessments, requirements, S&T/R&D, development, acquisition, and operations.

In addition to this, the Navy invests its Space Cadre personnel in Joint Program Offices, the National Reconnaissance Office, the National Security Space Office, STRATCOM, and many other space forums so that both Navy needs and a maritime viewpoint are inherent in the spacebased systems development process.

SPACE LAUNCH

41. Senator BILL NELSON. Secretary Teets, the Air Force has decided to pick up infrastructure costs for the Evolved Expendable Launch Vehicle (EELV) program. The Air Force is also getting ready to complete the next group of space launches referred to as "buy three." How will you balance and integrate the decision to pay infrastructure costs with the need to compete launch services?

Mr. TEETS. In our previous buys, we paid a single price for a launch service, which included the contractor's infrastructure and launch vehicle hardware, making the contractors assume all the financial risks. Consistent with the President's recently-released U.S. Space Transportation Policy and in order to share the risk more equitably with the contractors, beginning with Buy 3, we will procure a national launch capability (infrastructure) separately from launch services (which primarily

includes launch vehicle hardware). In Buy Three, we plan to award up to 24 launch services between the two competing providers.

42. Senator BILL NELSON. General Cartwright, in your view how is assured access to space maintained in the next 5 years?

General CARTWRIGHT. I echo the U.S. Space Transportation Policy in that assuring access to space will require maintaining a viable space transportation industrial and technology base. In the next 5 years, the capabilities provided by programs such as the EELV will be the foundation for space access. The near-term approach of having two space launch providers should assure the availability of critical space capabilities by providing a mutual backup capability. However, I also advocate the need for a future generation of launch technologies where access to space is reliable, routine, and affordable.

SPACE RANGE MODERNIZATION

43. Senator BILL NELSON. Secretary Teets, General Cartwright, General Lord, General Dodgen, and Admiral Sestak, I am concerned that the space launch ranges may not be being sufficiently modernized. Could each of you provide your thoughts on what needs to be done to ensure that the ranges are modernized to meet all national security needs?

Mr. TEETS. We believe our continuing modernization and sustainment efforts will enable the spacelift ranges to meet national security needs now and in the foreseeable future. Our modernization programs have delivered over $240 million worth of modernized systems in the past 18 months and are scheduled to deliver $150 million more in the next 12 months. Improvements include: automated, interoperable planning and scheduling systems; higher capacity, reconfigurable communications networks; more reliable, capable, and redundant command destruct (flight termination) systems; and fully integrated, centralized flight operations and analysis (safety) systems. The increased level of range modernization funding in our fiscal year 2006 budget request reflects our renewed commitment to making the ranges more responsive, reliable, and supportable. It implements our mid term vision of keeping the ranges healthy while making upgrades to enable on-demand deployment of on-orbit mission assets within days to support crisis and combat operations. Additionally, these efforts will help pave the way for the long-term transformation to higher capacity, global ranges able to support the operationally responsive spacelift systems of the future.

General CARTWRIGHT. The ranges are aging but the support to warfighters continues to be outstanding—the ranges are doing their job. Recent modernization efforts have focused on enhanced range safety, improved responsiveness and flexibility, and the replacement of obsolete hardware to sustain reliability and availability. The integrated Launch and Test Range System modernization and sustainment plan is comprehensive and should keep the ranges healthy for the foreseeable future.

General LORD. We believe our continuing modernization and sustainment efforts will enable the spacelift ranges to meet national security needs now and in the foreseeable future. Our modernization programs have delivered over $240 million worth of modernized systems in the past 18 months and are scheduled to deliver $150 million more in the next 12 months. Improvements include automated, interoperable planning and scheduling systems; higher capacity, reconfigurable communications networks; more reliable, capable, and redundant command destruct (flight termination) systems; and fully integrated, centralized flight operations and analysis (safety) systems. The Air Force has increased the level of range modernization funding in the fiscal year 2006 budget request by $99 million reflecting our renewed commitment to making the ranges more responsive, reliable, and supportable. This funding implements our mid-term vision of keeping the ranges healthy while making upgrades to enable on-demand deployment of on-orbit mission assets within days to support crisis and combat operations. Additionally, these efforts will help pave the way for the long-term transformation to higher capacity, global ranges able to support the operationally responsive spacelift systems of the future.

General DODGEN. Currently the Army's only space launch range capability is at the U.S. Army Kwajalein Atoll/Reagan Test Site (USAKA/RTS) in the Republic of the Marshall Islands. DOD's only land-based equatorial launch site, USAKA/RTS has two facilities supporting current and future launch customers. Meck Island currently supports the launch of interceptors from the Ground-based Midcourse Defense (GMD) program, and is being considered for the additional role of target launches for missile defense test events. The second facility, Omelek Island, is cur-

rently being developed to a minimal launch infrastructure, per the requirements of the customer, to support Space Exploration Technologies (SpaceX), a commercial space-launch company under contract to Defense Advanced Research Projects Agency (DARPA) to develop and prove-out low-cost space-launch capabilities. The most significant challenge this range faces in developing and maintaining a level of readiness is sufficient and consistent funding to construct, maintain, and modernize (pursuant to technological advancements) all supporting facilities, including both mission operations and logistic facilities. As these activities are accomplished, the range would be able to better meet the requirements of other potential DOD space launch customers.

Current launch customers could potentially benefit from investment in fiber connectivity to the continental United States (CONUS), thereby improving the bandwidth and latency limitations inherent in relaying real time or near-real time data across SATCOM channels. SATCOM is the range's only means of off-base communications and data exchange. With the assistance of Defense Information Systems Agency (DISA), USAKA/RTS is currently evaluating the feasibility of establishing submarine fiber-optic connectivity with the CONUS in an effort to substantially increase this data flow capability.

Admiral SESTAK. Space launch ranges, like our space surveillance and GPS capabilities, have become multi-use, serving both government and commercial requirements with funding responsibilities remaining exclusively with the DOD. Perhaps it's time to rethink our management approach to these "dual use" space infrastructures to incorporate either a cost-sharing approach or an approach that meets the needs of both sectors. One idea that may bear further study is to establish some sort of government trust fund, similar to the Highway Trust Fund and the Aviation Trust Fund, which could be examined as a means of earmarking funds for supporting space infrastructure. As an example, a very modest tax could be added to commercial GPS equipment. The potential for revenue from GPS users is obvious and straightforward an this revenue stream could allow our space infrastructure to keep pace with user demands.

SPACE-BASED INFRARED SYSTEM HIGH

44. Senator BILL NELSON. Secretary Teets, the SBIRS has just experienced another Nunn-McCurdy breach. What are you doing to ensure that all technical problems are identified and resolved, that a new realistic cost and schedule baseline is developed, and that this new baseline will survive until the program is completed?

Mr. TEETS. To date, SBIRS has had to deal with a number of challenges, the legacy of a poor foundation. The 10 March 2005 Nunn McCurdy Average Procurement Unit Cost (APUC) notification is directly related to the same issues that drove the 17 June 2004 Program Acquisition Unit Cost (PAUC) breach. The program "replan," incorporates additional testing, more robust oversight, increased time spans, and realistic software productivity estimates, in an effort to ensure future technical issues are flushed out and addressed earlier in the development. With the 10 March 2005 Nunn McCurdy notification, I directed an Independent Program Assessment (IPA) to establish a clear and unambiguous program baseline and associated cost estimate. We will provide a full briefing of the results upon completion. The program is making technical progress—HEO# 1 delivered; HEO#2 on track; GEO integration/test proceeding well. This has our complete and undivided attention.

BALLISTIC MISSILE RANGE SAFETY TECHNOLOGY

45. Senator BILL NELSON. Secretary Teets, as you are aware, the Rocket Systems Launch Program line in the annual DOD budget request has been increased by congressional action for each of the past 2 years to include a funds for a project we believe has great benefit to the U.S. Air Force and the future of the Nation's space launch and test ranges. The Ballistic Missile Range Safety Technology (BMRST) is a mobile range support unit incorporating today's latest GPS technologies, command destruct functions, and telemetry data systems. This system has demonstrated operationally improved and flexible down-range reentry support and increased range safety at lower range support costs.

After securing additional funds to develop and demonstrate this system, I would have expected the Air Force to have embraced this technology program and invest in its final development and fielding. My understanding is that those military units utilizing BMRST, such as the launch activity at Cape Canaveral Air Force Station, are impressed with the added flexibility it gives them in performing their mission and have embraced it.

While I appreciate the Air Force's interest in applying the funds provided by Congress for continued program development and demonstration, I am disappointed that the system has not been picked up in the Department's annual budget request and established as an acquisition program.

Please provide the committee your assessment of the Air Force's requirements and efforts to modernize safety systems for our launch and test ranges. What are the greatest risks to operations or safety associated with launch range safety?

Mr. TEETS. The Air Force has validated and documented its requirements for modernizing safety systems in the April 2003 Operational Requirements Document (ORD) for Launch and Test Range System (LTRS) Modernization. The Air Force developed these performance-based ORD requirements primarily to meet public safety requirements, based on years of operational and test experience at the ranges. The ongoing Range Standardization and Automation Phase IIA program (RSA IIA), managed by the Space and Missile Systems Center in Los Angeles, has developed new flight safety systems to meet core safety performance requirements at the Eastern and Western Ranges. The Eastern Range system has been operational since September 2003 and the Western Range system is currently in the integration and test phase. The Eastern Range system has demonstrated its greater efficiency and effectiveness for a number of launches since being placed in operation, and we expect the forthcoming Western Range system will produce the same kinds of results. Both systems will have the ability to process and analyze tracking data passed through digital telemetry systems from GPS tracking sources to ensure flight safety.

The Air Force believes BMRST has the potential to provide additional flexibility in meeting baseline safety and range user requirements. A BMRST Integrated Product Team (IPT) has been established to closely examine the concept of employment, test, certification, maintenance, and sustainment aspects of the BMRST system. Once the IPT assessment is complete, and if it is determined the system meets ORD requirements and proves cost effective, the AF will evaluate how best to integrate BMRST into the current range architecture.

The Air Force has numerous requirements and guidelines that are applicable to assured access to space and safety for the general public. The greatest risk to operations or safety would be to have errant rockets launched from a range cause injuries and loss of life or destroy property. The current range safety system has been highly successful in preventing injuries, loss of life, and destruction of property, and we expect the ongoing modernization efforts to continue this record of success.

46. Senator BILL NELSON. Secretary Teets, what are the Air Force's priorities and plans for launch range safety-systems modernization?

Mr. TEETS. Modernization of range safety systems is our number one Spacelift Ranges modernization priority. As an integral part of our ongoing range modernization efforts, this entails: fully integrated, centralized, and automated flight operations and analysis (safety) systems; more reliable, capable, and redundant command destruct (flight termination) systems; more accurate and cost effective GPS tracking systems to replace ground based tracking radars where operationally feasible; and more reliable open system architecture upgrades to ground based tracking radars which can't be replaced by GPS systems for operational reasons. Other modernization efforts contributing to range safety include: improved collection and processing of local weather data for range safety models; and faster, more accurate air, sea, and land range surveillance systems to prevent incursions into launch hazard areas. Of course, range safety is also the top priority with respect to operating and maintaining the ranges.

47. Senator BILL NELSON. Secretary Teets, what is the Air Force's evaluation of the capability of BMRST and the potential or promise of a GPS-based range safety capability?

Mr. TEETS. The Air Force believes BMRST has the potential to provide additional flexibility in meeting baseline safety and range user requirements. A BMRST Integrated Product Team has been established to closely examine the concept of employment, test, certification, maintenance, and sustainment aspects of the BMRST system. Once the IPT assessment is complete, and if it is determined the system meets ORD requirements and proves cost effective, the AF will evaluate how best to integrate BMRST into the current range architecture. Over the long term, in order to meet future operationally responsive space launch vehicle concepts, the future range architecture must become more responsive while providing global connectivity. It is our belief, mobile assets like BMRST could become integral components of an affordable, global launch and test range architecture.

The Air Force sees great promise in GPS-based range safety technology in the future. The AF already is using GPS-based tracking systems for ballistic missile tests

and intends to convert to GPS tracking for space launch. This will occur as on board systems are developed and integrated into new launch vehicle programs, recognizing that some legacy systems like the space shuttle will continue to rely on radar tracking until they are replaced by newer systems employing GPS capabilities.

48. Senator BILL NELSON. Secretary Teets, has the Air Force conducted any analysis of the benefits of GPS-based range safety systems?

Mr. TEETS. The Air Force has analyzed GPS-based range safety (tracking) systems extensively, has used them operationally for ballistic missile tests, and plans to use them for space launch applications. A GPS tracking system cost analysis was conducted when the transition to GPS-based tracking was first proposed under the Range Standardization and Automation program. Subsequently, the Air Force contracted with the National Research Council for an independent assessment of GPS-based tracking, which endorsed the use of GPS-based systems for ballistic missile testing and recommended the transition to GPS-based tracking for space launch purposes as rapidly as feasible. The full potential of GPS tracking systems is realized in the downrange area, where GPS will reduce the dependence upon costly remote ground based radars and will enable operations outside the coverage of these fixed ground sites. Where operationally feasible, GPS tracking systems could replace up to 9 of 18 Air Force owned and operated ground based tracking radars.

49. Senator BILL NELSON. Secretary Teets, please provide the committee with an estimate of the direct and indirect costs associated with our current launch safety systems versus the costs estimated for a BMRST system. Given the demonstrated potential of BMRST, why has the Air Force declined to establish an acquisition program to complete development and deploy this capability?

Mr. TEETS. The Air Force has spent the money given by the Congress for the BMRST program to develop and deliver the product. An upgraded version is already in work and expected to be delivered in September 2005. Formal operational test, evaluation, and certification will be conducted along with development of a concept of employment. Once these efforts are complete, the AF will perform a cost benefit analysis to determine the best way to integrate BMRST to augment the range architecture should the system meet ORD requirements and prove cost effective. It is important to understand that BMRST was initially built as a stand-alone, mobile range safety system. It was never designed to replace existing command, telemetry or GPS metric tracking safety systems. As such, BMRST is a system that could augment existing range safety capability. Thus, to provide an estimate of the costs associated with current launch safety systems versus the costs estimated for BMRST is an inappropriate comparison. The cost benefit analysis we anticipate from the system program office this summer will tell us what value we expect to gain in employing BMRST (as a supplemental system) for the costs involved in operating and sustaining the system. No cost savings is anticipated for bringing on a system like BMRST; rather, the cost and capability will be additive.

[Whereupon, at 5:49 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006

MONDAY, APRIL 4, 2005

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

STRATEGIC FORCES AND NUCLEAR WEAPONS ISSUES

The subcommittee met, pursuant to notice, at 2:02 p.m. in room SR–222, Russell Senate Office Building, Senator Jeff Sessions (chairman of the subcommittee) presiding.

Committee members present: Senators Sessions and Bill Nelson.

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

Majority staff members present: William C. Greenwalt, professional staff member; Stanley R. O'Connor, Jr., professional staff member; Robert M. Soofer, professional staff member; and Kristine L. Svinicki, professional staff member.

Minority staff member present: Madelyn R. Creedon, minority counsel.

Staff assistants present: Catherine E. Sendak and Nicholas W. West.

Committee members' assistant present: William K. Sutey, assistant to Senator Bill Nelson.

OPENING STATEMENT OF SENATOR JEFF SESSIONS, CHAIRMAN

Senator SESSIONS. The hearing will come to order. I am pleased to welcome our witnesses today: General James Cartright, Commander of the U.S. Strategic Command; and Linton Brooks, Administrator of the National Nuclear Security Administration (NNSA) and the Under Secretary of Energy. I would also note that sitting behind General Cartright, Rear Admiral Charles Young, the Navy lead for strategic forces, and Major General Roger Burg, the Air Force focal point for strategic systems. Gentlemen, thank you for your service to our Nation and for taking the time and effort to be here with us today.

This subcommittee will also be accepting for the record the written statements of Mira Ricardel, Acting Assistant Secretary of Defense for International Security Policy, regarding the policies used in formulating the Nuclear Posture Review.

[The prepared statement of Ms. Ricardel follows:]

PREPARED STATEMENT BY MIRA R. RICARDEL

Mr. Chairman and distinguished members of the subcommittee: First of all, I would like to thank each the members of this subcommittee for this opportunity and for your support of our Nation's strategic forces. You have devoted considerable time to understanding the need to reshape our Nation's strategic capabilities. Only with your support will the Nation's strategic posture continue toward the needed transformation from its Cold War configuration to one that can meet the challenges of the decades ahead.

Last year, the Department of Defense, in cooperation with the National Nuclear Security Administration, conducted an assessment of progress by the two Departments in implementing the transformation outlined in the December 2001 Nuclear Posture Review (NPR). I will discuss the key findings of that assessment, but first, I will review the key tenets of the NPR and address some of the erroneous characterizations of the administration's strategy for strategic capabilities.

NUCLEAR POSTURE REVIEW: "KEY CONCLUSIONS"

In December 2001 Secretary Rumsfeld submitted the NPR Report to Congress. Conceived even before the terrorist attacks of September 11, this new strategy was driven by the President's clear direction to reduce the number of nuclear weapons to the lowest level compatible with our security needs, and to move the U.S. beyond a Cold War deterrent strategy of managing a bi-polar "balance of terror" based ultimately on mutual offensive nuclear threats. Our Cold War strategic nuclear force posture was designed to deter an adversary—the Soviet Union—that no longer exists. Under that strategy, the security of the United States depended on our ability to deter a major nuclear attack because, in reality, there were no other prudent options to prevent such an attack. As a result, we settled for "stability" based on mutual vulnerability and a balance of terror.

President Bush recognized that the conditions that made deterrence feasible and vulnerability an asset during the Cold War will not exist in all circumstances in the future security environment. He set a new course: a transformational strategy that seeks to strengthen deterrence of the new post-Cold War security threats—in particular unpredictable regional states that possess weapons of mass destruction (WMD)—while simultaneously preparing for situations where the various conditions necessary for reliable deterrence do not exist.

Secretary Rumsfeld enumerated the key conclusions of the December 2001 Nuclear Posture Review in his report to Congress:

- Nuclear forces will continue to play a critical security role for the United States, its allies and friends.
- Deterrence should not be limited to the threat of retaliation, nor rely exclusively on nuclear forces. Existing nuclear forces, moreover, are unsuited to many of the contingencies that may confront the United States and our allies.
- A mix of strategic capabilities, offensive and defensive, nuclear and conventional, will provide a broad range of military options that are credible to enemies, reassuring to allies, and consistent with American values.
- In the post-Cold War period, active and passive defenses will contribute to deterrence, and provide useful protection in the event deterrence fails.
- Transformation of our Nation's nuclear posture is needed and will complement the transformation of U.S. conventional forces and capabilities.
- To comply with the President's guidance, we will reduce our nuclear forces to the lowest possible level consistent with our national security needs, including our obligations to our allies.
- This broad range of capabilities will help assure allies and friends and will dissuade potential foes from investing in capabilities with which to threaten us.

Instead of the legacy Cold War posture we have inherited, with its reliance on the high-yield, offensive nuclear weapons suited to a balance of terror, this new approach requires a broad mix of strategic capabilities to strengthen our strategic deterrence capability and to better tailor our deterrence strategies to the spectrum of post-Cold War threats.

MISUNDERSTANDINGS ABOUT THE NPR

Despite the advent of this landmark strategy and its unprecedented direction to reduce dramatically the number of deployed nuclear weapons, there remain misunderstandings about the NPR and the President's strategy for nuclear weapons.

For example, some commentators have suggested that the NPR rejects deterrence in favor of nuclear "warfighting," and "lowers the nuclear threshold." In fact, as Secretary Rumsfeld emphasized in the Foreword to the NPR, the NPR's direction is designed to "improve our ability to deter attack," while "reducing our dependence on nuclear weapons" to do so. The NPR strategy places greater emphasis on advanced non-nuclear and defensive capabilities, increases the credibility of our deterrent for many possible contingencies, and reduces the emphasis on nuclear weapons in our strategic posture. In fact, the NPR identified the potential for non-nuclear weapons to substitute for nuclear weapons, further reducing our reliance on the latter.

By strengthening the credibility of our strategic deterrent with a new strategy that includes nuclear, non-nuclear and defensive capabilities, we also strengthen nonproliferation because we can better assure our allies and friends that they can rely on the U.S. strategic deterrent, and do not need to seek an alternative nuclear deterrent for their security. Moreover, this more flexible and capable strategic force helps to dissuade potential adversaries from investing in nuclear capabilities as a successful way to challenge the U.S.

Our Cold War nuclear arsenal was designed for a different time, and a different threat than we now face. Consequently, in addition to the NPR's call for nuclear reductions and an emphasis on non-nuclear and defensive capabilities, it identified the need to adapt our nuclear capabilities to post-Cold War requirements for deterrence.

In a regional crisis, for example, the credibility of our deterrent from the adversary's perspective may turn on our ability to threaten his WMD, missiles, command and control, and leadership bunkers protected in hard and deeply buried facilities—while minimizing the threat of collateral damage. Thus, rather than rejecting deterrence, the NPR's direction to examine the potential for threatening deeply buried facilities while minimizing the threat of collateral damage seeks to strengthen our deterrent by increasing its credibility for post-Cold War contingencies.

In sum, the NPR's transformation is intended to strengthen our capability to deter in circumstances very different from those of the Cold War, reduce the number of deployed nuclear weapons and our reliance on nuclear weapons, and contribute to non-proliferation by assuring our allies and dissuading potential adversaries.

IMPLEMENTING THE NPR: STATUS REPORT

The Department of Defense just completed a review of progress to date in implementing the December 2001 Nuclear Posture Review. Noteworthy progress includes:

- To guide the implementation of the NPR, a broad framework of new national policy guidance documents has been issued covering nuclear forces, ballistic missile defense, national command and control, and cyber operations.
- Changes to the Unified Command Plan aligns United States Strategic Command missions with the New Triad capabilities by making the Commander of Strategic Command responsible for "operationalizing" the strategy.
    - A Global Strike Concept Plan has been developed and implemented, and non-nuclear strike options are being integrated into strategic deterrence operational plans.
    - The President's direction to deploy ballistic missile defenses is expected to lead to an initial fielded capability later this year.
- Reductions in U.S. nuclear forces are on track toward our goal of 1,700 to 2,200 operationally deployed strategic nuclear warheads by 2012. This represents a reduction of two-thirds from the time this administration entered office.
- By the end of this fiscal year, the last of the Peacekeeper intercontinental-range ballistic missiles will have been deactivated. Progress is well underway in modifying four former ballistic missile submarines to serve in the future as delivery platforms for conventional cruise missiles and special forces.
- Consistent with the reduction in operationally deployed warheads, a new plan for the nuclear stockpile has been implemented that will cut the total stockpile (active and inactive warheads) nearly in half by 2012.
- The Department is making steady progress on improvements in planning, intelligence, and command and control capabilities that are needed to integrate New Triad capabilities effectively.

Despite considerable progress in establishing new policies and directives in support of the NPR strategy, progress in developing and fielding capabilities for the New Triad has been less than desired. There are two areas of special concern:

- Non-nuclear strategic strike capabilities
  - If we are fully to realize the goal of reduced reliance on nuclear weapons and a broader range of strategic capabilities for the national leadership, we will need to invest in a portfolio of non-nuclear weapons with unique characteristics. Two general categories of weapons will be needed:
    - Prompt, precise, long-range, conventional weapons that can be used in response to an imminent threat; and
    - Non-nuclear weapons with unique effects that can provide an effective, yet appropriate response for some situations in which an adversary uses weapons of mass destruction.
  - We are actively examining options for non-nuclear weapons for these important roles.
- A responsive infrastructure for nuclear weapons
  - Revitalization of our Nation's nuclear weapons infrastructure (managed by the National Nuclear Security Administration) is essential. This unique defense R&D and industrial capability will continue to be a vital element of our security strategy for the foreseeable future. Our existing nuclear stockpile was designed for a different time and for Cold War missions. The age of most warheads has already exceeded the original design life. While the recently implemented stockpile plan makes dramatic reductions—cutting the stockpile nearly in half by 2012—we don't need a smaller Cold War era nuclear stockpile, we need capabilities appropriate for 21st century threats. That means we need to conduct a range of studies on potential weapon concepts—including the completion of the Robust Nuclear Earth Penetrator (RNEP) Study. It is also critical to revitalize the nuclear weapon R&D and production infrastructure in order to assure the long-term safety and reliability of U.S. nuclear warheads, strengthens deterrence for the new security environment, and provides a hedge against an unforeseen, catastrophic technological failure of any element of the nuclear force or unanticipated adverse changes in the geopolitical threat environment. In this connection, our joint work with NNSA on Reliable Replacement Warhead concepts, described more fully by Ambassador Brooks in his testimony, is a first step towards enabling the responsive nuclear weapons infrastructure called for in the NPR.

In short, our goal is an array of integrated, strategic response capabilities that will provide unprecedented flexibility, assuredness, and effectiveness—essential characteristics for both adversaries and allies alike to consider in their calculus of a modernized U.S. strategic deterrent.

With that in mind, I ask for your continued support of the President's plan to implement this new strategy.

Mr. Chairman, once again thank you for this opportunity.

Senator SESSIONS. We will begin this hearing in open session. At an appropriate time, the hearing will move into Russell Room 232–A for a closed session to more fully explore some of today's hearing topics in a classified setting. We will try to have as much of the policy discussion as we can here in this open session. I think it is important that the American people and the people of the world for that matter understand what our goals are, what our capabilities are, and what we plan to do in the future. The details of that, of course, many of them are classified and should be discussed only in a classified setting.

Today we will receive testimony on strategic forces and nuclear weapons issues. We will examine how the Strategic Command (STRATCOM) and the NNSA support global deterrence and the extent to which this differs from the Cold War mission of strategic deterrence.

Strategic forces today provide the President and the warfighter with a range of global prompt capabilities for time-urgent missions,

such as global strike. General Cartright, this subcommittee is interested in your perspectives regarding whether the United States has the capabilities necessary to support deterrence and whether there are any shortfalls. That is your responsibility in your new position.

Another critical task for this committee is to exercise its oversight function with respect to the United States nuclear forces. Nuclear weapons are the most formidable weapons in our arsenal. Although an analysis of the appropriate mix of nuclear and conventional weapons is ongoing as part of the Quadrennial Defense Review, I cannot foresee any circumstances in which nuclear weapons will cease to play a central role in our nuclear deterrent and our deterrence posture.

Ambassador Brooks, the subcommittee is interested in hearing your assessment of the Stockpile Stewardship Program, which is charged with maintaining the safety, security, reliability, and effectiveness of our current nuclear stockpile, which has been in place for many decades now, and also you are in charge of reducing the numbers of those weapons in our stockpile.

Additionally, I wish to explore with you progress being made in developing the responsive nuclear weapons infrastructure called for in the Nuclear Posture Review of 2001. I will ask the witnesses to define the term "responsive." We use that term, but have we agreed what it really means? Do we have the nuclear weapons complex we need or do we have the one we inherited from the Cold War? What are our needs and what are our capabilities?

The post-Cold War security environment introduced new threats and greater uncertainties that require new, flexible, and adaptive strategic forces. Rather than rely exclusively on a nuclear triad of land and sea-based intercontinental missiles and long-range bombers that has been the historic position since the beginning of the Cold War, the Nuclear Posture Review outlined a new triad consisting of nuclear and conventional offensive strike forces, missile defenses, and a revitalized nuclear infrastructure capable of providing new capabilities in a timely fashion to meet emerging threats.

Indeed, the direction taken by the Nuclear Posture Review should improve our ability to deter attack by placing greater emphasis on advanced non-nuclear and defensive capabilities, which in turn reduces the dependence on nuclear weapons in our strategic posture.

A central purpose of this hearing is to explore more fully the range of strategic capabilities needed to achieve prompt, decisive results when required and to understand the scope and cost of the programs that support the objective. We still face the reality, however, that nuclear weapons are uniquely capable of holding certain critical targets at risk. This subcommittee and this Senate have engaged in a debate for a number of years regarding a study of the Robust Nuclear Earth Penetrator (RNEP). This subcommittee and full committee authorized RNEP in fiscal years 2003, 2004, and 2005. The full Senate supported the RNEP and funding was appropriated during fiscal years 2003 and 2004 totaling approximately $22 million. Amendments to eliminate funding for RNEP both in this committee and in the full Senate have failed in the past.

Last year, during fiscal year 2005, although RNEP was once again fully authorized by this subcommittee at $27 million, funding was not continued by the appropriators.

The budget request for fiscal year 2006 once again requests funds for completing the RNEP study. This issue is not new. The study will examine if RNEP would provide a capability to deal with specific buried and hardened targets in a more precise way. The full committee has heard the testimony of both the Secretaries of Defense and Energy earlier this year that the RNEP study—study only—is needed.

I would note that not only is the study all that is called for; statutory provisions say that no RNEP or like weapon could be built without explicit approval by Congress.

So we have taken the testimony, had the debate, and affirmed by our votes the need to complete the feasibility study of RNEP, but I know we will deal with that issue again this year and there will be an opportunity to discuss it.

I suspect that some of our debate when it comes to RNEP revolves around concerns as to whether we ought to maintain nuclear weapons at all. While that is certainly appealing and I wish we could get to that point, frankly, I do not foresee that as a likely eventuality in our lifetimes. Our nuclear forces must be effective in order to provide credibility in our deterrence umbrella for the United States and our allies. Completing the RNEP study is one more way to help us maintain that credibility.

So these are some of the issues that we will explore in our hearing today. Let me now recognize my distinguished ranking member, Senator Nelson of Florida. He is a strong and active member of the Armed Services Committee, and it is a pleasure for me to work with him as the ranking member on this subcommittee.

Senator Nelson.

STATEMENT OF SENATOR BILL NELSON

Senator BILL NELSON. Thank you, Mr. Chairman.

I want to welcome our witnesses. It is an important hearing. In this hearing I hope that we are going to discuss a range of topics, topics on nuclear and strategic issues, and I want to focus on two topics. The first, already mentioned here, is the RNEP. Last year, Congress denied funds for the program and, in spite of this fact, the fiscal year 2006 budget request for both the Department of Energy (DOE)/NNSA and the Air Force includes money for RNEP.

It would appear that the administration is committed to going forward with this controversial program, not just completing the feasibility study. If the only goal is to develop earth-penetrating capability that could be used for either a nuclear or conventional weapon, it would seem logical that the focus of the effort would be a conventional and not a nuclear weapon. We have had discussions about this in committee as well as on the floor of the Senate.

The second topic is the Reliable Replacement Warhead. Congress, the American people, need to understand what it will produce and what it will cost. Is it, as some hope, a pivotal change in the approach to nuclear deterrence that will enable real significant reductions in the number of nuclear warheads and reduce the cost of maintaining a nuclear arsenal? Is it an opportunity to have

a serious review and discussion of nuclear weapons and nuclear policy? Or is it just an excuse to develop a new nuclear weapon and to return to nuclear weapons testing? I hope our witnesses are going to provide some insight and clarity on that issue.

I also hope that we can get a clear understanding on the policy context for both of these initiatives, the RNEP and the Reliable Replacement Warhead. We need to understand the cost of each program, the impact these programs will have on the ability to make real reductions in the stockpile, and the impact that these programs will have on others. Will these programs have a deterrent effect or will it encourage other nations to start developing nuclear weapons?

So I look forward to discussion of these issues today. Thank you, Mr. Chairman.

Senator SESSIONS. Thank you.

General Cartright, you are our strategic commander of STRATCOM. Give us your thoughts, if you would.

STATEMENT OF GEN. JAMES E. CARTWRIGHT, USMC, COMMANDER, UNITED STATES STRATEGIC COMMAND

General CARTWRIGHT. Senator Nelson and Mr. Chairman: Listening to your statements, it is kind of like being the fourth gent in a row of people who are speaking. You are hearing all your points being brought out. But let me hit at a couple, in particular, and then be ready for your questions.

One, the acknowledgment that the environment in the world has changed is maybe an obvious statement, but the realities here of the implications of the global environment we live in, both to the discussion of the threat as it exists today, a global threat, the context in which we conduct military operations from a forces perspective, which is where I spend most of my time. Clearly, the world has changed and the diversity of the threat compared to the Cold War and what we must protect against are things that drove, particularly in the Department, the realignment with STRATCOM of a set of global enablers that could be provided to the regional combatant commanders to allow them to conduct their job in this very diverse world that we are living in.

We have had experience with these types of global enablers before, obviously United States Transportation Command and how we consolidated all of our logistics functions and our lift into one command, because it made sense to approach this from a global standpoint. The Special Operations Command is another example where we have consolidated because it made sense.

Our strategic weapons have always been with STRATCOM, but we have now added space, as you said, global strike, integrated missile defense, intelligence, surveillance, and reconnaissance (ISR) function, have been added in there. Net warfare, the information operations side, and the cyber world have been added to our set of global capabilities at STRATCOM. We are also in the process of evaluating and providing options for combating weapons of mass destruction as an additional mission.

Trying to bring these together as global enablers is really an acknowledgment that the threat is very diverse. In the world that we live in, almost every action that we take has global implications.

It's hard not to wake up in the morning and look at the world and people who are watching elections in the former Soviet Union, Soviet republics; people who are watching the implications of the war in Iraq, the elections in Iraq, the elections in Afghanistan, et cetera, they have global implications, as does the price of oil, the price of coffee.

So this is a global environment and we need a set of global enablers. That is what STRATCOM is trying to bring to the table. To do that, we have to do it in an environment that is different than what we had in the Cold War.

[The prepared statement of General Cartwright follows:]

PREPARED STATEMENT BY GEN. JAMES E. CARTWRIGHT, USMC

Mr. Chairman and members of the subcommittee: This is my first opportunity to appear before you as Commander of the United States Strategic Command (USSTRATCOM). Thank you for the time you've given me to discuss the missions assigned to us as we continue to prosecute the global war on terror and take on the challenge of combating weapons of mass destruction.

My prepared remarks cover USSTRATCOM's role in the challenging 21st century environment and plans for addressing those challenges with capabilities to serve our Nation's needs in war and in peace.

THE 21ST CENTURY GLOBAL ENVIRONMENT

Global interdependence—economic, political, and social—combined with near instantaneous global connectivity, is a trademark of the new century. It also heightens the importance of strong links between U.S. strategic objectives and regional operations. U.S. strategic objectives have profound influence on individuals, regions, nations, and non-state actors and networks. The tight linkage between U.S. strategic objectives and the conduct of regional operations is evident in our operations in Afghanistan and Iraq, and more recently in Asia in the aftermath of the tsunami. In Afghanistan, the strategic objective to combat global terrorism guided, as well as constrained, our regional decisions. The regional operations in Iraq are clearly influencing cultural, economic, and security considerations around the globe.

Our adversaries are using asymmetric approaches; exploiting social, political, and economic vulnerabilities to avoid confronting superior U.S. forces head on. We continue to see increases in the speed and deceptive scale of proliferation of potential weapons of mass destruction, including delivery and concealment capabilities. We see adversaries who would use improvised explosive devices (IEDs) and suicide bombs against their own people and infrastructure, as well as against deployed multinational forces. These adversaries have easy access to the same global technology base we do, and can exploit the same communication and information resources as the American public. They have proven they are an intelligent and adaptable enemy.

All operations, while regional in execution, have global consequence and therefore require a global perspective. Regional combatant commanders, who are responsible and accountable for conducting combat and peacekeeping operations in their areas of responsibility (AORs), have long depended upon support provided from outside their AORs. Much of that support, which in the past was provided on an ad hoc basis, has now been codified in the Unified Command Plan as a USSTRATCOM global responsibility. We are positioning USSTRATCOM to advance a distinctly global and strategic perspective on current and emerging capabilities necessary to deter threats to our way of life, particularly those threats involving weapons of mass destruction. USSTRATCOM will enable combatant commander's regional operations through realization of a comprehensive set of global mission capabilities, soundly integrated to achieve more effective and efficient execution.

We look upon this responsibility as both an exciting challenge and a solemn obligation to the regional combatant commanders, the American men and women who serve in their AORs and to the American people.

GLOBAL ENABLERS

21st century operations are fundamentally different from those of the last century. Combat operations are being conducted in rapidly changing circumstances, shifting from humanitarian operations to intense firefights within a few hundred yards of each other with little or no warning. This dynamic nature is matched by

a varying composition of assisting partners. We must be ready to conduct integrated, distributed operations using global and regional military forces. In many situations, these forces will be augmented by other U.S. Government personnel, coalition and commercial partners, and possibly, non-governmental organizations. To plan and effectively execute these types of distributed, agile and integrated operations, the regional combatant commands increasingly rely on multiple capabilities the global commands must support or provide.

The Unified Command Plan expands USSTRATCOM responsibilities through the assignment of global mission areas that span levels of authority, cross regional boundaries and intersect with various national and international agencies. USSTRATCOM's missions are:

- Global deterrence;
- Global support from space-based operations;
- Global intelligence, surveillance, and reconnaissance;
- Global strike;
- Global information and network operations;
- Global command and control;
- Global integrated missile defense coordination;
- Globally combating weapons of mass destruction.

Achieving the full potential of these missions is contingent upon identifying the right capabilities mix and sustaining our global reach through space. However, without the context of advanced situational awareness, and the power of collaboration, even the best tools may be insufficient to deter and defeat a determined adversary. We are placing an emphasis on the following global enablers:

The New Triad

USSTRATCOM supports The New Triad concept; a strategic way ahead in pursuit of a more diverse set of offensive and defensive warfighting capabilities. We are active participants in all three legs of The New Triad: offensive nuclear and non-nuclear strike (including non-kinetic), passive and active defenses, and a defense infrastructure capable of building and sustaining all offensive and defensive elements, including the critical support areas of command and control and intelligence.

Coupled with improved collaboration and shared global awareness, The New Triad concept will enable more precisely tailored global strike operations. With a full spectrum of nuclear, conventional and non-kinetic options available, regional combatant commanders will be enabled to achieve specific local effects against high value targets in the context of the strategic objective.

While we are confident in our ability to support effective global strike operations today, we must continue to evolve that capability to meet the demands of an uncertain tomorrow. For example, I intend to conduct experiments to better understand the value of weapon accuracy within a range of stressing environments. If modeling and testing confirm the value of such capability, this may lead to new thoughts on the balance between nuclear and conventional strike alternatives.

The new responsibilities assigned to USSTRATCOM have required the command to broaden its Cold War focus from deterring nuclear or large-scale conventional aggression to becoming a major contributor to the much broader defense strategy. Nuclear weapons; however, continue to be important, particularly for assuring allies and friends of US security commitments, dissuading arms competition, deterring hostile leaders who are willing to accept great risk and cost, and for holding at risk those targets that cannot be addressed by other means.

As steward of the Nation's strategic nuclear capabilities, we have two specific areas of focus—rationalizing our nuclear forces, and providing for a relevant nuclear stockpile in the context of The New Triad. USSTRATCOM's first priority will continue to be the maintenance of the absolute security, safety, and surety of the stockpile. At the same time we will continue to evaluate and provide a range of options, both nuclear and non-nuclear, relevant to the threat and military operations.

The New Triad concept presents an opportunity to reduce our reliance on nuclear weapons through the evaluation of alternative weapons, defensive capabilities and associated risk. It is our intent to have the upcoming Quadrennial Defense Review address nuclear issues, and the associated infrastructure, to determine transformation requirements for our nuclear capabilities in the 21st century. We will look at rationalizing our nuclear forces as an element of the overall force structure and the proper tailoring of nuclear effects as part of the broad spectrum of national power. These assessments will be important to future operational planning as well as future budget plans.

Finally, The New Triad concept provides a framework on which to establish a new dialogue on the future role for nuclear weapons in our national strategy. The challenging security and threat environment of the 21st century signals the need for an

informed national level discussion to hear the voices of government leaders, military, academia and the public if we are to effectively establish a long term nuclear investment plan.

Space

The importance of the space mission to our national security cannot be overstated. The U.S. economy, our quality of life, and our Nation's defense are all linked to our freedom of action in space. For example, satellites are at the heart of routine financial activities such as simple automatic teller machine operations or complicated international currency and stock market transactions. The telecommunication industry is heavily vested in space. Commercial airliners, container ships, trains, trucks, police, fire departments and ambulances have also become highly dependent upon space-based global positioning systems to enhance their ability to safely deliver people, goods and services. The fact is, our dependency on space increases every day—a fact not lost on our adversaries. This growing national dependence on space-based and space-enabled capabilities establishes a true imperative to protect our space assets and our ability to operate freely in, and from, space.

We currently enjoy an asymmetric advantage in space, but our adversaries are gaining on us. Our space support infrastructure is aging and, in some instances, on the verge of becoming obsolete. We will continue to face additional challenges as other nations exploit new technologies and capabilities in attempts to bridge the gap between them and us.

The space environment itself is also rapidly changing. For example, the number of objects in-orbit increases every month, while the size of those objects decreases. This is challenging our space surveillance technology, developed in the latter half of the 20th century, because it was not designed to detect or track the current magnitude of new, smaller objects, including micro-satellites. This increases the chances of collisions, which threatens our manned spaceflight program; opens the door for unwarned action against U.S. satellites by adversaries; and limits our ability to protect our space assets.

We must do a better job of leveraging the capabilities of our space assets—in DOD, national and commercial systems. We must also maintain the ability to protect our own space assets and capabilities, both actively and passively, while denying our adversaries the military use of space—at the time and place of our choosing.

In order to bring these elements of space control together, our near-term plan is to work with the various space programs to identify potential gaps and make sure existing information and applications are available and provided to authorized users on a global network. This plan will serve as the basis for a concept of operations to exploit information from our space assets, providing space situational awareness to the regional combatant commands.

Distributed Operations

For distributed, integrated operations, dominant situational awareness is an imperative—globally, regionally, and locally. It must exist across the full breadth and depth of operations, from planning and combat through post-conflict reconstruction, and ultimately, peacetime.

For our forces to effectively employ collaborative capabilities and capitalize upon situational awareness, we must enable them to create pictures of the battlespace tailored to their specific needs—what we refer to as User Defined Operating Pictures. It is USSTRATCOM's job to provide the global capabilities to enhance situational awareness, facilitate collaborative planning, and provide a basic User Defined Operating Picture capability for all of the combatant commands.

Many of the capabilities required for agile, distributed operations will be facilitated by space and enabled by a global information environment with ubiquitous, assured access to information, when and where any combatant commander needs it. To achieve this vision, the old mantra to provide information on a "need to know" basis, must be replaced by a "need to share." Critical information that the warfighter didn't know existed, and the owner of the information didn't know was important, must be made available within a global information environment easily accessible to commanders at all levels.

Interdependent Capabilities

Our action plan for global command and control focuses on ensuring the all-source information needed for effective operations is available to all theaters. For the global Intelligence, Surveillance, Reconnaissance (ISR) mission, that also means developing integrated and persistent systems capable of supporting precision targeting. USSTRATCOM has the lead for coordinating global ISR capabilities and will be working closely with the regional combatant commanders, Joint Forces Command and the services to develop the associated strategy.

The Department's net-centric global information services, currently in development, are essential to our global missions. These services will connect global and regional applications and improve both horizontal and vertical information integration.

We are developing a prioritized plan for transitioning away from stove-piped legacy systems to capabilities that support broader information and applications access. Included in this plan are actions focused on leveraging existing legacy applications and data by making them more broadly accessible. Each user will be allowed the flexibility to select from any available data source, anywhere on the network, those objects most useful to them at any particular time. Additionally, any new data source will be available the moment it comes onto the network, rather than requiring a modification to existing systems, as is the case today.

USSTRATCOM is an advocate for net-centricity. Our focus is on:

- Capability to enable our "internet-like" environment and access to information;
- Realization of a high-bandwidth, ubiquitous communications backbone to deliver information with high assurance and low latency; and
- Robust information assurance required to defend our networks and our information.

Creating a collaborative structure is more than just designing and disseminating tools—it is also about changing human behavior. Our objective is a global, persistent, 24/7 collaborative environment—comprising people, systems, and tools. Our future structure must support real time command and control at both the global and local levels as well as enable dynamic, adaptive planning and execution in which USSTRATCOM, the regional combatant commanders, and other geographically dispersed commanders can plan and execute operations together. Our collaborative environment must also provide the capability to "connect all the dots"—enemy dots, friendly dots, neutral dots, contextual dots—all the dots that matter—as they appear, rather than wait for a post-event analysis when all of the different data stores can be opened. With improved collaboration and shared awareness, we can more effectively conduct operations using the full spectrum of capabilities to achieve desired, focused effects against high value targets.

In that regard, we are actively assessing the currently available collaborative environment and processes and investigating potential pilot programs to encourage organizational information sharing to build trust in shared information. Fundamental to this issue is the establishment of data tagging standards and associated information assurance policies.

With regard to sharing information, we are in some respects navigating uncharted waters. While the value of sharing information with allies, coalition partners and other Federal departments and agencies is well understood, sharing information with industry or other private sources presents proprietary, intellectual property and privacy concerns which are not well understood. Such information has the potential to be of great value to USSTRATCOM and the regional combatant commanders in accomplishing our missions. We will be attentive to the actions currently being taken throughout the Federal Government in response to Executive Order 13356, "Strengthening the Sharing of Terrorism Information To Protect Americans," which may provide us valuable insight and guidance in this sensitive area.

BUILDING AN ASYMMETRIC ADVANTAGE

In addition to our role as steward of the Nation's nuclear stockpile and guardian of global deterrence, USSTRATCOM now has the responsibility for working across regional boundaries to address threats in a global perspective. To achieve the asymmetric advantage we desire requires us to build the interdependent, collaborative, operational environment we've envisioned. It is our responsibility to provide global services and global context to the regional combatant commands and their deployed forces so we are collectively a more effective force—for warfighting, peace and all possible combinations of both.

New Command Structure

As the latest step in maturing our approach to fulfilling USSTRATCOM's global mission responsibilities we are implementing a new command structure. This structure is critical to the asymmetric advantage we seek, leveraging essential competencies of associated components and key supporting agencies through an distributed, collaborative environment.

Rather than creating additional organizational layers, we are bringing existing commands and agencies under our global mission umbrella through the establishment of Joint Functional Component Commands. These interdependent Joint Func-

tional Component Commands will have responsibility for the day-to-day planning and execution of our primary mission areas: space and global strike, intelligence surveillance and reconnaissance, network warfare, integrated missile defense, and combating weapons of mass destruction.

USSTRATCOM headquarters retains responsibility for nuclear command and control. Additionally, headquarters will provide strategic guidance, exercise global command and control, and conduct strategic level integrated and synchronized planning to ensure full-spectrum mission accomplishment. USSTRATCOM will also advocate for the capabilities necessary to accomplish these missions.

This construct will allow us to leverage key, in-place expertise from across the Department of Defense and make it readily available to all regional combatant commanders. Our vision is for the combatant commanders to view any Joint Functional Component Command as a means by which to access all of the capabilities resident in the USSTRATCOM global mission set. Anytime a combatant commander queries one of our component commands, they will establish strategic visibility across our entire structure through our collaborative environment. The fully integrated response USSTRATCOM provides should offer the combatant commander greater situational awareness and more options than originally thought available. Specific Joint Functional Component Command responsibilities include:

- Space and Global Strike. The Commander STRATAF (8th Air Force) will serve as the Joint Functional Component Commander for Space and Global Strike. This component will integrate all elements of military power to conduct, plan, and present global strike effects and also direct the deliberate planning and execution of assigned space operation missions. For plans not aligned with a specific mission set, the Joint Functional Component Command for Space and Global Strike is tasked to work in close coordination with USSTRATCOM headquarters as the lead component responsible for the integration and coordination of capabilities provided by all other Joint Functional Component Commands.
- Intelligence Surveillance and Reconnaissance. The Director, Defense Intelligence Agency (DIA) will be dual-hatted to lead the Intelligence, Surveillance, and Reconnaissance Joint Functional Component Command. This component is responsible for coordinating global intelligence collection to address DOD worldwide operations and national intelligence requirements. It will serve as the epicenter for planning, execution and assessment of the military's global ISR operations; a key enabler to achieving global situational awareness.
- Network Warfare. The Director, National Security Agency (NSA) will also be dual-hatted to lead the Network Warfare Joint Functional Component Command. This component will facilitate cooperative engagement with other national entities in computer network defense and offensive information warfare as part of our global information operations.

Our coordinated approach to information operations involves two other important supporting commands. The Director, Defense Information Systems Agency also heads the Joint Task Force for Global Network Operations. This organization is responsible for operating and defending our worldwide information networks, a function closely aligned with the efforts of the Joint Functional Component Command for Network Warfare. Additionally, the Commander, Joint Information Operations Center coordinates the non-network related pillars of information operations: psychological operations, electronic warfare, operations security and military deception. Both the Joint Task Force for Global Network Operations and the Commander, Joint Information Operations Center will be full members of the USSTRATCOM distributed, collaborative environment.

- Integrated Missile Defense. The Commander, Army Space and Missile Defense Command will head the Integrated Missile Defense Joint Functional Component Command. This component will be responsible for ensuring we meet USSTRATCOM's Unified Command Plan responsibilities for planning, integrating, and coordinating global missile defense operations and support. It will conduct the day-to-day operations of assigned forces; coordinating activities with associated combatant commands, other STRATCOM Joint Functional Components and the efforts of the Missile Defense Agency (MDA). The Joint Functional Component Command for Integrated Missile Defense is a key element of the "defenses" leg of the New Triad concept.
- Combating Weapons of Mass Destruction. The Secretary of Defense (SECDEF) recently assigned USSTRATCOM responsibility for integrating and synchronizing DOD's efforts for combating weapons of mass destruc-

tion. As this initiative is in its very formative stages, we have yet to formalize any specific componency structure. However, we anticipate establishing a formal relationship with the Defense Threat Reduction Agency as an initial starting point.

This new componency structure is in its infancy and will take several months to fully realize. There are detailed issues to work through, including the proper distribution of subject matter expertise and an assessment of expanding relationships with other U.S. Government departments and foreign nations.

A final element of our evolving organizational structure involves developing relationships with the private sector to build upon efforts under the Partnership to Defeat Terrorism. This important partnership with the private sector supports many of our national objectives and crosses into relatively uncharted territory.

- Partnership to Defeat Terrorism. The United States has achieved success in the global war on terrorism by attacking terrorist infrastructure, resources, and sanctuaries. Nevertheless, our adversaries continue to plan and conduct operations driven by their assessment of our vulnerabilities. The main vulnerability requiring our constant vigilance is the Nation's economy, and one need look no further than the economic aftershock attributed to the September 11 terrorist attacks to affirm this assertion. The risk is accentuated given the global underpinnings of our economic structure. Even a small-scale terrorist attack against a lower tier provider in a distant land can have wide-ranging and pervasive economic implications.

Given the evolving understanding of terrorist's use of global processes, the Partnership to Defeat Terrorism was created to intercede on behalf of combatant commanders, among others, and positively affect outcomes through connections with the private sector. Since November 2001, the Partnership to Defeat Terrorism has successfully combined private sector global processes with other elements of national power to help fight global terrorism as part of USSTRATCOM's global mission responsibilities. This fruitful relationship with the private sector has proven effective on a number of occasions and has garnered the support of influential leaders both within and outside government.

Yet, the Partnership to Defeat Terrorism is somewhat of an ad hoc process based on trusted relationships. As such, the value of the program is directly related to the availability of the participants. USSTRATCOM was recently contacted by a group of people from various non-military sectors, advocating the creation of a working group to formalize this ad hoc program to begin planning a more permanent approach for the long-term.

Evolving plans call for the establishment of a Global Innovation and Strategy Center, which will serve as an independent headquarters for the work of the Partnership to Defeat Terrorism. When fully operational, the Global Innovation and Strategy Center will be able to access on-site and public/private sector experts to conduct rapid analysis of national security situations. The center will also have access to a wide range of available technologies to assist in the development of strategies incorporating capabilities well in excess of those of the military alone.

On a strategic level, the value of such an effort is the open realization that all elements of national power, which have not traditionally operated in a synchronized and coordinated role in national security, understand the urgent need for their involvement.

Full realization of the benefits inherent in the distributed, interdependent organizational structure described above requires an effective collaborative operation. A true collaborative environment provides us the asymmetric advantage necessary to deter and defeat the agile adversaries we face in the 21st century environment. In the future, these skills will take on even greater importance as we broaden our partner base within the U.S. Government, with coalition partners, commercial partners, academia and others, including non-government organizations.

ACHIEVING THE STRATEGIC IMPERATIVE

Agile, responsive distributed operations, enabled by meaningful information exchange, shared objectives, and shared situational awareness, are key to the successful performance of USSTRATCOM's global missions. We have assessed the capability gaps in our global mission areas and have developed action plans, working with our partner commands, to improve our collective ability to carry out operations at all levels.

USSTRATCOM's strategy is focused on:

- Stewardship of the strategic nuclear stockpile;

- Defending against asymmetric approaches used by our adversaries, including weapons of mass destruction;
- Responding effectively in a rapidly changing combat operations environment;
- Achieving prompt, predictable precision operations; and
- Coordinating with U.S., multinational, interagency, and private sector partners in a collaborative environment.

Implementing this strategy relies on new and enhanced capabilities, including:

- Dominant situational awareness;
- A ubiquitous, assured, global information environment;
- Dynamic, persistent, trustworthy collaborative planning;
- User Defined Operating Pictures, using distributed, globally available information, and;
- A culture that embraces "need to share" rather than "need to know."

We are not there yet. Working with our partner commands, we have developed plans to improve our global capabilities. We need your continued support to deliver the capabilities needed to combat the threats of the 21st century. We need your support for:

- Pursuit of high capacity, internet-like capability to extend the Global Information Grid to deployed/mobile users worldwide;
- Adoption of data tagging standards and information assurance policies to increase government-wide trusted information sharing; and
- Technology experiments to enhance our understanding of the value of accuracy and stressing environments for current and future weapons.

Finally, as an element of our role as steward of the Nation's strategic nuclear capabilities, we need you to:

- Consider a new national dialogue on nuclear policy. This Nation is ready for a genuine policy debate on the role of nuclear weapons within the context of the current global environment and the potential offered by The New Triad concept. We must build a long-term nuclear investment plan suited to national security goals.

USSTRATCOM recognizes what has to be done to be a global command in support of the warfighter. We are aggressively moving out on actions to ensure USSTRATCOM fulfills our full set of global responsibilities, supporting our national security needs in peace and in war.

Thank you for your continued support.

Senator SESSIONS. General Cartwright, with regard to STRATCOM's relationship then to, say, General Abizaid or a combatant commander, how do you see that? Will you state that again?

General CARTWRIGHT. The way I see that relationship and the way I have articulated that relationship is I am trying to provide and will provide to General Abizaid, the commander of Central Command (CENTCOM), or any other regional commander, global capabilities so that that particular commander, in the case of General Abizaid, has a set of global skills, things like space, global ISR, missile defense, that he can use in his region to apply.

To me that's what's different about STRATCOM today and that's what's different about the context in which STRATCOM operates today. We have, through the Nuclear Posture Review (NPR), a new triad which acknowledges the values of offense, defense, and infrastructure and tries to balance those legs such that the threats of today, the threats that we can imagine for tomorrow, we have the opportunity by adjusting those balances to adapt to a changing world.

It is a reality that this world is going to change and it is probably going to change at a rate that is more significant than it has in the past. So the triad gives us that vehicle by which we can address those changes.

Underpinning that triad, or part and parcel to it, is command and control, the ability to connect these three legs, understand the balances, and provide to, say, General Abizaid, the skills, the capabilities, let us say ISR or network warfare, to provide those skills and the command and control necessary to actually use these capabilities that we are trying to put together.

So the world and the approach to the threat has definitely changed. Around that triad at STRATCOM we have built a set of commands that represent each of these mission areas. They are called functional commands, joint functional component commands. These are commands that provide these skills, whether it be integrated missile defense, or whether it be ISR. They are to provide those to the regional combatant commanders.

They are all connected. So if General Abizaid needs assistance in ISR and he comes to my commander for ISR, he also gets the space component, he gets the missile defense component. He gets all of the pieces, no matter where he enters into our capability. That is the approach here, a holistic approach to try to understand this complex threat and provide to a regional combatant commander those kinds of capabilities.

So that is what is fundamentally different at STRATCOM.

Senator BILL NELSON. Mr. Chairman, if I could just interject here?

Senator SESSIONS. Yes.

Senator BILL NELSON. So one of the things that you are telling us is that your assets in space have to be reliable. You have to know that they are there, they are working, and that an enemy cannot take them out. Is that correct?

General CARTWRIGHT. I would add to reliable, assured. They have to be there. They have to be in a configuration that a regional combatant commander can count on them, whether it be in position, timing and navigation, or in communications or any of the other capabilities that we currently have in space. We have to have them in a position where they are assured and can be provided to a regional combatant commander and he can count on the effects that they will deliver.

Senator BILL NELSON. Now, you almost used in the same breath the example of space assets as one component and missile defense as the other component. But the National Missile Defense System, that is not to the point that a combatant commander could rely on that, is it?

General CARTWRIGHT. Clearly, the emerging national missile defense, the system that is there to protect the United States, is a an emerging, developing capability that we are working our way through. But its ties to sensors in space, its ties to terrestrial sensors, are all there today and available to, say, a regional combatant commander to be used and leveraged. Maybe not for missile defense, but again this sensor in one minute can be used for missile defense, the sensor in the next minute could be used for ISR, radar surveillance, et cetera.

So how you use the sensor is what we are there to try to leverage in more than one way. To build a sensor for a single function today is probably less than optimal. You would like to be able to build sensors, in particular in this discussion, so that missile defense

could use it, so that space surveillance could use it, so that a regional combatant commander could use it for his warfighting requirements.

So how we do that is what STRATCOM is trying to pull together in networking these capabilities in ways that are available to the regional combatant commander.

Let me finish with three points of leverage that I think are out there that are areas that we are pursuing to try to build this capability for the regional combatant commanders. The first is the concept of precision. We have seen over the last 10 to 15 years the value that precision brought to our conventional forces, weapons like Joint Direct Attack Munitions (JDAMs) and laser-guided bombs and things like that.

Precision has an intrinsic quality of being able to, one, define what it is, the effect that you would like to create on an enemy's capability; two, to focus it so that you can actually provide it in a way that does not require multiple delivery vehicles, multiple sensors, multiple warheads. If you can get to a point in precision—there is a very clear knee in the curve where you can start to have a direct effect on your inventory, whether that be of sensors, whether it be delivery platforms, or warheads.

To me, we have to go explore this and understand where those leverage points are and make sure that we are applying them across the entire set of delivery capabilities that we have in the strategic side of the equation.

That precision also has to go to the issue of intelligence, because having the weapons without the precise intelligence is a mismatch. We have to try to work on the intelligence and approaching intelligence in a fundamentally different way, a more holistic way, to try to get at more precise intelligence so that weapon-to-target and delivery and sensor all come together in a way that is the most effective way that we can put it against an adversary.

The second piece of leverage or point of leverage that I think we have to consider is the one that connects the triad to the infrastructure. Ambassador Brooks and I have spent a considerable amount of time both in analysis, in tabletops and exercises trying to understand, as was highlighted in the opening comments, what does "responsive" mean. What does it bring to us, how can we best leverage it so that the Nation particularly can be ready for what it does not expect, because the world is going to change, that it can recover from what it does not expect.

From a ground perspective, we have an old saying that basically no good plan survives first contact. We are going to be surprised. There are going to be things that emerge that we did not count on. What is our ability to react to that, not only to the human dimension of training an individual soldier, sailor, airman, or marine to be able to respond to the unknown, but to set the entire enterprise on a footing that makes sense and allows us to be responsive to emerging threats that we did not plan on?

So that is an attribute of the infrastructure that the two of us have spent a great deal of time trying to understand. We do not have the exact answers yet, but we are starting to close in on what we think are the key leverage points in the infrastructure piece and how that relates to the defensive leg and the offensive leg. I

think that is going to be important and I would like to go into that in more detail in the closed session.

The last point that I would touch on, which we talked about a little bit here, is the precision and the fundamental change in how we do planning. Once again the word "responsive" comes up. Can we do planning in a responsive way and have the precision in our intelligence, have the precision in our targeting? We have worked hard to change the way we do our planning, to make it more holistic, to make our planning reflect that the world is complicated, that the systems that we are working against are complicated, and they should be looked at as systems of systems and architectures rather than individual targets, and to understand that in a complex way.

We have done a very good job in working against infrastructure type targets and understanding the relationships of, say, a power grid and how a power grid is put together, and that it is probably not necessary to aim at each and every element of that grid. We are expanding that work now into a much broader target set, to understand the interrelationships. That, too, can have a significant effect on the infrastructure side of the equation, as well as on the delivery side of the equation.

To me, this is going to be important work that we are going to embark on. We are doing this in conjunction with Joint Forces Command to get a more holistic approach at how we develop targeting and how we employ precise munitions and precise intelligence.

With that, I stand ready for your questions, sir.

Senator SESSIONS. Thank you.

Senator BILL NELSON. Mr. Chairman, a family from my State of Florida is being honored starting at 3 o'clock with the first presentation of the first Congressional Medal of Honor posthumously to a sergeant that lived in Tampa. So, with your permission, I am going to go on down there so that I can be with that family at the White House while that presentation is made.

If I may, in my absence if you would just see that a couple of those issues that I brought up in my opening comments would be addressed for the record.

Senator SESSIONS. I will definitely do that, and I know you have to be there for that and I know you want to be there for that, because I know how deeply you care about those soldiers who defend our interests throughout the world. It is a great honor. So we thank you for that.

Ambassador Brooks, you are the Administrator of the NNSA and Under Secretary of Energy. So we would be glad to hear your comments at this time.

STATEMENT OF HON. LINTON F. BROOKS, ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION, AND UNDER SECRETARY OF ENERGY

Ambassador BROOKS. Thank you very much, Mr. Chairman.

I have submitted a statement for the record and I would like to summarize just a few of the key points from that statement if I may.

Senator SESSIONS. If you would, please.

Ambassador BROOKS. I would like to talk about the administration's emerging vision for the nuclear weapons enterprise, both the stockpile and the complex for the future, and how we hope to get to that vision. But before I do, I want to emphasize that stockpile stewardship, which you referred to in your opening statement, is working. I am confident that today's stockpile is safe and reliable and I am confident that there is no near-term requirement for nuclear tests. Last month the Secretary of Energy and the Secretary of Defense (SECDEF) reaffirmed this judgment in reporting to the President their ninth annual assessment of the safety and reliability of the stockpile.

Still, if we were starting to build that stockpile today we would probably take a different approach than we took during the Cold War. The legacy stockpile we have inherited from the Cold War may not be the most appropriate from a number of perspectives.

First, it may not be the right stockpile technically. Most of our current warheads were designed to maximize explosive yield while minimizing size and weight. We did this so we could put the maximum number of warheads on a delivery vehicle. This was the most cost effective way to meet Cold War military requirements.

As a result, we designed these systems very close to performance cliffs, and we were not terribly worried about that because we were in an era where we were continually gaining new knowledge from an ongoing nuclear test program. If we were designing the same stockpile for the same mission today with a test moratorium, with a force in which most delivery systems will carry fewer warheads than their maximum capability, we would manage the technical design risk differently.

The second technical problem is that our stockpile was not designed for longevity. It was designed at a time when we introduced new weapons and we turned over weapons every 15 to 20 years. Today our stockpile is being rebuilt and having its life extended in fairly difficult and costly life extension programs.

Now, no one will suggest that rebuilding nuclear weapons will ever be cheap, but decisions taken during the Cold War to use certain specialized materials make the life extension program more costly and more difficult than it would be if we were starting from scratch today. More broadly, when we designed these weapons we did not have as one of our criteria minimizing costs over the entire life cycle of the warhead.

Now, as a result of these decisions, which made perfect sense during the Cold War, it is becoming more difficult and more costly to certify remanufacture, despite the extraordinary success of the Stockpile Stewardship Program. The inevitable accumulation of small changes over the lifetime of these systems will increase uncertainty in long-term weapons performance. So we believe that we need to gradually over the next decade, 2 decades, shift from today's strategy of certifying what we build to a strategy of building things we know we can certify and we know we can do so without nuclear testing.

Now, the stockpile we inherited from the Cold War may not be the right stockpile militarily, either. This is much more in General Cartwright's area than mine, but the NPR identified a number of capabilities shortfalls. Our yields are probably too high, we have no

capability against hard and deeply buried targets, our systems are unsuited for some specialized missions.

Now, we do not know when, if ever, the Nation will decide that it needs new capabilities. Other than to request completing this modest research and development effort on the RNEP, we are not investigating any capability changes. Still, we need to maintain the capability to respond to potential future requirements.

The stockpile we now plan for the coming decade may also be the wrong one from a policy perspective. It is probably still too large, even after the President's extraordinarily bold decision last May to make one of the largest reductions in the total deployed stockpile ever made, total active stockpile ever made. Until we achieve a responsive nuclear weapons infrastructure, we are going to have to retain substantial non-deployed warheads to hedge against technical failure of a critical system or to hedge against unforeseen geopolitical changes. But that is not the best long-term answer.

Finally, today's stockpile may not be optimal from a physical security standpoint. The Cold War threat was people trying to steal secrets. In the post-September 11 world, we increasingly realize that there is a terrorist threat, the terrorist threat of individuals willing to die in order to gain access to a warhead and detonate it in place. This has dramatically increased our security costs, and if we were designing the stockpile today we would look at new approaches to warhead-level use control to reduce these costs.

So today's stockpile may not be the stockpile you want to have 20 years from now. Whatever you think of that, today's nuclear weapons complex is certainly not the responsive infrastructure we want over the long term. A responsive infrastructure would be able to deal with unanticipated events or emerging threats and would let us anticipate innovations by an adversary and counter them before our deterrent is degraded.

Our current infrastructure is not responsive. We had over the past decade a nearly complete halt to nuclear weapons modernization. We have in the past underfunded key elements of our manufacturing complex, and those actions have taken their toll. For example, we cannot produce plutonium parts for nuclear weapons and have not been able to do so for 15 years.

But we are making progress. We restored tritium production in the fall of 2003. We will have the Tritium Extraction Facility on line in time to meet the needs of the stockpile. We are restoring some lost production capabilities. We are devoting substantial resources to restoring facilities that suffered from years of deferred maintenance.

Much remains to be done and we need the continued support of Congress. We have to achieve the scientific goals of stewardship, continue to revitalize our facilities and infrastructure, plan for and construct a modern pit facility (MPF) so that we are no longer the only nuclear power that cannot make plutonium pits, strengthen test readiness, and transfer knowledge to the next generation of weapons scientists.

But we also need to begin to transform to a smaller, less costly, more easily secured, safe and reliable stockpile and we need to transform the infrastructure that supports that stockpile. Part of that transformation will be to retain the capability to provide new

or different military capabilities that the Department of Defense (DOD) requires. But transformation is more than that. Even if everybody in this room were absolutely convinced that we would never need a capability that we do not have today, the need to ensure the safety, security, and reliability of the legacy stockpile over the long term would still require us to transform, and concerns about responsiveness would mandate transformation of the weapons complex.

Now, these two are intertwined. If the stockpile can be transformed so it is easier to maintain, then a responsive infrastructure becomes easier to construct, and a responsive infrastructure is essential to reduce stockpile numbers so that we maintain our hedge in the infrastructure rather than in non-deployed weapons.

We are beginning, with the support of Congress, a program mentioned in both yours and the ranking member's opening statements, the Reliable Replacement Warhead, that may—we are at the very early stages—help enable the transformation we seek. We will look under this program at whether, if we relax some of the design constraints imposed on Cold War systems, we can provide replacements for existing weapons that can be more easily manufactured, with more readily available and more environmentally benign materials.

Now, these warheads would be delivered by existing systems and would have the same military capabilities as the legacy warheads they replace. But because they would be designed for ease of certification and would be less sensitive to incremental aging effects, they would reduce the possibility that the United States would ever need to conduct a nuclear test in order to diagnose or remedy a reliability problem.

So the answer to Senator Nelson's question is not only is the Reliable Replacement Warhead program not designed to foster a return to nuclear testing, it is probably our best hedge against the need some time in the future to be faced with the question of a return.

There is another reason why we ought to start this transformation now. We have not developed and fielded a new warhead in 20 years and we have not modified a warhead in nearly 10. We are losing expertise. We need to train the next generation of nuclear weapons designers and engineers before the last generation retires. Otherwise, we will place at risk our ability for stockpile stewardship in the future.

This kind of training cannot be done except in real design work. The enabler for this transformation, as I said earlier, is the Reliable Replacement Warhead program. We will use the funds Congress provided last year and those requested this year to begin concept and feasibility studies on replacement warheads or warhead components that provide comparable military capabilities to existing warheads. If those studies suggest the concept is feasible, then perhaps by 2012, 2015, we should be able to demonstrate through a small build of warheads that a Reliable Replacement Warhead can be manufactured and certified without nuclear testing.

Once that capability is demonstrated, then the United States will have several opportunities. We will have the option to cease some of the planned life extension programs, apply the savings from the

reduced life extension workload to transform to a stockpile that is easier and less costly to manufacture, and use stockpile transformation to drive a shift to a more responsive infrastructure.

We should not underestimate the very complex challenge this kind of transformation will involve. We are transforming an enterprise while it is operating at close to full capacity with warhead life extension programs. But I believe we need to begin.

If we can establish a responsive infrastructure and demonstrate we can produce replacement warheads on the same time scale in which geopolitical threats emerge, and if we can demonstrate that we can respond quickly to technical problems, then I believe we can go much further in reducing non-deployed warheads in order to meet the President's stated vision of the smallest stockpile consistent with our Nation's system requirements.

Success in realizing our vision for transformation should let us achieve a smaller, safer, more secure stockpile, one that offers a reduced likelihood that we will ever need to test again, one that reduces ownership costs, one that enables a much more responsive nuclear infrastructure, and one that helps ensure that we maintain a credible deterrent well into the 21st century.

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

[The prepared statement of Ambassador Brooks follows:]

PREPARED STATEMENT BY AMBASSADOR LINTON F. BROOKS

INTRODUCTION

Mr. Chairman, thank you for the opportunity to appear before you today to discuss nuclear weapons programs and policies. I look forward to working with you in this new area of responsibility. I also want to thank all of the members for their strong support for critical national security activities. Before I begin my remarks, I want to say how pleased I am to be on this panel today with my colleague, Gen. James E. Cartwright, Commander of United States Strategic Command (USSTRATCOM), who will present the military perspective on these issues.

Today, I will discuss with you the administration's emerging vision for the nuclear weapons enterprise of the future, and the initial steps we will be taking, with your support, to realize that vision. This vision derives from the work of the Nuclear Posture Review (NPR), the August 2003 Conference at Strategic Command, the follow-on NPR Strategic Capabilities Assessment and related work on a responsive nuclear infrastructure—key elements of which are addressed in Acting Assistant Secretary of Defense Mira Ricardel's written statement submitted for the record. The Nuclear Weapons Complex Infrastructure study, currently underway and scheduled to be completed this summer, will further refine this vision. I should add that Gen. Cartwright and the Directors at our three National Laboratories have provided both leadership and creative impetus to this entire effort.

The NPR has resulted in a number of conceptual breakthroughs in our thinking about nuclear forces—breakthroughs that have enabled concrete first steps in the transformation of our nuclear forces and capabilities. The recognition of a more dynamic and uncertain geopolitical threat environment but one in which Russia does not pose an immediate threat, the broad reassessment of the defense goals that we want nuclear forces to serve, and the evolution from a threat-based to a capabilities-based nuclear force have enabled substantial reductions in operationally-deployed strategic warheads through 2012 as reflected in the Moscow Treaty. This has also led to the deep reduction, directed by the President last May, in the total nuclear weapons stockpile required to support operationally-deployed forces. By 2012 the stockpile will be reduced by nearly one-half from the level it was at the time this administration took office, resulting in the smallest nuclear stockpile in decades. This represents a factor of four reduction in the stockpile since the end of the Cold War.

Very importantly, the NPR articulated the critical role of the defense research and development (R&D) and manufacturing base, of which a responsive nuclear weapons infrastructure is a key element, in the New Triad of strategic capabilities. We have worked closely with the Department of Defense (DOD) to identify initial steps on

the path to a responsive nuclear infrastructure and are beginning to implement them.

Building on this progress, I want to address the current state of our thinking about the characteristics of the future nuclear weapons stockpile and supporting nuclear infrastructure. Specifically, I will address three key questions:

- What are the limitations of today's stockpile and nuclear infrastructure?
- Where do we want the stockpile and infrastructure to be in 2030?
- What's the path to get there?

In laying out these ideas, the administration hopes to foster a more comprehensive dialog with Congress on the future nuclear posture. I must first emphasize, however, that today stockpile stewardship is working, we are confident that the stockpile is safe and reliable, and there is no requirement at this time for nuclear tests. Indeed, just last month, the Secretary of Energy and Secretary of Defense (SECDEF) reaffirmed this judgment in reporting to the President their ninth annual assessment of the safety and reliability of the U.S. nuclear weapons stockpile. Like the eight certifications that preceded it, this year's assessment is based on a collective judgment of the Directors of our National Laboratories and of the Commander, USSTRATCOM, the principal steward of our nuclear forces. Our assessment derives from 10 years of experience with science-based stockpile stewardship, from extensive surveillance, from the use of both experiments and computation, and from professional judgment.

WHAT ARE THE LIMITATIONS OF TODAY'S STOCKPILE AND NUCLEAR INFRASTRUCTURE?

Although nuclear weapons issues are usually contentious, I believe that most would agree that if we were starting to build the stockpile from scratch today we would take a much different approach than we took during the Cold War. Indeed, today's Cold War legacy stockpile is the wrong stockpile from a number of perspectives. Let me explain.

First, today's stockpile is the wrong stockpile technically. Most current warheads were designed to maximize explosive yield with minimum size and weight so that many warheads could be carried on a single delivery vehicle. During the Cold War, this resulted in the most cost effective approach to meet then existing military requirements. As a result, our weapons designers, in managing risk during a period when we used nuclear tests as part of the tool kit to maintain confidence, designed closer to the so-called "cliffs" in performance. If we were designing the stockpile today under a test moratorium and to support an operationally-deployed force in which most delivery systems will carry many fewer warheads than the maximum capacity, we would manage technical risk differently, for example, by "trading" size and weight for increased performance margins, system longevity, and ease of manufacture.

Second, the legacy stockpile was not designed for longevity. During the Cold War we introduced new weapons into the stockpile routinely and "turned over" most of the stockpile every 15–20 years exploiting an enormous production capacity. Today, our weapons are aging and now are being rebuilt in life extension programs that are both difficult and costly. Rebuilding nuclear weapons will never be cheap, but decisions taken during the Cold War forced the use of certain hazardous materials that, in today's health and safety culture, cause warheads to be much more costly to remanufacture. Maintaining the capability to produce these materials causes the supporting infrastructure to be larger and more costly than it might otherwise be.

More broadly, our nuclear warheads were not designed with priority to minimize overall demands on the nuclear weapons enterprise; that is, to minimize DOE and DOD costs over the entire life cycle of the warhead which includes design, development, production, certification, surveillance, deployment, life extension, retirement, and dismantlement.

As a result of these collective decisions, it is becoming more difficult and costly to certify warhead remanufacture. The evolution away from tested designs resulting from the inevitable accumulations of small changes over the extended lifetimes of these systems means that we can count on increasing uncertainty in the long-term certification of warheads in the stockpile. To address this problem, we must evolve our strategy from today's "certify what we build" to tomorrow's "build what we can certify."

The Cold War legacy stockpile may also be the wrong stockpile from a military perspective. The NPR identified a number of capabilities shortfalls in the existing arsenal that could undermine deterrence in the future. Specifically, the NPR suggested that current explosive yields are too high, that our systems are not capable against hard and deeply buried targets, that they do not lend themselves to reduced collateral damage and that they are unsuited for defeat of biological and chemical

munitions. The designs of the past do not make full use of new precision guidance technologies from which our conventional systems have fully benefited, nor are they geared for small-scale strikes or flexibility in command, control and delivery. We do not know when, if ever, we will need to field new capabilities to deal with these shortfalls. Nonetheless, it is vital that we maintain the capability to respond to potential future requirements.

The stockpile we plan for in 2012 is the wrong stockpile politically because it is probably still too large. The President's decision last May to reduce the stockpile significantly was taken in the context of continued progress in creating a responsive nuclear weapons infrastructure as part of the New Triad of strategic capabilities called for in the NPR. But we have a ways to go to get there. Until we achieve this responsive infrastructure, we will need to retain a substantial number of non-deployed warheads to hedge against a technical failure of a critical warhead or delivery system, or against unforeseen geopolitical changes. Because operationally-deployed forces are dominated by two weapons types—the W76 SLBM warhead and the W80 cruise missile warhead—we are particularly sensitive to technical problems involving these systems. We retain "hedge" warheads in large part due to the inability of either today's nuclear infrastructure, or the infrastructure we expect to have when the stockpile reductions are fully implemented in 2012, to manufacture, in a timely way, warheads for replacement or for force augmentation, or to act to correct unexpected technical problems. Establishing a responsive nuclear infrastructure will provide opportunities for additional stockpile reductions because we can rely less on the stockpile and more on infrastructure (i.e., ability to produce or repair warheads in sufficient quantity in a timely way) in responding to technical failures or new or emerging threats.

Finally, today's stockpile is the wrong stockpile from a physical security standpoint. During the Cold War the main security threat to our nuclear forces was from spies trying to steal our secrets. Today, the threat to classified material remains, but to it has been added a post-September 11 terrorist threat that is difficult and costly to counter. We now must consider the distinct possibility of well-armed and competent terrorist suicide teams seeking to gain access to a warhead in order to detonate it in place. This has driven our site security posture from one of "containment and recovery" of stolen warheads to one of "denial of any access" to warheads. This change has dramatically increased security costs for "gates, guns, guards" at our nuclear weapons sites. If we were designing the stockpile today, we would apply new technologies and approaches to warhead-level use control as a means to reduce physical security costs.

Let me turn to issues of the nuclear weapons infrastructure. By "responsive" nuclear infrastructure we refer to the resilience of the nuclear enterprise to unanticipated events or emerging threats, and the ability to anticipate innovations by an adversary and to counter them before our deterrent is degraded. The elements of a responsive infrastructure include the people, the science and technology base, and the facilities and equipment needed to support a right-sized nuclear weapons enterprise. But more than that, a responsive infrastructure involves practical and streamlined business practices that will enable us to respond rapidly and flexibly to emerging DOD needs.

Our current infrastructure is by no means responsive. A nearly complete halt in nuclear weapons modernization over the past decade, coupled with past under funding of key elements of our manufacturing complex has taken a toll on our ability to be responsive. For example, we have been unable to produce certain critical parts for nuclear weapons (e.g., plutonium parts) for many years. Today's business practices—for example, the paperwork and procedures by which we authorize potentially hazardous activities at our labs and plants—are unwieldy. But progress is being made. We restored tritium production in the fall 2003 with the irradiation of special fuel rods in a TVA reactor, and anticipate that we will have a tritium extraction facility on-line in time to meet the tritium needs of a reduced stockpile. We are restoring some lost production capabilities, and modernizing others, so that later this decade we can meet the scheduled startups of refurbishment programs to extend the life of three warheads in the legacy stockpile. We are devoting substantial resources to restoring facilities that had suffered from years of deferred maintenance. Finally, we have identified quantitative metrics for "responsiveness," that is, timelines to address stockpile problems or deal with new or emerging threats. These will help guide our program by turning the concept of responsiveness into a measurable reality.

That said, much remains to be done. Among other things, we must achieve the scientific goals of stockpile stewardship, continue facilities and infrastructure recapitalization at National Nuclear Security Administration's (NNSA) labs and plants, construct a Modern Pit Facility (MPF) to restore plutonium pit production, strength-

en test readiness, streamline business practices, and transfer knowledge to the next generation of weapons scientists and engineers who will populate this responsive infrastructure. Our challenge is to find ways to carry this out that reduce duplication of effort, support consolidation of facilities and promote more efficient operations complex-wide. I want to stress the importance of a MPF even if the stockpile continues to shrink—sooner or later the effects of plutonium aging will require all our current pits to be remanufactured.

WHERE DO WE WANT THE STOCKPILE AND INFRASTRUCTURE TO BE IN 2030?

Although the legacy stockpile has served us well, it was designed to meet the requirements of the Cold War era, many of which are irrelevant or inadequate today. We need to begin now to transform to the nuclear weapons enterprise of the future—this means transformation to a smaller, less costly, more easily secured, safe and reliable stockpile as well as transformation of the supporting nuclear infrastructure. The two are, of course, intertwined—we see stockpile transformation as "enabling" transformation to a responsive nuclear infrastructure, and a responsive infrastructure as essential to reducing total stockpile numbers and associated costs.

Part of transformation will be to retain the ability to provide new or different military capabilities in response to DOD's emerging needs. General Cartwright will discuss this aspect of transformation in more detail in his testimony.

But transformation involves more than retaining the capability to respond to new military requirements. My main responsibility is to assure the continued safety, security and reliability of the nuclear weapons stockpile. In this regard, even if we never received another DOD requirement for a new military capability for the nuclear stockpile, the concerns raised about our ability to assure the safety, security and reliability of the legacy stockpile over the very long term would still drive the need to transform the stockpile. The concerns about responsiveness to technical problems or geopolitical change would still mandate transformation of the weapons complex.

More broadly, we must explore whether there is a better way to sustain existing military capabilities in our stockpile absent nuclear testing. With the support of Congress, we are beginning a program—the Reliable Replacement Warhead (RRW) program—to understand whether, if we relaxed warhead design constraints imposed on Cold War systems (that have typically driven "tight" performance margins in nuclear design) we could provide replacements for existing stockpile weapons that could be more easily manufactured with more readily available and more environmentally benign materials, and whose safety and reliability could be assured with highest confidence, without nuclear testing, for as long as the United States requires nuclear forces. Such warheads would be designed specifically to facilitate less costly remanufacture and ease of certification of safety and reliability, and thus would reduce infrastructure costs needed to support that component of the stockpile. Because they would be designed to be less sensitive to incremental aging effects, they would dramatically reduce the possibility that the United States would ever be faced with a need to conduct a nuclear test in order to diagnose or remedy a reliability problem.

There is another reason why it is critical that we begin now to transform the stockpile. We have not developed and fielded a new warhead in 20 years, nor have we modified a warhead in nearly 10 years. We are losing expertise. We must train the next generation of nuclear weapons designers and engineers before the last generation, which honed its skills on nuclear testing, retires. If such training—and I cannot emphasize this strongly enough—is disconnected from real design work that leads to engineered systems, we will, as one laboratory director put it, "create not a new generation of weapons designers and engineers but a generation of analysts" who may understand the theory, but not the practice, of warhead development. If that happens, it would place at risk our capabilities for stockpile stewardship in the future.

Along these lines, as part of the transformation of the stockpile, we must preserve the ability to produce weapons with new or modified military capabilities if this is required in the future. Currently the DOD has identified no requirements for such weapons, but our experience suggests that we are not always able to predict our future requirements. The chief implication is that we must maintain design capability for efforts like those being carried out in the RRW program but also as a hedge against possible future requirements for new capabilities.

WHAT'S THE PATH TO GET THERE?

Let me briefly describe the broad conceptual approach for stockpile and infrastructure transformation. The "enabler" for such transformation, we believe, is the RRW

program. To establish the feasibility of the RRW concept, we will use the funds provided by Congress last year and those requested this year to begin concept and feasibility studies on replacement warheads or warhead components that provide the same or comparable military capabilities as existing warheads in the stockpile. If those studies suggest the RRW concept is technically feasible, and if, as I expect, the DOD establishes a requirement, we should be able to develop and produce by the 2012–15 timeframe a small build of warheads in order to demonstrate that an RRW system can be manufactured and certified without nuclear testing.

Once that capability is demonstrated, the United States will have the option to:

- truncate or cease some ongoing life extension programs for the legacy stockpile,
- apply the savings from the reduced life extension workload to begin to transform to a stockpile with a substantial RRW component that is both easier and less costly to manufacture and certify, and
- use stockpile transformation to enable and drive consolidation to a more responsive infrastructure.

We should not underestimate the very complex challenge of transforming the enterprise while it is operating at close to full capacity with on-going warhead life extension programs and potential evolving requirements. As a result, as we proceed down this path, we will look for opportunities to restructure key life extension programs to provide more "head room" for transformation. This could also provide, in the nearer term, opportunities to ensure appropriate diversity in the stockpile, making our nuclear deterrent less sensitive to single-point failure of a particular warhead or delivery system.

Once we establish a responsive infrastructure, and demonstrate that we can produce new (or replacement) warheads on a timescale in which geopolitical threats could emerge, and can respond in a timely way to technical problems in the stockpile, then we can go much further in reducing non-deployed warheads and meet the President's vision of the smallest stockpile consistent with our Nation's security.

Success in realizing our vision for transformation will enable us to achieve over the long term a smaller stockpile, one that is safer and more secure, one that offers a reduced likelihood that we will ever need to test again, one that reduces NNSA and DOD ownership costs for nuclear forces, and one that enables a much more responsive nuclear infrastructure. Most importantly, this effort can go far to ensure a credible deterrent for the 21st century that will reduce the likelihood we will ever have to employ our nuclear capabilities in defense of the Nation.

CONCLUSION

The administration is eager to work with Congress to forge a broad consensus on an approach to stockpile and infrastructure transformation. The vision of our future nuclear weapons posture I have set forth today is based on the collective judgment of the Directors of our National Laboratories and of the Commander, USSTRATCOM. It derives from lessons learned from 10 years of experience with science-based stockpile stewardship, from many years of effort in planning for and carrying out the life extension programs for our legacy stockpile, and from coming to grips with national security needs of the 21st century as laid out in the NPR.

I hope that the committee finds our vision both coherent and compelling. But I must emphasize that it is simply that, a long-term vision, nothing more and nothing less. Much of it has not yet begun to be implemented in program planning, or is at the very early stages of development. But we believe it is the right vision to guide our near term planning and to ensure the Nation's long-term security. I ask for the committee's support and leadership as we embark on the path of transformation.

Thank you Mr. Chairman. I will be pleased to answer any questions.

Senator SESSIONS. Thank you, Ambassador Brooks. Those were excellent comments and I thought you were frank and spoke in language that most of us can understand. Sometimes that is not true when we deal with these subjects.

You indicated and suggested that the forces we have may not be militarily the best kind of nuclear weapons that we need, suggesting that some, maybe many, are too powerful, less surgical, I suppose, less available for multiple missions. General Cartwright, do you have any thought about that? If you had nuclear weapons available to you, would they be exactly the kind—if you had them available for your needs, would they be exactly the kind that we

produced as a result of the Cold War situation? Or would you agree with Ambassador Brooks that it could be configured perhaps with even fewer, less powerful but more effective weapons?

General CARTWRIGHT. I would tend to agree with Ambassador Brooks. We can focus both at the effect that the weapon could create—the target set of today and tomorrow is probably not going to be at least identical for sure, but it is going to be much more diverse. But I would also focus on the fact that if I were to start today with a clean slate the idea of a more secure weapon, a safer weapon to handle, and a weapon that had increased surety, such that, again in an inventory type model, if applied to a target you were sure it was going to work and you only needed to apply one weapon to that target, if that could be engineered in, that is the type of engineering that we would want to have different today than we had in the past.

So getting the safety, getting the security, and getting the surety of the weapon engineered in the front end rather than later on would definitely be a change to the configuration of the weapons that we have today.

Then, going on to the different types of targets that are emerging as we look at today's targets and what we expect to emerge in the future, we would probably design these weapons different than we have.

Senator SESSIONS. I think you make a very good point there. We might as well begin to discuss it. It is a long way from dealing with those issues in any concrete way, but I think America believes in free speech and free discussion, so I think it is good that you have raised those questions.

I would just note, Ambassador Brooks, that as part of the President's reduction in warhead program we have reduced by about two-thirds the number of warheads in the inventory. At least that is the plan, and you are moving forward to accomplishing that by 2012; is that correct?

Ambassador BROOKS. Yes, sir.

Senator SESSIONS. That would reduce the number of operationally deployed strategic nuclear warheads we have, decommissioning them, by two-thirds, from 1,700 to 2,200 warheads?

Ambassador BROOKS. Yes, sir.

Senator SESSIONS. General Cartwright, do you think even with these legacy forces does that give you the kind of deterrent capability that STRATCOM believes is necessary to defend America?

General CARTWRIGHT. It does. It allows us also, given that we are talking about 2012, to realize some of the value of this new triad called for in the NPR. So the value of a more robust infrastructure, the value of a defensive capability, the value of an offense that is more than just our nuclear capability, but includes the kinetic capabilities of conventional weapons and the non-kinetic capabilities that we intend to field, so we have time to both meter the downward slope of the weapons and the increased capabilities of the other legs.

Senator SESSIONS. Would it be fair to say, Ambassador Brooks, that as we discuss how to improve and make more effective and reliable and helpful our nuclear arsenal, the truth is we are reducing it substantially? For those who are concerned about nuclear weap-

ons, we are bringing those numbers down, even with any kind of changes you are discussing, continually, and if you could make some modernization efforts in the stockpile, you could take the numbers down even more?

Ambassador BROOKS. I believe that you could. First, let me distinguish between what is clearly what the President has decided and what I am suggesting to you we might——

Senator SESSIONS. I think that is important. Neither this Congress nor the President has made any decision to make any changes. But I think it is healthy to discuss it.

Ambassador BROOKS. The President decided last year to make a substantial reduction in the total stockpile. That is both the deployed stockpile and the reserves, if you will. That is a reduction of nearly 50 percent, to be implemented by 2012. It will end us up with 1,700 to 2,200 operationally deployed strategic weapons plus a number that I will be happy to discuss in closed session for spares, but particularly for contingencies.

So for example, if a problem occurs with a warhead, you would like to be able to have enough of a different type of warhead to deploy to take up the slack. If there is an unexpected change in the geopolitical situation, an increase in the threat, you would like to be able to match that by deploying more weapons.

What I am suggesting is that right now the only way you can maintain those hedges is to maintain a large number of non-deployed weapons. But if I have an infrastructure that could respond to technical problems by fixing them quickly and that could respond to geopolitical problems by remanufacturing whatever was needed to meet those problems, I would not need even the substantial reductions.

It is important, Mr. Chairman, to understand that the stockpile that we will have in 2012 is the lowest stockpile the United States has had in decades. It will be the lowest stockpile that I have personally been associated with and I have been in the nuclear weapons business for a while now.

Senator SESSIONS. In addition to just the warhead numbers, we will be reducing, eliminating, retiring the Peacekeeper MX missile.

Ambassador BROOKS. Correct.

Senator SESSIONS. Which has 10 warheads per missile. We are maintaining the Minuteman missile, but reducing the warheads from three per missile to one per missile; is that the plan?

General CARTWRIGHT. Yes, sir.

Senator SESSIONS. Then the nuclear submarines with nuclear warheads and missiles on them, 4 of the 18 will be moved from nuclear weaponry. That would also reduce the number of warheads per missile on those submarines. So you have over a 20-percent reduction in the number of nuclear warhead submarines as part of the triad and an additional reduction in number of warheads per missile on those submarines.

General CARTWRIGHT. Yes, sir.

Senator SESSIONS. So I think we have demonstrated our Nation's willingness to bring down those numbers.

Let me ask either of you. We urge that our Russian friends maintain strict security on their nuclear weapons. How do you feel we are doing with ours? Do you need anything, just briefly, to enhance

the security of our stockpiles, to avoid terrorists perhaps either attacking them or stealing them?

Ambassador BROOKS. Most of the intact nuclear weapons are in the custody of the DOD. I have nuclear weapons at the Pantex Plant and I move nuclear weapons between the DOD and my facilities. The rest of what the DOE has is components, which are probably more of a concern for an improvised nuclear device than as an intact weapon.

We have substantially increased the funding for physical security. In 2001 the NNSA spent about $400 million. Last year, the current year, we are spending $740 million. We are asking for $708 million in the budget that is before Congress now.

So we have made a very substantial investment in improving physical security and I am quite comfortable that the weapons and materials in my custody or in the Department's custody are secure. I will defer to General Cartwright on DOD weapons.

General CARTWRIGHT. We have reviewed the threat, updated the threat to understand the change in the character of the threat between the Cold War and now, taken the opportunity in that review to understand the things we would change that currently exist to improve our posture to protect these weapons. Both the Navy and the Air Force have very aggressive programs to improve all of the issues that we highlighted in our review and are on a path to fix those, update those, whatever the right characterization of the particular issue is, to get us to a footing.

I am comfortable that we have the weapons protected and that we are moving to a posture that will improve that protection in light of the changing threat.

Senator SESSIONS. That is good news and it is important and I think it is just something this Congress needs to assure, and you need the resources necessary.

I think, General Cartwright, you answered in your comments as you summarized your thoughts earlier, you answered the question about how are we changing from strategic deterrence to global deterrence. I think that was something I wanted to get at and I think you have covered that pretty well.

I would want to ask you a little bit more maybe about the New Triad. That is a little vague to me or at least I am not sure I fully understand it.

But we also are moving away from solely a nuclear response. We have much more capability today with the precision weapons. How do the new precision capabilities we have to direct conventional weapons, non-nuclear weapons, precisely to a target, reduce our dependence on nuclear weapons?

General CARTWRIGHT. To the extent—and let me just go back on the offensive side and talk just briefly. On the kinetic type weapons, we have the nuclear and then we have the conventional weapons. We are also developing a class of weapons that we call non-kinetic, that get an effect by attacking a network, for instance, that would control a particular function, like when we talked about power grids and things like that.

We are developing a set of tools that allows us to go after targets in a non-kinetic way. They are just emerging as capabilities today, but we are working very hard in that environment.

When we talk about nuclear versus conventional, what precision allows you to do is to—if you have both the precise intelligence and the ability to deliver a weapon to a precise location, then the energy required to destroy a target can be more focused.

Senator SESSIONS. You mean a smaller bomb?

General CARTWRIGHT. Exactly. So in the conventional world, as you saw years ago, we were using 2,000 pound bombs. Just as few as 5 years ago, we were down to 1,000 pound bombs from aircraft-delivered weapons. We are now in the 500 pound and smaller for the same effect, because of precision.

So it has that ability to start to reduce the amount of kinetic energy necessary to create the effect. That is one positive. The other thing is this targeting, this new way of approaching targeting that I described, which identifies a target area from the standpoint of a system and how to effect that system with precision such that you do not have to hit each of the nodes in any particular system is also offering us leverage in the number of weapons necessary to hold a target at risk.

So between the two of those, we start to get at a way to be much more efficient in delivering our effect, and to the extent that we need large-yield conventional or nuclear weapons there is a group of them against a set of targets that can now be significantly smaller if we apply this precision.

Senator SESSIONS. How would you explain to us the global strike concept? How do you utilize that, what the President and the SECDEF would like to see, how are you getting along toward achieving it?

General CARTWRIGHT. Global strike is one of our mission areas. It provides to the Nation the ability to rapidly plan and rapidly deliver effects anyplace on the globe. It allows us to provide effects for a regional combatant commander if that is appropriate, say in the case of CENTCOM, General Abizaid. It allows us to provide a strategic capability, which again is not necessarily nuclear, for that regional combatant commander, to tailor it for his target and deliver it very quickly, with very short time lines on the planning and delivery, any place on the face of the Earth.

Senator SESSIONS. Is that possible? Do we have the technology that is available today, if you had the money, that you could within a short period of time deliver a conventional weapon anywhere in the world?

General CARTWRIGHT. Even with the money, right now we have technical challenges that we have to overcome in order to get this capability. If we are talking about non-kinetic, we can move pretty much anyplace on the earth at the speed of light in cyber-type capabilities. But the conventional type capabilities and the nuclear type capabilities—nuclear right now is delivered in our missiles at very high speeds at very long ranges. Our bombers have very long ranges, not quite the speeds.

But trying to pull those attributes together with both conventional and nuclear kinetic effects is a little bit of what we are trying to work at in the global strike arena. But it is much broader. It encompasses both the ability to plan rapidly, to apply the precision to the intelligence and gather that intelligence in a very rapid

manner, and then to apply that intelligence to the target and understand the effect we want to create.

All of those are part and parcel to delivering the weapon. So we have to get it all. One part of this is not enough.

Senator SESSIONS. That is the joint strike capability you are working on?

General CARTWRIGHT. The global strike, yes, sir.

Senator SESSIONS. What about the costs of that? Where are we on funding? Do you have adequate funding to achieve what you are seeking?

General CARTWRIGHT. I believe that we do. I am trying to make sure that I can stay at the right classification level here, but I am comfortable that the areas that we are looking at for feasibility to ensure that we can deliver this capability, both in the intelligence side of the equation, the delivery side of the equation, and the weapons side of the equation, that we have sufficient latitude and resources to go investigate what is feasible, what gives you great leverage, and then, if it is a new thing, the opportunity to come back and advocate for something new. If it is just a different use of a current capability, the ability to put the pieces together, connect the dots, so to speak, and provide that capability.

Senator SESSIONS. But in terms of explosive power, a nuclear weapon on a missile, for example, would have far more explosive power than a conventional munition would?

General CARTWRIGHT. Yes, sir. But again, if it were——

Senator SESSIONS. Obviously it does. But the point is a conventional munition might not be sufficient under certain circumstances.

General CARTWRIGHT. Under certain circumstances, and there are circumstances in which that is the case.

Senator SESSIONS. With regard to the hard and deeply buried targets, I know a number of our adversaries are proud of their tunneling ability and they have worked hard to place deep in the ground and in mountains and other areas their strategic capabilities. Would you explain, General Cartwright, what your concerns are in that regard, what you feel like we need to be capable of neutralizing that capability that our adversaries have?

I would just note parenthetically that it is the history of warfare that if someone feels threatened in one capability they figure out a way to make it not threatened, to eliminate that threat, and burying into the ground is a way to do that. It also would be historically—so that if we want to be able to prevail in a conflict, then we would be able to confront that challenge.

So are we there? Is a study of the capabilities of a Deep Earth Penetrator in your opinion justified to see if something like that is feasible? Do you support it and why?

General CARTWRIGHT. Yes, sir. First I would say that this target set of buried, deeply buried, and hardened targets is a very real target set and that it is growing. As you say, if an enemy has a capability that they want to protect, they generally move toward some way to disguise and deceive us about its capability and its location to thwart our targeting and our weapons capabilities. Oftentimes they go to mobility. Sometimes they go to cover. Sometimes they bury deeply.

Clearly, the hard and deeply buried targets that go very deep into the earth using commercial capabilities are target sets that we want to understand better, both what is it they are trying to accomplish, what it is that they are trying to put in these bunkers, and then to what extent we can hold those capabilities at risk.

We are exploring as many different avenues of approach to understanding these target sets and holding them at risk as we can come up with. Again, it will probably not be solved by one weapon or one approach. We are going to have to understand the intelligence necessary to locate and understand what goes on in these bunkers. We are going to have to have multiple ways by which we can hold them at risk.

We are working our way through that right now. The RNEP is one of several capabilities that we think will be necessary. Whether it is a nuclear capability or whether we have other capabilities is the work that is being done in the study. But that study has implications far beyond just the nuclear solution to this in characterizing the facilities, in characterizing the effect that can be brought by a weapon against those facilities, whether it be kinetic or nonkinetic, and in the different types of training for our forces to hold these facilities at risk.

So it is a multifaceted problem which we are trying to get our arms around. We have a reasonable base of experience for a large amount of this target set, but as it gets more sophisticated we have to keep improving our capability.

Senator SESSIONS. Well, sort of to recap where we are on it, I think we have authorized the study in this committee and by the full Senate in 2003, 2004, and 2005. Funding was appropriated in 2003 and 2004. It goes to, I believe, the Energy Subcommittee for final appropriations of the funds and in conference with the House I believe the chairman of the House Energy Appropriations Subcommittee objected and eventually that funding was not included last year, after having been in there previously.

The President's request this year I believe, Ambassador Brooks, is less, but is it sufficient to continue the study that we would undergo?

Ambassador BROOKS. Yes, with the proviso that there is another increment in 2007. We are requesting $4 million in the current budget and anticipating requesting $14 million in 2007, and our 5-year projection shows no additional money for this.

The reason the level is so much less is we have cut back on what it is that we propose to do. Originally we proposed to examine two different warheads. Fundamentally, what we are doing is taking a warhead, putting a very hard case on it, controlling its attitude very precisely so that it can penetrate a few meters into rock and still stay intact and go off. That way the energy goes into the ground.

We have concluded that we can demonstrate whether or not the concept is feasible by looking at only one warhead. We selected the B83 which is one of the two bombs we were looking at—because that was where we were when the program was stopped.

If the funding is provided us in 2006 and 2007, we will gain enough knowledge to know whether the United States should further investigate the concept. We of course will not actually be able

to deploy anything. As you pointed out in your opening statement, that would require a whole different Congressional action. That is not what this is about. This is a study.

Senator SESSIONS. I think that is a reasonable request and have supported that. So the amount of funding will be considerably less, but it would give us an indication of how we could deal with that, whether we could achieve it or not, even if we were to decide to do so.

Let me ask you this. There is concern expressed that such an action would destabilize somehow the nuclear world environment, encourage others to build more and dangerous weapons. How would you analyze that?

Ambassador BROOKS. I believe that is a misreading of the world. Let us look at sort of three kind of classes, four really, classes of people. One is the established nuclear powers. There is no evidence that the Russian Federation or China will take some action in their stockpile because we do or do not do this study, and in closed session I can talk a little bit more about what those two powers are doing.

The nuclear wannabes, if you might, the North Koreas of the world, seem to be completely uninfluenced by what we do. To the extent that they are looking at the U.S., it is our overwhelming conventional power that probably causes them to go into the search for nuclear weapons.

Terrorists obviously are not deterred by what we do or what we do not do. So the one area in which some believe that this kind of nuclear modernization has adverse consequences is the large number of non-nuclear states who collectively help us preserve the nonproliferation regime through things like export control.

But even here, a study should not make any difference and we have empirical evidence because the previous administration took a bomb and hardened it to penetrate into frozen soil and in essence it had no discernible effect on the actions of any other country. So I believe that there is room to debate—whenever you want to spend money, there is always room to debate whether it is a good use of the public funds, but I believe the concern that somehow we are going to destabilize the nonproliferation regime is just wrong, not supported by the facts.

Senator SESSIONS. I think that was a good analysis and I thank you for that. Everybody will have to make their own decision about that, but I would agree. Again, I think you are talking about—we have many nations now with an active nuclear weapon program and capabilities of building or updating their systems. We are the one nation of the nuclear powers that does not have a plutonium pit capability, as you noted. So having a precision discreet nuclear weapon capable of dealing with hardened targets only in a world in which nuclear research and development and production is ongoing in a broad-based way is not impressive to me. It does not persuade me that we should be afraid of that.

Ambassador Brooks, I see the New York Times recently had an article that indicated that our W76—is that it?

Ambassador BROOKS. Yes, sir.

Senator SESSIONS.—weapons that are a big part of our inventory, may not be effective. You have told us that you think the stockpile

is effective. I just would ask you to specifically comment on that and any thoughts you have. I note with interest that they sort of criticize you for not having a stockpile that would work, but they are also the fiercest critic of any testing to see if it would work. But regardless, what are your thoughts on the reliability today?

Ambassador BROOKS. Yes, sir. The W76 is a warhead for the Trident missile. It is the most numerous warhead in our deployed arsenal, so it is obviously of great concern. The dispute has to do with a minority view about interpretation of data taken back in the era of underground testing.

We have looked into this extensively. We went through a process in which the lab that did not design a particular warhead, in this case the W76, examined it. We held a special study or a special examination under Dr. Everet Beckner, who is the deputy who runs the Defense Programs in the DOE, bringing in the critics, bringing in experts that they suggested. We have looked at this a number of ways and I am sure that the critics are very sincere and I am sure that they believe what they say, but our best technical judgment is they are just simply wrong.

Senator SESSIONS. General Cartwright, the Common Aero Vehicle is a vehicle that, if developed, could lift in low orbit a munition or lift other items, Unmanned Aerial Vehicles (UAVs) or other things, into low orbit and then back into the United States, back to the world. We prohibited funding on that, I believe, previously, Congress did, awaiting your dealing with the concerns that this might be mistaken as some sort of attack on, for example, Russia. In other words, they have the capability of identifying a launch and they might think it would be a launch against them of maybe a nuclear warhead, and we wanted to be sure that there could be no misunderstanding in that before we authorized going forward with this vehicle.

What can you tell us about the status of the Common Aero Vehicle?

General CARTWRIGHT. First let me go to the attributes that we are looking at in the system. Those are the attributes of, as we talked about earlier in global strike, of being able to hold targets at risk at great distances in very short periods of time. Now, it could be held at risk in the sensor standpoint. It could be held at risk in a weapons standpoint. There are many uses, as you alluded to, to a platform that could go into low earth orbit and quickly get around the world. Associated with that is the responsive lift that would get there, that would allow it to get there.

We are studying that. I think I would turn to Air Force, General Burg, back here as to the details of the resources associated with it since the moratorium was put on it. I am not sure where we are this year exactly in our request.

What we are trying to understand is in global strike what are the options of moving a capability very quickly around the world, in the planning, the intelligence, and the delivery, and how can we do that and what feasibility is there in using space, in moving through the air, in other methods of delivery, cyber, et cetera. This is just one of several areas that we are investigating.

Senator SESSIONS. Have you given thought to the specific objection that Congress had with regard to it being misinterpreted in

some fashion? It seems to me that the locations of our Intercontinental Ballistic Missiles (ICBMs) are well known. Would that obviate that fear?

General CARTWRIGHT. I think we have worked our way through on this issue over time from bombers, that clearly have capabilities to deliver both conventional and nuclear capabilities, and how we portray them such that it is reasonably unambiguous what our intent is with the weapon. Cruise missiles have had the same type of discussion. We are now having that discussion with space vehicles and with missiles that get you to either low earth orbit or outside the atmosphere.

There are any number of ways to approach the problem if we want to take this on. What we have to understand is we have done this in the past with basing options so that it is clear, with inspection options, protocols, and with profiles of the trajectory of the flights, all of which are possibilities, and not to exclude the discussion that has gone on about shared awareness or warning. We need to make sure that, if we are going to use a weapon that is a conventional weapon, but somehow could be misunderstood, that we try to provide every opportunity to ensure that it is not misunderstood. At the end of the day the objective here is to increase the number of options, to try to give the Nation more decision time on any crisis, and to expand the choices that we might be able to offer the President in a crisis.

Senator SESSIONS. Well, I think that has potential as being an effective part of our defense needs and I hope that you will pursue it. I think I indicated low earth orbit, but this would not be an orbital vehicle; it may go into low earth orbit. It would not be a space vehicle.

I just want to follow up here with the NPR in 2001 and the New Triad. Are you confident that we have a clear understanding of what is involved in that? How much of it is expected to develop over time, and would you share with us, General Cartwright, briefly how you understand the New Triad?

General CARTWRIGHT. The three legs associated with the New Triad are: the offense, and we talked about that briefly before, which is a kinetic capability that is both conventional and nuclear, and bringing to bear in particular now more robust non-nuclear options, and also the non-kinetic, which is the focus right now. We have put probably our greatest effort in the cyber type of capabilities on the non-kinetic side, and creating both the alternative, which is the ideal state, or in combination some way of managing the offensive side of the discussion.

The defense is a combination of, in our terms, active and passive capabilities, those things that we would do in a passive sense to protect ourselves and then in the active sense those things that we would put together, such as missile defense, to protect the Nation against those things that would cause us significant regret.

On the infrastructure side, we have had a pretty good discussion about the infrastructure pieces and where the leverage is there. Clearly there has to be a balance between the three. Over time, technology, aging platforms, et cetera, will change the balance. The change in the world climate will change the balance of those. But the idea here is to hold at risk with a credible deterrent through

the three legs of the triad our capabilities such that no one leg can be targeted and eliminated without a credible capability in the other two.

The underpinning of that activity is the command and control system that connects all of it and making sure that that is assured and survivable. We cannot forget that particular leg, particularly now as we look at the transformation going on in our communications globally, moving from circuit-based capabilities to Internet protocol type capabilities. That transformation has to be considered in the context of our command and control systems for the triad, and how we make that migration, how we come up with a very robust distributed capability, will all be important parts of the New Triad.

Senator SESSIONS. I thank you for that, and I thank both of you for your plainspoken, understandable comments on this complex area of our Nation's defense. It is very critical. We have to expend an extraordinary amount of money each year, but as a percentage of our total defense budget it is probably less than, what, 3 or 4 percent that we spend on nuclear weapons, although I encourage you, Ambassador Brooks, to keep those costs as low as you can.

So I think we will keep the record open for additional questions that are going to be submitted by the other members. I know several members for one reason or another could not be here today. But we have established a record that I think would be a good foundation for us to consider a new defense authorization bill this year. We need to know what you believe, what the facts are, how you analyze them, as we make our decisions about what to authorize as part of our Nation's defense in the future.

So do either of you have any further comments before we go to closed session?

General CARTWRIGHT. Just one real quick comment.

Senator SESSIONS. Please.

General CARTWRIGHT. Which is associated with the comments on the triad, is that it is absolutely critical, and we both believe it, that the two of us have to be in a constant dialogue in order to make this triad work. There has to be a clear, clean relationship and a good dialogue there and we have endeavored to develop that and foster it, and we both benefit from each other's insights.

Senator SESSIONS. That is important.

I have worked in the Federal Government with a host of different agencies in the law enforcement world and you have to go beyond rules and regulations. You have to have two people talking from different agencies on a regular basis to get the kind of sharing and cooperation that you need to be successful. So I really think you are wise in saying that and I encourage you to continue.

So if there are no further questions before this meeting now, we will be adjourned for closed session later.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

FUNDING FOR FEASIBILITY STUDIES: RESPONSIVENESS TO DOD REQUESTS

1. Senator SESSIONS. Ambassador Brooks, last year this committee authorized funding for what was called the "Advanced Concepts Initiative." The purpose of advanced concepts was to provide funding to respond to Department of Defense (DOD)

requests for feasibility studies on enhancing the military capabilities of the existing stockpile and to support Strategic Command (STRATCOM) by supplying quick turnaround, limited scope answers concerning technical questions related to the stockpile. Although Advanced Concepts was fully authorized, no funding was appropriated. The National Nuclear Security Administration (NNSA) has requested no funding for Advanced Concepts in fiscal year 2006. Is the Department of Energy (DOE) able to respond to technical inquiries and requests from DOD, as was envisioned under Advanced Concepts?

Ambassador BROOKS. The fiscal year 2005 Omnibus Appropriations Act reassigned the $9 million requested for the Advanced Concepts Initiative (ACI) into a new activity entitled "Reliable Replacement Warhead." RRW funding will enable the NNSA to work with the DOD to assess the feasibility of warhead replacement components—both nuclear and nonnuclear—to ensure the long term sustainability of the military capabilities provided by the existing stockpile without nulear testing. The RRW program has the potential to "enable" the long-term transformation of the nuclear weapons stockpile and lead to a more efficient, less costly nuclear weapons infrastructure. With respect to other requests from DOD to respond to technical inquiries and requests not currently funded, we would consult with Congress on an approach to carry out this work.

2. Senator SESSIONS. Ambassador Brooks, shouldn't NNSA be able to provide this kind of quick turnaround analysis if we are to have a truly "responsive" system as laid out in the Nuclear Posture Review?

Ambassador BROOKS. With respect to inquiries regarding the existing stockpile, we have the capability and authority today to provide the DOD with appropriate responses. With respect to requests from DOD to carry out feasibility studies on advanced concepts that are not currently funded, we would consult with Congress on an approach to carry out this important work.

DESIGN BASIS THREAT—TIMETABLES AND FUNDING

3. Senator SESSIONS. Ambassador Brooks, since September 11, DOE has modified its requirements regarding the kinds of threats against which it needs to protect its nuclear facilities. These scenarios are described in something known as "the design basis threat." When Secretary Bodman was before the full committee, he testified that it will take until 2008 before all of DOE's facilities are in compliance with the new threat scenarios—which would be 7 years after September 11. Just as we are concerned with the security of nuclear materials around the world, we need to be just as sure that nuclear materials here at home are secure. When do you estimate that all of the NNSA facilities will be in compliance with the new design basis threat?

Ambassador BROOKS. The Department has issued two Design Basis Threat (DBT) policy revisions since September 11, May 2003 and October 2004. Site DBT Implementation Plans for the May 2003 revision were approved by my office in February 2004 and all NNSA sites are on schedule to be compliant with this revision by the end of fiscal year 2006. Site Implementation Plans for the October 2004 DBT revision are due to Headquarters in July 2005, with the requirement that sites identify the upgrades and funding necessary to be compliant with this revision by the end of fiscal year 2008.

4. Senator SESSIONS. Ambassador Brooks, since the NNSA budget request for the nuclear weapons facilities is down slightly in the fiscal year 2006 budget request, is the request sufficient to conduct your ongoing missions as well as provide for the needed security upgrades?

Ambassador BROOKS. Yes, the fiscal year 2006 budget presents a balanced approach that provides for ongoing mission, supports the President's highest priority on detecting and preventing proliferation of WMD, and allows us to continue to make improvements to our nuclear weapon facilities to address the revised DBT. The fiscal year 2006 safeguards and security (S&S) budget supports the third and final year of the improvements to meet the 2003 Design Basis Threat. The fiscal year 2006 budget also includes support for the Vulnerability Assessments necessary to develop the implementation plans to come into compliance with the 2004 DBT policy issues by the end of 2008.

Much of the reduction you see in the nuclear weapons facilities-related accounts, including Safeguards and Security, results from changes in construction project funding.

RELIABLE REPLACEMENT WARHEAD

5. Senator SESSIONS. Ambassador Brooks, the fiscal year 2006 budget request includes a program called the Reliable Replacement Warhead. The purpose of this program is described in the budget request as: "to demonstrate the feasibility of developing reliable replacement components that are producible and certifiable for the existing stockpile." This objective sounds very similar to the Life Extension Program, which DOE has been conducting for many years, in which DOE extends the lifetime of a warhead through dismantlement, replacement of limited life components, and return of the warhead to the stockpile. Could you more fully describe the purpose of the Reliable Replacement Warhead program and how it differs from the Life Extension Program?

Ambassador BROOKS. The Reliable Replacement Warhead program is very closely aligned with the purpose of ongoing warhead Life Extension Programs; that is, to ensure the long-term sustainability of the military capabilities provided by warheads in the existing stockpile. There is, however, concern that our current path—successive refurbishments of existing warheads developed during the Cold War and to stringent Cold War specifications—may not be the right path to achieve this long-term sustainability. Specifically, the directors of our national laboratories have raised concerns about their ability to assure the safety and reliability of the legacy stockpile over the very long term absent nuclear testing. With the support of Congress, we are undertaking the RRW program to understand whether, if we relaxed warhead design constraints imposed on Cold War systems that have typically driven "tight" performance margins in nuclear design, we could provide replacement components for existing stockpile weapons that could be more easily manufactured with more readily available and more environmentally benign materials, and whose safety, security and reliability could be assured with high confidence, without nuclear testing, for as long as the United States requires nuclear forces.

6. Senator SESSIONS. Ambassador Brooks, is the goal of the Reliable Replacement Warhead program to replace existing warheads with new designs and new warheads or is the goal to refurbish and increase the reliability of existing nuclear warheads?

Ambassador BROOKS. The focus of the Reliable Replacement Warhead program is to extend the life of those military capabilities and the reliability provided by existing warheads, not develop new warhead types for new or different military missions.

MODERN PIT FACILITY—PIT PRODUCTION CAPABILITY

7. Senator SESSIONS. Ambassador Brooks, the Modern Pit Facility (MPF) would provide the United States the capability to manufacture plutonium pits for our nuclear weapons stockpile. The United States is the only nuclear weapons nation without this capability. Attempts to determine the production rate for a new pit production facility have been complicated by the fact that there is uncertainty regarding the exact lifetime of plutonium pits in a nuclear warhead. Pit lifetime is currently estimated to be somewhere between 45 and 60 years. This is a wide range, and I understand there is considerable uncertainty. What activities is DOE currently undertaking to refine its knowledge of the lifetime of nuclear weapons pits and the effect of plutonium aging on the performance of weapons?

Ambassador BROOKS. The 45- to 60-year estimate of the minimum pit lifetime is based on an assessment made at the end of fiscal year 2003 using the available data and analyses. There is an underlying rationale for stating the estimate as a range. Each weapon type in the stockpile has a design margin between the baseline performance level and a threshold level below which the primary would no longer produce the required output. Aging degradation of the pit could diminish critical performance parameters until the weapon's design margin is eventually reduced to zero and primary output would drop below the required threshold. Since the design margin is different for each weapon type, pit lifetime estimates must be weapon-specific. The 45- to 60-year range accounts for the differences in design margins between the weapon types, the current uncertainties in the sensitivity of performance to aging degradation, and the lack of aging data beyond the oldest available pits (retired units up to 43 years of age).

The ongoing NNSA effort on pit lifetime is focused on obtaining additional data on pit aging, evaluating the aging impacts on critical performance parameters, and reducing the uncertainty in the estimate. Accelerated aging experiments are underway using carefully prepared plutonium alloys that will reach a 60-year equivalent age for evaluation in 2006. High-pressure static and dynamic experiments (e.g., diamond anvil cell, Z experiments, TA–55 gun shots, JASPER gas gun shots) are being conducted to obtain the needed data on plutonium properties at different ages. Mod-

eling and calculations are being performed using our most advanced computational capabilities to assess aging effects on weapon performance. Relevant historical data from underground nuclear tests is also being identified and interpreted to illuminate the effects of aging on weapon performance. At the request of NNSA, a series of JASON reviews are being conducted on the science underpinning the pit lifetime effort as well as an updated estimate. Based on the results from these activities, an updated pit lifetime estimate will be made at the end of fiscal year 2006. We would still expect the updated estimates to be expressed as a range of years but specific to each warhead type. Additional work will be necessary beyond fiscal year 2006 to further establish the scientific basis for pit lifetime prediction. Based on the "Requirements for a Modern Pit Facility" report to Congress in January 2005, the need for a Modern Pit Facility is not likely to be impacted.

8. Senator SESSIONS. Ambassador Brooks, what is the average age of a pit in the current stockpile? If the average age is a classified figure, alternatively, could you provide the range of ages of pits in the stockpile?

Ambassador BROOKS. The pits in the current stockpile range from about 15- to 35-years old with an average age of approximately 20 years old.

9. Senator SESSIONS. Ambassador Brooks, does this country need a pit production capability regardless of whether the U.S. ever produces new nuclear warhead types?

Ambassador BROOKS. Yes. Because pits have "lifetimes" (the current estimate of 45–60 years is under review) based on changes in plutonium over time, the U.S. needs a pit production capability regardless of whether we ever produce a new nuclear warhead type. The Administration's Nuclear Posture Review, approved by the President, requested the Department of Energy to accelerate efforts on a Modern Pit Facility to eliminate a serious deficiency in our Nation's nuclear security.

10. Senator SESSIONS. Ambassador Brooks, how long would it take to bring such a pit production facility online?

Ambassador BROOKS. Given our current funding profile, our current plan is to have operational startup beginning in fiscal year 2019, with full production for an MPF projected for fiscal year 2021. The Critical Decision-0 for the start of conceptual design of a Modern Pit Facility (MPF) was approved in May 2002, with a target of fiscal year 2007 to start preliminary design and a 2013 construction start.

11. Senator SESSIONS. Ambassador Brooks, why do you believe a site for this facility needs to be selected in fiscal year 2006?

Ambassador BROOKS. The Fiscal Year 2005 Consolidated Appropriations Act bars the use of any funds to select a Modern Pit Facility (MPF) construction site in fiscal year 2005 pending the outcome of the ongoing review of the nuclear weapons complex and initial results from accelerated pit aging experiments in fiscal year 2007. Thus, we have deferred site selection. Because pit lifetime will likely remain an issue beyond fiscal year 2007, the NNSA needs to proceed with planning an MPF or equivalent pit production capability. It is essential to make a site selection in fiscal year 2006 to: (1) allow site-specific design to proceed, (2) retain the current design team, and (3) avoid repeating work already completed on the Environmental Impact Statement for an MPF. We look forward to working with Congress towards this goal.

The interim pit manufacturing capability of 10 pits per year being established at Los Alamos National Laboratory in fiscal year 2007 will not be sufficient to maintain the 2012 stockpile as determined in the May 2004 stockpile plan approved by the President and submitted to Congress in June 2004. Further, the NNSA submitted a pit report to Congress in January 2005 that confirmed the need for at least a 125 pit per year capability starting in 2021.

ENHANCED TEST READINESS

12. Senator SESSIONS. Ambassador Brooks, the National Defense Authorization Act for Fiscal Year 2004 requires DOE to achieve and maintain thereafter a test readiness posture of not more than 18 months. In other words, DOE would be able to resume underground nuclear testing within 18 months of a Presidential decision to conduct a test. DOE is to achieve this readiness no later than October 1, 2006. Will DOE achieve the 18-month test readiness by the statutory deadline?

Ambassador BROOKS. We are "on track" to meet the statutory requirement of an 18-month test readiness posture by the end of fiscal year 2006. Successful execution

of our test readiness program to achieve this requires that Congress appropriate the resources requested by NNSA, to carry out this important mission.

13. Senator SESSIONS. Ambassador Brooks, are there any critical path activities—in terms of both facilities and personnel—that might cause DOE not to meet the deadline?

Ambassador BROOKS. The National Nuclear Security Administration has a well-developed program underway to meet the October 1, 2006, deadline to achieve an 18-month test readiness posture as specified in the National Defense Authorization Act for Fiscal Year 2004. This program is described in the February 2005 Nuclear Test Readiness Report to Congress. We are confident that we will meet the deadline, assuming our budget request is approved by Congress.

14. Senator SESSIONS. Ambassador Brooks, has DOE been able to hire and retain personnel for the "key" and "critical" testing program positions at the Nevada Test Site?

Ambassador BROOKS. Yes. The National Nuclear Security Administration's Nevada Site Office has been able to both hire new employees and retain key employees in its critical positions for the testing program at the Nevada Site Office. NNSA has used its excepted service direct appointment authority to fill key positions, and has used other incentives such as recruitment bonuses and retention allowances to retain employees in critical positions.

STOCKPILE STEWARDSHIP PROGRAM

15. Senator SESSIONS. Ambassador Brooks, the Stockpile Stewardship Program is the program through which DOE maintains and certifies the safety, security, and reliability of the nuclear stockpile through the use of science based tools such as computer simulations, materials research, and component testing. How do you judge the success or failure of the Stockpile Stewardship Program?

Ambassador BROOKS. The Stockpile Stewardship Program (SSP) has been a success and is working well to provide the Nation with a safe, secure, and reliable nuclear deterrent. However, maintaining the aging stockpile continues to be a scientific and engineering challenge that requires the application of the National Nuclear Security Administration's best capabilities. While some aspects of the developing stewardship capability have taken longer than envisioned, our knowledge of the aging stockpile continues to improve as the SSP tools come online. The best indicator of SSP's success boils down to the fact that the Secretary of Energy and Secretary of Defense recently provided the President with their ninth annual assessment of the nuclear weapons stockpile. Each of these nine assessments has relied on the tools and capabilities of the SSP. To date, these assessments have not identified a need to augment SSP tools and capabilities with nuclear testing.

16. Senator SESSIONS. Ambassador Brooks, if a President were to face a circumstance where he needed to resume full scale nuclear weapons testing, would you consider science-based Stockpile Stewardship to have "failed"?

Ambassador BROOKS. No. Discovering a problem in the stockpile through SSP would not be a failure, even if we discovered a problem so severe that we would recommend a nuclear test to the President. The SSP would have failed only if we did not detect a major deficiency in a deployed warhead in the U.S. arsenal in time to take appropriate corrective actions. The SSP is not a substitute for nuclear testing, nor would a return to nuclear testing negate the need for the SSP. SSP activities would still be necessary to effectively assess the safety, security, and reliability of the aging U.S. nuclear weapons stockpile. The U.S. has not conducted a nuclear weapons test since 1992 and has no plans to resume nuclear testing.

17. Senator SESSIONS. Ambassador Brooks, does the need for the Reliable Replacement Warhead program mean that science-based Stockpile Stewardship has "failed"?

Ambassador BROOKS. No. The stockpile is aging and eventually warheads will need to be replaced. The goal of the Reliable Replacement Warhead (RRW) program is to demonstrate that we can design, produce and certify replacement components and warheads without nuclear testing. The replacement components and warheads will be designed to enhance the safety and security of the deployed stockpile. The Stockpile Stewardship Program is working well but continues to evolve. The RRW program is expected to be a significant part of our long-term strategy for nuclear

forces, serving as the "enabler" for our planned stockpile and infrastructure transformation.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

THE RELIABILITY OF THE W76

18. Senator BILL NELSON. Ambassador Brooks, an article in the New York Times on April 2, 2005, written by William Broad, questions the reliability of the W76 warhead on the D–5 missile. The article suggests that the W76 would be the first candidate for the reliable replacement warhead program. What is the status of the W76, is it reliable, and is it the first candidate for the reliable warhead replacement program?

Ambassador BROOKS. The NNSA is very confident in the reliability of the Los Alamos National Laboratory (LANL) designed W76 warhead. This warhead was developed and tested between 1973 and 1981. Its history of underground nuclear tests in Nevada is one of the most extensive of the weapon systems now in the U.S. inventory.

The Directors of Sandia National Laboratories, Los Alamos National Laboratory, and Lawrence Livennore National Laboratory provide an annual assessment of all stockpile weapons to the Nation's leadership, with extensive internal and external technical review. Their Annual Assessment of September 2004 and the draft assessment for September 2005 reiterates no change in the laboratories' confidence in the performance of the W76 warhead.

Since the W76 warhead is a central pillar in the Nation's deterrent force, we have initiated a major Life Extension Program (LEP) to address identified aging and surveillance concerns before failure occurs. The purpose of the LEP is to extend the service life from 20 to 60 years. The LEP is manageable, cost effective, maximizes reuse of components, and includes modern surety enhancements while minimizing system certification risk.

Today and into the future the W76 warhead has a significant role in the Nation's nuclear deterrence.

The Department of Defense (DOD) and NNSA recognize that further steps are needed to fully accomplish Presidential direction to achieve "a credible deterrent with the lowest possible number of nuclear weapons consistent with our national security needs." We believe that this Reliable Replacement Warhead (RRW) concept is promising and has the potential to save production, maintenance, and environmental costs, while at the same time increasing DOD and NNSA confidence in weapon reliability over the long-term.

Because of the significant role the W76 warhead has in the Nation's deterrent, the DOD and NNSA believe that the first application to be examined for RRW will be in connection with W76 warheads currently deployed on the Trident sea-launched ballistic missile.

The NNSA's RRW strategy will help lead the transition to an efficient, responsive infrastructure. This approach is also important to sustaining the capabilities of both the NNSA design laboratories and the production plants. Our strategy is a critical positive approach that is necessary to sustain and improve reliability, safety, and security of weapons for the long-term.

FUTURE OF NUCLEAR WEAPONS

19. Senator BILL NELSON. Ambassador Brooks and General Cartwright, the DOE has maintained the nuclear weapons stockpile safely and securely, without testing, for just over 12 years. For the most part this stockpile was designed and built in the 1970s and 1980s, to meet Cold War requirements and priorities. Is it time to reevaluate deterrence including the role nuclear weapons play in deterrence, the desired capabilities that cannot be achieved with conventional weapons, the number and type of nuclear weapons needed, and nuclear weapons employment policy?

Ambassador BROOKS. The December 2001 Nuclear Posture Review and follow-on studies including the recently-completed NPR Strategic Capabilities Assessment and the DOD Stockpile Transformation study have resulted in a number of conceptual breakthroughs in our thinking about nuclear forces and their future role in national defense policy. These breakthroughs have led to the Treaty of Moscow, which will result, by 2012, in substantial reductions in operationally-deployed strategic forces, and to the subsequent decision by the President to reduce, also by 2012, the overall nuclear stockpile consisting of both deployed and non-deployed warheads. Moreover, this work has provided the impetus for examining the potential of the Reliable Re-

placement Warhead (RRW) program to facilitate both stockpile and infrastructure transformation leading to an even smaller, but safer and more reliable stockpile for the long term. Specific questions about the role of nuclear weapons in deterrence, nuclear weapons employment policy, and the degree to which conventional capabilities could (or could not) achieve certain deterrence missions, however, are best directed to the Department of Defense.

General CARTWRIGHT. Yes, the New Triad concept presents an opportunity to reduce our reliance on nuclear weapons through the evaluation of alternative weapons, defensive capabilities and associated risk. The ongoing Quadrennial Defense Review (QDR) will also help to frame the discussion associated with the future role of nuclear weapons in support of our defense policy goals of assurance, dissuasion, deterrence and defeating our adversaries, to include the number and types of weapons required.

20. Senator BILL NELSON. Ambassador Brooks and General Cartwright, I understand the DOD has started to give some thought to these issues, as have you General Cartwright. What studies are underway at DOD, at the STRATCOM and at DOE that would have a bearing on these questions and are there any plans for additional studies?

Ambassador BROOKS. The December 2001 Nuclear Posture Review and follow-on studies including the recently-completed NPR Strategic Capabilities Assessment and the DOD Stockpile Transformation study have resulted in a number of conceptual breakthroughs in our thinking about nuclear forces and their future role in national defense policy. These breakthroughs have led to the Treaty of Moscow, which will result, by 2012, in substantial reductions in operationally-deployed strategic forces, and to the subsequent decision by the President to reduce, also by 2012, the overall nuclear stockpile consisting of both deployed and non-deployed warheads. Moreover, this work has provided the impetus for the joint DOD–NNSA Reliable Replacement Warhead (RRW) feasibility and cost study, scheduled to begin in May 2005, that will examine the potential of RRWs to facilitate both stockpile and infrastructure transformation leading to an even smaller, but safer and more reliable stockpile for the long term. The NNSA Complex Infrastructure Study, initiated at the request of Congress and currently underway, when completed, will offer recommendations for a more efficient, less costly infrastructure for supporting the nuclear stockpile.

General CARTWRIGHT. The New Triad concept presents an opportunity to reduce our reliance on nuclear weapons through the evaluation of alternative weapons, defensive capabilities and associated risk. The 2005 Quadrennial Defense Review (QDR) will help frame the discussion associated with the future role of nuclear weapons in meeting our defense policy goals and any shortfalls or capability gaps that may exist in conventional, advanced conventional and non-kinetic capabilities.

ROBUST NUCLEAR EARTH PENETRATION

21. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, what is the Air Force planning to do with the funding in its fiscal year 2006 and fiscal year 2007 budget request for the Robust Nuclear Earth Penetrator (RNEP)?

Ambassador BROOKS. It is our understanding that the Air Force plans to utilize its requested funds for fiscal year 2006 and 2007 research to work on the navigation, guidance, and control kit (NG&C) and delivery aircraft integration. But we would look to the Air Force to answer this question in better detail.

General CARTWRIGHT and General BURG. USSTRATCOM is not an acquisition decision authority. Respectfully defer to the Acting Secretary of the Air Force.

22. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, could you please provide a breakout and description of the activities planned?

Ambassador BROOKS. We understand the Air Force will provide a breakout and description of their planned Fiscal Year 2006–2007 Robust Nuclear Earth Penetrator study activities.

General CARTWRIGHT and General BURG. USSTRATCOM is not an acquisition decision authority. Respectfully defer to the acting Secretary of the Air Force.

23. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, are these activities coordinated with DOE?

Ambassador BROOKS. An essential part of the Robust Nuclear Earth Penetrator (RNEP) study is close coordination of National Nuclear Security Administration and Air Force activities. The management structure of the RNEP study has been ap-

proved by the Nuclear Weapons Council, to include a Joint RNEP Study Group and an Executive Integrated Product Team.

General CARTWRIGHT and General BURG. Respectfully defer to the Acting Secretary of the Air Force.

24. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, if the RNEP study is only a feasibility study, why are DOD and DOE developing requirements for RNEP now—doesn't it make more sense to develop a requirement after the feasibility of the project is established?

Ambassador BROOKS. For this study, the requirements set many of the key parameters by which the feasibility will be assessed. There may be some confusion on this point. The Joint Phase 6.X process which defines the acquisition process for the National Nuclear Security Administration requires that the draft requirement Military Characteristics and Stockpile-to-Target Sequence—the so-called "requirements"—are developed during Phase 6.2/2A, which is what the RNEP study is. These draft requirements are essential in order to develop design options and interface documents, and to evaluate those design options.

General CARTWRIGHT and General BURG. The RNEP study is investigating a solution to a military requirement for Hard and Deeply Buried Target (HDBT) defeat that was validated by the Joint Requirements Oversight Council (JROC) in January 2001. The RNEP phase 6.2/6.2A study process generated technical requirements that define key performance measures that are used in determining the feasibility of concepts.

25. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, what performance measures must be met to establish feasibility and what is the schedule to meet these performance measures?

Ambassador BROOKS. The downselect process that was established to evaluate the original two systems had established "screening" criteria and "selection" criteria. Each system must first demonstrate the screening criteria and then it would be graded against the selection criteria. A failure to demonstrate the screening criteria eliminates that system from further selection. For the screening criteria, the proposed option must demonstrate the feasibility of the design to penetrate and survive penetration in the threshold geology and meet the other Military Characteristics and Stockpile-to-Target Sequence requirements. In addition, each option must show that certification is feasible. The National Nuclear Security Administration is now considering only the B83 option but the original downselect criteria remain the appropriate performance measures.

General CARTWRIGHT and General BURG. The detailed technical performance measures of the RNEP concept are documented within draft joint technical requirement documents and are classified. However, the Phase 6.2/6.2A study effort focused on determining the technical feasibility of modifying an existing nuclear explosive package from the B61 or B83 family to provide a nuclear earth penetrator capability against strategic deep underground facilities. The principal technical feasibility question centered on whether the DOE can modify existing designs to penetrate a few meters into the threshold surface geology, survive impact, and function as intended. The RNEP candidates must be certified without nuclear testing and must be compatible with the DOD delivery system.

26. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, is the DOE/NNSA going to receive any of the money in the Air Force budget?

Ambassador BROOKS. No. The National Nuclear Security Administration will not receive any funding designated for the Air Force's portion of the Robust Nuclear Earth Penetrator Phase 6.2/2A cost and feasibility study.

General CARTWRIGHT and General BURG. Respectfully defer to the Acting Secretary of the Air Force.

27. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, DOE/NNSA is only looking at the feasibility of using the B83 for the RNEP. Is DOE/NNSA planning an additional feasibility study for the B61 as an RNEP?

Ambassador BROOKS. The present funding request does not have any provision to continue with the B61. If the B83 option does not appear to be feasible, the data will have to be evaluated relevant to the B61 and a decision will be made with the Department of Defense as to whether or not to propose reconstituting the B61 effort.

General CARTWRIGHT and General BURG. Respectfully defer to the National Nuclear Security Administration.

28. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, this year DOE/NNSA did not include any money in its 5-year budget for RNEP other than $14 million for fiscal year 2007. Last year DOE/NNSA did show the cost of the RNEP in the 5-year budget plan. DOE and DOD are developing requirements for RNEP which implies the feasibility study is not an intellectual exercise. Why did DOE/NNSA drop RNEP from its 5-year budget plan?

Ambassador BROOKS. The National Nuclear Security Administration was asked to participate with the Department of Defense to do a study that would allow the President to decide on whether or not to go forward with the Robust Nuclear Earth Penetrator (RNEP) program. In the interest of transparency, in last year's Future Years Nuclear Security Program—our FYNSP—we included the money for the study, as well as the estimated funding that it would take should there be a decision to actually produce it. Because of this inclusion, some inaccurately concluded that the decision to go forward had been made. In this year's budget request and FYNSP, we have included only the funding needed to complete the study in fiscal year 2006 and fiscal year 2007. The President has made no decision to go forward with the RNEP program, and the fiscal year 2006 President's budget requests no funding beyond the completion of a phase 6.2/6.2A study.

General CARTWRIGHT and General BURG. Respectfully defer to the National Nuclear Security Administration.

29. Senator BILL NELSON. Ambassador Brooks, General Cartwright, and General Burg, what is DOE going to do with the $4 million in its fiscal year 2006 budget request?

Ambassador BROOKS. The $4 million requested in fiscal year 2006 will enable NNSA to reconstitute the B83 team and to execute the sled-track test. The recovery, disassembly, reduction of the data and analysis of any of the data will be done with fiscal year 2007 funding.

General CARTWRIGHT and General BURG. Respectfully defer to the National Nuclear Security Administration.

ADVANCED CONCEPTS

30. Senator BILL NELSON. Ambassador Brooks, DOE/NNSA was prohibited from spending the $6 million for advanced concepts appropriated for fiscal year 2004 until it submitted a report describing how the money would be spent. $4 million of the $6 million was further prohibited from being spent until DOE/NNSA submit a revised stockpile plan. DOE/NNSA submitted the spending plan on the first $2 million in March 2004, the revised stockpile plan was submitted last summer, but I don't believe DOE/NNSA has submitted a funding plan for the remaining $4 million. Could you either direct us to that report if it was submitted or if not when will the plan be submitted? Alternatively, will DOE/NNSA reprogram that money for a different purpose?

Ambassador BROOKS. NNSA submitted a report for planned activities for fiscal year 2004 for advanced concepts work to Congress on March 12, 2004. This report was sent to the House and Senate Committees on Armed Services and House and Senate Appropriations Subcommittees on Energy and Water Development. This money is being used to complete advanced concepts work that started in fiscal year 2004; the National Nuclear Security Administration does not intend to reprogram it for other purposes.

RELIABLE REPLACEMENT WARHEAD PROGRAM

31. Senator BILL NELSON. Ambassador Brooks and General Cartwright, what is DOE/NNSA planning to do with the $9 million provided in fiscal year 2005 for the Reliable Replacement Warhead program?

Ambassador BROOKS. During fiscal year 2005 and fiscal year 2006, a National Nuclear Security Administration and multi-laboratory team will work with the Department of Defense to assess potential Reliable Replacement Warhead (RRW) components and systems, define feasibility of key manufacturing processes and design/certification methodology, and develop a program plan to achieve project goals.

General CARTWRIGHT. Respectfully defer to the National Nuclear Security Administration.

32. Senator BILL NELSON. Ambassador Brooks and General Cartwright, the DOE/NNSA budget justification says that the fiscal year 2006 request will be used "to

provide cost and schedule efficient replacement pits that can be certified without underground testing." What does this mean exactly?

Ambassador BROOKS. The objective of the Reliable Replacement Warhead (RRW) program is, among other things, to demonstrate the feasibility of developing reliable replacement components for existing warheads that can be manufactured and certified without nuclear testing. During an initial 1- to 2-year feasibility evaluation, the NNSA will assess whether reliable replacement components such as pits can be manufactured more efficiently and cheaply than current pits. The NNSA will also determine whether warheads that would use certain of these components can be certified without nuclear testing. Such warheads would provide comparable military capabilities to when the weapons were first placed in the stockpile. The pit is an "initial focus" because it is an essential long-lead component.

General CARTWRIGHT. Respectfully defer to the National Nuclear Security Administration.

33. Senator BILL NELSON. Ambassador Brooks and General Cartwright, what relationship does this activity have to the $23 million in the DOE/NNSA budget request for the pit programs to certify and manufacture pits other than the W88 pit?

Ambassador BROOKS. The $23 million referred to in your question is in the category of "Pit Manufacturing Capability." The objective of this $23 million activity is to develop manufacturing processes and equipment for all replacement pits including pits being evaluated in the Reliable Replacement Warhead (RRW) program. The budget required for certification and development of specific manufacturing techniques for an RRW pit will be covered in the RRW program. The manufacturing processes and equipment developed in the "Pit Manufacturing Capability" effort will be applicable for the Modern Pit Facility or for pit production at the Los Alamos National Laboratory.

General CARTWRIGHT. Respectfully defer to the National Nuclear Security Administration.

34. Senator BILL NELSON. Ambassador Brooks and General Cartwright, an article in the New York Times from February 7, 2005 states that funds provided in fiscal year 2005 are being used to design "a new generation of nuclear weapons meant to be sturdier and more reliable and to have longer lives, Federal officials and private experts say." The article goes on to quote John Harvey, an official of the NNSA, that the goal of the program is to make nuclear weapons "inherently more reliable." "The goal is to see if we can make smarter, cheaper and more easily manufactured designs that we can readily certify as safe and reliable for the indefinite future — and do so without nuclear testing." In short, is the goal to replace the current stockpile and if so, does that mean we will dismantle the current stockpile?

Ambassador BROOKS. The goal of the RRW program is to provide reliable replacement warhead components or systems that will ensure the long-term sustainability of the military capabilities provided by warheads in the existing stockpile. Implementing the RRW program will ensure diversity in the nuclear stockpile and reduce the likelihood that a common mode technical failure of one or more warheads could negate a critical component of our Nation's nuclear deterrent. Over the long term, this strategy will enable us to achieve a smaller stockpile, one that is reliable, safer and more secure, one that offers a reduced likelihood that we will ever need to test again, one that reduces NNSA and DOD ownership costs for nuclear forces, and one that enables a much more responsive nuclear infrastructure. Thus, if RRW feasibility is established, it will provide opportunities to retire and dismantle substantial additional warheads from the legacy stockpile—even below the historic stockpile level determined by the President last May. At the same time, we would expect that some legacy warheads, for example, those that will have undergone refurbishment as part of the Life Extension Program, will remain in the stockpile through the end of their service lives.

General CARTWRIGHT. Respectfully defer to the National Nuclear Security Administration.

35. Senator BILL NELSON. Ambassador Brooks and General Cartwright, in the article John Harvey goes on to say "what we are looking at now is a long-term vision. We're trying to flesh this out and understand the path we need to be on, and to work with Congress to get a consensus." How do each of you plan to work with Congress to get a consensus on nuclear policy?

Ambassador BROOKS. We plan, as we did in today's testimony, to inform Congress at all levels and on a regular basis about the promise and progress of the RRW program in facilitating transformation toward a smaller, safer and more reliable stockpile over the long term, and to a more responsive nuclear weapons infrastructure.

We will work with Congress to demonstrate that this approach offers a cost effective and affordable path to sustain needed nuclear weapons capabilities for the long-term future. Finally, in concert with the DOD through the Nuclear Weapons Council, we will seek advice and concurrence from Congress as we implement this vision.

General CARTWRIGHT. USSTRATCOM pledges to work openly with Congress to improve the safety, security, reliability, and surety of the Nation's nuclear weapons.

36. Senator BILL NELSON. Ambassador Brooks and General Cartwright, will work on the Reliable Replacement Warhead be managed in the same way that the DOE manages life extension programs and RNEP through the 6 "X" process or in the way new nuclear warheads were managed historically through the phased weapons acquisition, phase 1, 2, 3, etc.?

Ambassador BROOKS. A joint Department of Defense/Department of Energy Project Officers Group is being established to oversee a Reliable Replacement Warhead (RRW) cost and feasibility study. Because the focus of the RRW program is to extend the life of military capabilities provided by the existing stockpile, we consider the effort to be most closely aligned with the Phase 6.X process.

General CARTWRIGHT. Respectfully defer to the National Nuclear Security Administration.

NUCLEAR TEST READINESS

37. Senator BILL NELSON. Ambassador Brooks, what is the DOE/NNSA budget request for test readiness in fiscal year 2006?

Ambassador BROOKS. The National Nuclear Security Administration's budget request for Test Readiness in fiscal year 2006 is $25 million. Test Readiness maintains underground nuclear test unique capabilities that are not supported in stockpile stewardship experimental programs. Funds are requested to continue improving the state of readiness to reach an 18-month test readiness posture by October 1, 2006.

38. Senator BILL NELSON. Ambassador Brooks, what is the DOE/NNSA test readiness level planned to be at the end of 2006?

Ambassador BROOKS. With the requested budget, the National Nuclear Security Administration's underground nuclear test readiness posture is planned to be 18 months at the end of fiscal year 2006, in compliance with the National Defense Authorization Act for Fiscal Year 2004.

39. Senator BILL NELSON. Ambassador Brooks, what is the DOE/NNSA test readiness level now, and what is it planned to be at the end of 2005?

Ambassador BROOKS. The National Nuclear Security Administration's nuclear test readiness posture is approximately 30 months right now, with the goal of reducing this to 24 months by the end of fiscal year 2005.

40. Senator BILL NELSON. Ambassador Brooks, will the Reliable Replacement Warhead program require a resumption of nuclear weapons testing?

Ambassador BROOKS. No. The intent of the Reliable Replacement Warhead program is to identify replacement options that could be fielded without nuclear testing.

41. Senator BILL NELSON. Ambassador Brooks, will any other nuclear program under consideration require a return to testing?

Ambassador BROOKS. It has been U.S. policy since 1992 to observe a nuclear test moratorium. There are no nuclear programs under consideration that would require a return to nuclear testing. The potential technical need for testing of the existing stockpile is addressed annually by the national laboratory directors' assessment of existing warheads.

MODERN PIT FACILITY

42. Senator BILL NELSON. Ambassador Brooks, is the Environmental Impact Statement (EIS) for the MPF completed?

Ambassador BROOKS. A Draft Programmatic Environmental Impact Statement (EIS) has been completed in compliance with the National Environmental Policy Act. Five locations are being considered as host location for potential new construction of a Modern Pit Facility (MPF) (Los Alamos Site, New Mexico; Savannah River Site, South Carolina; Carlsbad Site, New Mexico; Pantex Site, Texas; and the Ne-

vada Test Site). An upgrade to an existing facility at Los Alamos National Laboratory is also considered in the EIS. The Consolidated Appropriations Act for Fiscal Year 2005 bars the use of any funds to select an MPF construction site in fiscal year 2005 pending the outcome of the ongoing review of the nuclear weapons complex and accelerated pit aging experiments. Thus, we have deferred site selection. It is essential to make that selection in fiscal year 2006 to allow site specific design to proceed and to avoid repeating work already completed on the EIS for an MPF. We look forward to working with Congress towards this goal.

43. Senator BILL NELSON. Ambassador Brooks, General Cartwright, General Burg, and Admiral Young, when will there be an established requirement for pits by type by year, including a requirement for new types of pits, if any, and what is the process to develop requirements?

Ambassador BROOKS. In response to a request in Public Law 108–375, "Ronald Reagan National Defense Authorization Act for Fiscal Year 2005," a report was submitted to Congress in January 2005 that addresses validated pit production requirements for an MPF. These requirements include the total number of pits to be produced per year, and the number of pits to be produced per year for each weapon type for the nuclear weapons stockpile specified in the revised nuclear weapons stockpile plan submitted to the congressional defense committees in June 2004. The report consists of an unclassified summary and a classified annex and concludes that a 125 pit per year MPF with full production starting in 2021 is the minimum capacity to support the President's reduced 2012 stockpile assuming a 60-year pit lifetime which is the upper end of the current 45- to 60-year estimate by National Nuclear Security Administration physics laboratories. There are no current requirements for new pit types.

General CARTWRIGHT, General BURG, and Admiral YOUNG. Respectfully defer to the National Nuclear Security Administration.

44. Senator BILL NELSON. Ambassador Brooks and General Cartwright, does DOE/NNSA have a deadline for making a site selection for a MPF and if so, what is the deadline and on what basis was it established?

Ambassador BROOKS. The National Nuclear Security Administration does not have a "deadline" for making a site selection for the MPF, but we desire to make this decision as soon as possible due to the complexity of the project. The Consolidated Appropriations Act for Fiscal Year 2005 bars the use of any funds to select an MPF construction site in fiscal year 2005 pending the outcome of the ongoing review of the nuclear weapons complex and accelerated pit aging experiments. Thus, we have deferred site selection. Planning for a MPF is based on the smallest possible pit manufacturing plant capable of supporting a reduced 2012 stockpile consistent with the President's May 2004 stockpile plan, as reported to Congress in June 2004, and a 60-year pit lifetime assumption. Based on these planning assumptions, an MPF capacity of at least 125 pits per year (single shift operations) with modular expansion capability, a construction start in 2012, and full production in fiscal year 2021 is required to maintain the stockpile. A site decision is required in fiscal year 2006 to support a construction start in fiscal year 2013.

General CARTWRIGHT. Respectfully defer to the National Nuclear Security Administration.

45. Senator BILL NELSON. Ambassador Brooks, the 5-year budget for the MPF apparently does not include the cost for such a facility. What is the plan for the funding by year in the budget for the MPF?

Ambassador BROOKS. Funding through fiscal year 2010 for a Modern Pit Facility is covered in the Department of Energy (National Nuclear Security Administration) Fiscal Year 2006 Budget Request to Congress on page 171.

NATIONAL IGNITION FACILITY

46. Senator BILL NELSON. Ambassador Brooks, will you commit to provide adequate funding to the National Ignition Facility (NIF) to support both ignition by 2010 and a robust series of high density physics experiments?

Ambassador BROOKS. We will commit to provide adequate funding to support the execution of the first ignition experiment in 2010 and a set of high-energy density experiments consistent with the highest priority needs of stockpile stewardship and the constrained budget. The NIF Activation and Early Use Plan defines the experimental program, including non-ignition experiments, to be executed on NIF through the execution of the first ignition experiment. Due to reductions in the fiscal year

2005 appropriations for the NIF Demonstration Program and changes in the fiscal year 2006–2010 funding profile from that previously planned, the NIF Activation and Early Use Plan is being modified. One of the consequences is that non-ignition work is being reduced. The NNSA will provide a revised NIF Activation and Early Use Plan to Congress by June 30, 2005, which will describe the implications of these budget changes. NNSA intends to focus the program on ignition while maintaining capability at the OMEGA and Z facilities to address near term issues.

47. Senator BILL NELSON. Ambassador Brooks, how much money would be needed in the NIF budget in fiscal year 2006 to fund both stockpile experiments and to keep ignition on track?

Ambassador BROOKS. The fiscal year 2006–2010 ICF budget is more constrained than previously planned; accordingly, some changes will be made in the Inertial Confinement Fusion Ignition and High Yield (ICF) Campaign, including the NIF Project. Current technical progress on some high energy density issues reduces priority for further study of those issues. A review of these technical issues together with reductions in the fiscal year 2005 appropriations for the NIF Demonstration Program and changes in the fiscal year 2006–2010 funding profile is leading to modification of the NIF Activation and Early Use Plan. The NNSA will provide the final revised Plan to Congress by June 30, 2005.

NNSA will support a constrained program in stockpile experiments in fiscal year 2006 consistent with the available budget, and will delay some high energy density stockpile experiments to later years. This program, while not robust, will meet minimum requirements and will enable a sensible transition into the fiscal year 2007–2011 period, where NNSA is examining the outyear changes necessary to bring the program back to the required level of support.

The additional funds required to support the original robust program of stockpile experiments can be most easily seen by comparing the "Support of Other Stockpile Programs" funding line within the ICF Campaign in the fiscal year 2005 and fiscal year 2006 NNSA congressional budget submissions. This comparison is shown in the table below:

[In thousands of dollars]

	Fiscal Year				
	2006	2007	2008	2009	2010
Fiscal Year 2005 Request—Support of Other Stockpile Programs	42,997	45,636	49,089	50,208	n/a
Fiscal Year 2006 Request—Support of Other Stockpile Programs	9,872	0	20,394	31,129	27,605
Difference	33,125	45,636	28,695	19,079	19,505

NAVY T–LAM–N, THE NUCLEAR TOMAHAWK

48. Senator BILL NELSON. Admiral Young, I understand that the Navy wanted to retire the nuclear Tomahawk. Is this still the Navy's position and if not, when and why did it change and how long does the Navy plan to keep this system?

Admiral YOUNG. Respectfully defer to the Secretary of the Navy.

49. Senator BILL NELSON. General Cartwright, what are the targets or types of targets that you want to hold at risk with the nuclear Tomahawk that cannot be held at risk with any other nuclear or conventional weapon?

General CARTWRIGHT. Currently, there are no targets that USSTRATCOM needs to hold at risk with the nuclear Tomahawk that cannot be held at risk with other nuclear and conventional weapons.

TACTICAL NUCLEAR WEAPONS IN EUROPE

50. Senator BILL NELSON. General Burg, is there any plan to review keeping nuclear weapons in Europe?

General BURG. The ongoing Quadrennial Defense Review is holistically looking at the requirements for strategic deterrence.

51. Senator BILL NELSON. General Cartwright, while I understand that tactical nuclear weapons in Europe do not fall within the purview of the Strategic Command, have you looked into the question of why nuclear weapons are kept in Europe

and NATO continues to exercise with these tactical nuclear weapons? Should these weapons fall under the purview of Strategic Command?

General CARTWRIGHT. Our nuclear forces support the defense policy objectives of assuring allies, dissuading competitors, deterring adversaries, and defending the United States should deterrence fail. The presence of U.S. nuclear forces based in Europe and committed to NATO provides a political and military link between the European and North American members of the Alliance. USSTRATCOM continues to work with U.S. European Command and Supreme Headquarters Allied Powers Europe to maintain our longstanding relationship. Current command relationships regarding nuclear weapons in Europe are adequate.

NUCLEAR CAPABLE F–22

52. Senator BILL NELSON. General Burg, is the Air Force planning to have any nuclear capable F–22 aircraft? If yes, what nuclear weapon will the F–22 carry?

General BURG. No.

NUCLEAR TARGETING

53. Senator BILL NELSON. General Cartwright, what will drive the number and type of reliable replacement warheads that will be needed in the future? For instance, will the number and type be determined by specific targets, by specific target types, or will it be driven by a desire to have specific capabilities?

General CARTWRIGHT. The National Defense Strategy drives all force structure including nuclear force elements. In that context, our nuclear force construct must be sized to support the policy objectives of assuring allies, dissuading competitors, deterring adversaries, and, if necessary, to defend the United States with sufficient force to defeat any aggressor. Furthermore, our forces must be flexible to provide the capability to deal with immediate, potential, and unexpected contingencies.

54. Senator BILL NELSON. General Cartwright, President Clinton and Russian President Yeltsin agreed that neither would keep nuclear missiles targeted at the other's country. Is this agreement still honored?

General CARTWRIGHT. Yes.

55. Senator BILL NELSON. General Cartwright, are U.S. ICBMs or SLBMs targeted today on Russia or any other country?

General CARTWRIGHT. There are no U.S. ICBMs or SLBMs targeted today on Russia or any other country.

LONG RANGE GLOBAL STRIKE

56. Senator BILL NELSON. General Cartwright, Admiral Young, and General Burg, in thinking about long range global strike and the future of Trident submarines and SLBMs, ICBMs, and the B–2, B–52, and B–1 bombers, what is the timetable to identify replacements for these missiles programs and platforms? How do conventional strike capabilities figure into the thinking?

General CARTWRIGHT and General BURG. The Air Force is conducting the Land Based Strategic Deterrent Analysis of Alternatives to explore the possibilities for replacing the Minuteman III in the 2020 timeframe. The oldest Trident submarines will reach end of hull life in approximately 2030, driving the identification of a Trident replacement nominally around 2015. The Air Force's Next Generation Bomber Program is ongoing and is intended to identify capabilities to replace the B–52 and B–2 that will reach their end of service lives around 2040.

In reference to conventional strike capabilities, the New Triad concept presents an opportunity to reduce our reliance on nuclear weapons through the evaluation of alternative weapons, defensive capabilities, and associated risk.

57. Senator BILL NELSON. General Cartwright, Admiral Young, and General Burg, are there currently any plans or serious discussions about using an ICBM or SLBM to deliver a conventional warhead? If so, what are the policy implications of this approach; that is, how can others be assured that a nuclear weapon is not on the missile?

General CARTWRIGHT, General BURG, and Admiral YOUNG. We are currently assessing the technical feasibility and potential policy implications regarding conventional warhead applications on an ICBM or SLBM.

58. Senator BILL NELSON. General Cartwright, Admiral Young, and General Burg, what would the cost be of developing, testing, and fielding such a conventional system?

General CARTWRIGHT, General BURG, and Admiral YOUNG. USSTRATCOM is not an acquisition decision authority. Respectfully defer to the Navy and Air Force Services.

59. Senator BILL NELSON. General Cartwright, Admiral Young, and General Burg, do we have the intelligence capabilities to support this type of conventional weapon?

General CARTWRIGHT, General BURG, and Admiral YOUNG. ICBM or SLBM-delivered munitions require the same U.S. intelligence capabilities as any other conventional-delivered munitions. For many potential targets, particularly fixed facilities, we have sufficient intelligence to give us a high level of confidence about the target's function and status. For other potential targets, particularly those that are mobile or relocatable, we lack the type of persistent surveillance that allows us to find and track a target and then hold it at risk.

60. Senator BILL NELSON. General Cartwright, Admiral Young, and General Burg, is there any consideration being given to have MMIIIs carry only conventional warheads?

General CARTWRIGHT, General BURG, and Admiral YOUNG. We are currently assessing the technical feasibility and potential policy implications regarding conventional warhead applications on an ICBM or SLBM.

61. Senator BILL NELSON. General Cartwright, Admiral Young, and General Burg, is there any discussion of withdrawing from the intermediate range ballistic missile treaty to have either conventional or nuclear warheads on intermediate range missiles?

General CARTWRIGHT, General BURG, and Admiral YOUNG. Not to my knowledge.

PLANS TO DISMANTLE NUCLEAR WARHEADS

62. Senator BILL NELSON. Ambassador Brooks, the 2004 stockpile plan identified approximately 3,000 to 4,000 warheads (the actual number is classified and so this number is not correct) that could be retired. Are there specific plans to dismantle these warheads over a specific time period? If so, what are these plans and is there money in the fiscal year 2006 budget request for DOE to implement these plans?

Ambassador BROOKS. The NNSA has developed specific plans to dismantle all retired warheads, including those reflected in the classified June 2004 Report to Congress, "A Revised Nuclear Weapons Stockpile Plan for 2012." The NNSA also provided a classified report to Congress in February 2005 specifically regarding dismantlement, with specific plans through fiscal year 2010. The funding requested for fiscal year 2006 is sufficient for fiscal year 2006 activities.

63. Senator BILL NELSON. Ambassador Brooks, if such plans do not exist, what is the significance of a warhead being designated for retirement?

Ambassador BROOKS. The NNSA has developed specific plans to dismantle all retired warheads, including those reflected in the June 2004 Report to Congress, "A Revised Nuclear Weapons Stockpile Plan for 2012." Once a warhead is designated as "retired", it is no longer part of the nuclear weapons stockpile and the NNSA works with the Department of Defense to store, transport, and dismantle the warhead, and then ultimately disposition the resultant components.

64. Senator BILL NELSON. Ambassador Brooks, how many total nuclear warheads and bombs are there in the stockpile today? How many were there 4 years ago?

Ambassador BROOKS. [Deleted.]

NUCLEAR WEAPONS SECURITY

65. Senator BILL NELSON. Ambassador Brooks, General Cartwright, Admiral Young, and General Burg, several years ago the Nuclear Weapons Council, the Strategic Command, and the Department of Energy undertook what became known as the End-to-End Review. While Congress has never been fully briefed on this study, I understand that there were several serious issues identified in the study having to deal with nuclear weapons security. Can you describe what were the concerns generally, what actions have been taken to remedy the concerns, and are there any outstanding issues that have not been addressed?

Ambassador BROOKS. The End-to-End Review of the Nuclear Command and Control System was completed in 2002 under the chairmanship of Brent Scowcroft. The Department of Defense and the Department of Energy's National Nuclear Security Administration are working together on a plan for implementation of the End-to-End Review. A request for a briefing on the conclusions of the Review should be addressed to the Department of Defense.

General CARTWRIGHT, General BURG, and Admiral YOUNG. The Office of Under Secretary of Defense (Acquisition, Technology, and Logistics) is the releasing authority for the report and its implementer.

NUCLEAR POLICY STUDIES

66. Senator BILL NELSON. General Cartwright, I understand that just before Admiral Ellis retired, your predecessor at the Strategic Command, he initiated a nuclear force study. Is this study completed, what did it cover, and what are the recommendations?

General CARTWRIGHT. Admiral Ellis and his staff were involved in an analysis that followed the 2001 Nuclear Posture Review (NPR) and to assist in the development of the March 2003 NPR Implementing Instructions. It was not a formal study.

67. Senator BILL NELSON. General Cartwright, does this nuclear force study exist in a written form and if so, could we get a copy of it?

General CARTWRIGHT. No. There was no formal study.

68. Senator BILL NELSON. General Cartwright, what other nuclear policies reviews are currently underway?

General CARTWRIGHT. Nuclear policy may be examined in the context of the Quadrennial Defense Review for 2005.

ANNUAL STOCKPILE CERTIFICATION

69. Senator BILL NELSON. Ambassador Brooks, General Cartwright, Admiral Young, and General Burg, each year the Secretaries of the DOE and DOD, in consultation with the directors of the National laboratories, must certify that the nuclear weapons stockpile remains safe, secure, and reliable. If the Secretaries are not able to make this certification they must recommend what actions need to be taken to resolve the issue identified. The annual certification process for 2005 is ongoing. Have any issues been identified so far in the 2005 review that concern any of you and if so, what are those issues? Will any of those issues require a resumption of nuclear weapons testing?

Ambassador BROOKS. Your questions concerning existing issues with the stockpile and the need for the resumption of nuclear weapons testing are best answered by the results of the Fiscal Year 2004 Annual Stockpile Assessment process that you should have now received. The results in fiscal year 2004 did note a number of manageable issues with the warheads that we continue to follow or work to better understand as part of the fiscal year 2005 assessment process; none of these issues appear to lead to a recommendation to resume nuclear testing.

General CARTWRIGHT, General BURG, and Admiral YOUNG. None of the issues currently identified will require a resumption of nuclear weapons testing.

[Whereupon, at 3:22 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2006

THURSDAY, APRIL 7, 2005

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

BALLISTIC MISSILE DEFENSE PROGRAMS

The subcommittee met, pursuant to notice, at 2:31 p.m., in room SR–222, Russell Senate Office Building, Senator Jeff Sessions (chairman of the subcommittee) presiding.

Committee members present: Senators Inhofe, Sessions, Cornyn, Levin, Reed, Bill Nelson, and E. Benjamin Nelson.

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

Majority staff members present: William C. Greenwalt, professional staff member; Robert M. Soofer, professional staff member; and Kristine L. Svinicki, professional staff member.

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

Staff assistants present: Andrew W. Florell, Benjamin L. Rubin, and Catherine E. Sendak.

Committee members' assistants present: Cord Sterling, assistant to Senator Warner; John A. Bonsell, assistant to Senator Inhofe; Arch Galloway II, assistant to Senator Sessions; Russell J. Thomasson, assistant to Senator Cornyn; Elizabeth King, assistant to Senator Reed; William K. Sutey, assistant to Senator Bill Nelson; Eric Pierce, assistant to Senator Ben Nelson; and Andrew Shapiro; assistant to Senator Clinton.

OPENING STATEMENT OF SENATOR JEFF SESSIONS, CHAIRMAN

Senator SESSIONS. Gentlemen, you may take your seats and the hearing will come to order.

We meet today to receive testimony on Ballistic Missile Defense Programs and the policies of the Department of Defense (DOD).

I want to welcome Senator Jim Inhofe, one of our senior and most active members of the Armed Services Committee and a member of this subcommittee, to be with us. Senator Bill Nelson, our ranking member, is caught in a meeting but should be joining us shortly.

Though this hearing is being held at the subcommittee level, all members of the full Armed Services Committee have been invited to participate.

I appreciate and am pleased to welcome today's witnesses: the Honorable Michael Wynne, Under Secretary of Defense for Acquisition, Technology and Logistics; and General James E. Cartwright, Commander of the United States Strategic Command (STRATCOM). It is good to meet with you again, General Cartwright. You have testified now in the last 2 weeks three different times before me, and I am impressed and appreciate your time. But these are important issues. I hope that it has not been too disruptive of your schedule, but we need a record on which to build an authorization bill that will be helpful to the country.

Senator Reed, it is great to have you with us.

Senator REED. Thank you, Mr. Chairman.

Senator SESSIONS. David Duma, the acting Director of the Operational Test and Evaluation (DOT&E); and Lieutenant General Henry Obering, Director of the Missile Defense Agency (MDA).

Gentlemen, we thank you for your service in this highly important area that is critical to our Nation's defense and a highly technical area. We thank you for the time from your schedule.

We have a lot of ground to cover today, so I will be brief with my opening remarks.

During this hearing, I would like to cover at least two key issues. First, how has MDA restructured their missile defense program as a result of the administration's $5 billion reduction to the missile defense program over the fiscal year 2006 through 2011, a billion dollar reduction in this year's funding? In particular, what is the rationale for MDA's proposed balance between the near-term fielding and longer-term deployment of systems, and what is the cost impact of cutting back or slowing programs as a result of these budget cuts? In other words, sometimes by slowing down too much or reducing programs too much, they end up costing more than we need to have occur. Sometimes it is better to continue the program and find the money in some other fashion.

Second, what is the status of our initial defensive capabilities and testing program? That has been a matter of concern and we will discuss that today.

With respect to this testing issue, I had the opportunity over the recess to visit with Senator Allard and Senator Cornyn—Senator Allard was the former chairman of this subcommittee, and Senator Cornyn is a member of the Armed Service Committee—to meet some of the men and women that are at our missile defense test sites and operational facilities in California and the Pacific. I was very impressed with them. I was very impressed with the breadth of infrastructure we have from the Marshall Islands, to Hawaii, to Vandenberg, to Alaska, which we did not visit. But it is quite an impressive array of radar, launch sites, and testing facilities.

I viewed the ground-based interceptor (GBI) at Kwajelein. It was being prepared for its next test launch and I had the opportunity to inspect the GBI sites at Vandenberg Air Force Base that will be used for testing and, should the need arise, to defend this country against incoming ballistic missiles.

We spent considerable time with MDA's Deputy Director for Test and Assessment, discussing what went wrong with the recent test, the ground-based midcourse defense system (GMD), and I feel confident that the last two aborted test launches do not represent setbacks for this important program. They represent setbacks in the sense that they were unsuccessful, but they do not reflect, from what I have learned to date, a serious defect in any of the systems. We are going to pursue that today and we want to hear your responses to the concerns that have been raised from those two failures.

As far as I can tell, we may have a problem with quality control, but the inherent workability of the hit-to-kill technology continues to be proven as we were able, for example, to be on the destroyer Russell, the Aegis destroyer, and see a demonstration of how that and the Aegis cruiser had successfully proven once again the SM–3 technology, hit-to-kill technology, that the Navy is utilizing.

General Obering, you are to be commended for taking the initiative in commissioning an independent review team to examine these recent test failures and recommend improvements to the development program.

Our capability to defend the country against long-range ballistic missiles has come a long way since the 1970s when we tested national defense interceptors armed with nuclear warheads. In fact, last Sunday I had the honor to attend the memorial service in Tuscumbia, Alabama for Senator Howard Heflin. When he left the Senate, he said one of the things he was most proud of was having played a key role in the early discussions over national missile defense. I know he felt good this past year to realize that that vision he had—and he played a key role in keeping it alive—had resulted in the deployment of eight missiles capable of defending the United States. So we have come a long way.

We should not forget that between 2000 and 2002, the MDA conducted four out of five successful intercept tests using prototypes of the GBIs we now have in place, and in 2003 and 2004, MDA conducted three successful flight tests of the operational long-range booster now in place in Alaska and California.

Despite what I believe to be a basically sound approach toward developing and fielding this important defensive capability, I do share the concern of many of my colleagues that additional operationally realistic testing of the GMB system is necessary. To address this concern, Congress last year directed the Secretary of Defense (SECDEF), in consultation with the DOT&E, Mr. Duma, to develop criteria for operationally realistic testing and conduct a test consistent with that criteria by the end of this fiscal year. My understanding is that the DOD has successfully addressed this requirement, and MDA now has in place a plan for increasingly realistic testing of the GMD systems over the next few years.

Finally, while much attention is focused on GMD, I would also like to note that other ground- and sea-based missile defense programs, such as the Patriot and the Navy's Aegis SM–3, continue to enjoy successful testing and now stand ready to defend our deployed forces and allies against shorter-range ballistic missiles.

Likewise, development continues on the advanced systems such as the airborne laser (ABL) and the kinetic energy interceptor (KEI), both of which are candidates for a boost-phase defense.

We will want to look carefully at these two programs, as they represent a considerable investment well into the next decade.

I would also like to understand why another boost-phase option, the spaced-based interceptor, has fallen out of the mix.

I have already gone on too long, but if any of the other Senators here would like to make any opening comments, we would be glad to hear them before we proceed with questions.

STATEMENT OF SENATOR JAMES M. INHOFE

Senator INHOFE. Mr. Chairman, I would like to do that. I think when you said how this is of the utmost importance, this is the most important thing that we can be dealing with right now. I will not be able to stay very long, but I thought I would express the concerns I had that perhaps Secretary Wynne and the rest of you could address in your opening comments.

As Mr. Reed just got back—I did too—from Iraq, I think that all the hysteria and the war effort has kind of deflected attention from a national missile defense system. People are not talking about that or as aware of that as they were before. When you see the successes—I had occasion to be there right after the election to see the E–4 attitude of the people over there who said such things as I could not see the ballot through my tears. It is the first time that in 7,000 years they have had an opportunity for self-determination.

Then this last week, I had an opportunity to be in the Sunni Triangle, going around Fallujah and Tikrit and other places, and just seeing people like a former brigade commander of Saddam Hussein, a guy named Mahti, is now doing the same thing in Fallujah for us. He is one who hated Americans but loves Americans now. It was great to watch the successes.

But in spite of those successes, the imminent threat that I have always felt was there is one that I thought was very visionary by Ronald Reagan. Mr. Chairman, it was just 2 weeks ago that we celebrated the 22nd anniversary of Strategic Defense Initiative (SDI). The fact that he saw this coming, saying it would take a long period of time for it to get here, several decades, and of course, it has.

I was disturbed and expressed my concern back in 1996 when President Clinton at that time vetoed the 1996 defense authorization bill. In his veto message, he said, the bill requires deployment by 2003 of a costly missile defense system able to defend all 50 States from a long-range missile threat that our intelligence community does not think exists. We found out afterwards that the intelligence community was wrong.

I can recall getting a letter—and I think, Mr. Chairman, you were there at the time—on August 24, 1998, saying it would be about 5 years before North Korea would have the capability of reaching the United States with a multi-stage rocket. Seven days later on August 31, they fired one.

Then people are saying, well, that is a country that is run by a person that you cannot predict. It is not like the Soviet Union was at one time, and then also with others they are trading technology

and systems with, such as Iran, people say, well, it will be 10 years before Iran has the delivery capability. Well, that is if it is indigenous. They could have it tomorrow.

So these are things that concern me, and what I would like to have you address in your opening statements is how you perceive the gravity of the problem. Maybe I am overlooking something. It is not as bad as I think.

Second, with the reduction—the chairman said $5 billion over 5 years. Is that not right? Well, $1 billion this coming year in the current budget. If that slows you down—I would like to have you be very honest with us as the committee as to what you think is adequate. We want to make sure that you have the resources to get us where we want to go as soon as possible. So if you could address those things in your opening statements, it would be very helpful.

Thank you, Mr. Chairman.

Senator SESSIONS. Thank you, Senator Inhofe.

Senator Reed, Senator Nelson, do you have any comments before the witnesses?

Senator BEN NELSON. I am anxious to hear the witnesses. Thank you.

Senator SESSIONS. Gentlemen, we would be glad to hear from you. Mr. Wynne, are you going to lead off?

STATEMENT OF HON. MICHAEL W. WYNNE, ACTING UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY, AND LOGISTICS

Mr. WYNNE. Yes, sir. Thank you, Mr. Chairman. Thank you, Senator Inhofe. Thank you, Senator Reed and Senator Nelson, for being here and other members of the committee. Thanks for the opportunity to testify today on the fiscal year 2006 DOD missile defense program and the budget submission.

As Senator Inhofe indicated, the addition of the global war on terror did not diminish the span of missions given to the DOD to provide for the common defense. In fact, it highlighted and expanded the total mission of the Department.

One of the reasons potential adversaries have sought ballistic missiles is that the United States has historically had no defense against long-range missile attack. President Bush made it a top priority of his administration to end this vulnerability.

Congress had actually preceded this with its own priority challenge when in the National Missile Defense Act of 1999 it established the U.S. policy to deploy an effective national missile defense system capable of defending us against limited ballistic missile attack.

Last year I testified to the full Senate Armed Services Committee that we had encountered and solved a number of technical difficulties and can expect further challenges. This year my expression is not much different. I am pleased to report that we are no longer defenseless against long-range ballistic missile attack. As we place additional components of our initial configuration into service, the effectiveness of our missile defense capability will incrementally improve through 2006 and beyond.

As I have testified in the past, the Ballistic Missile Defense (BMD) Program differs from the classical major defense acquisition

program. I am confident that our unique acquisition and the management structure the Department has put into place for the BMD Program reduces decision times and promotes the capability based incremental development of our highly integrated and layered ballistic missile defense systems.

I believe our innovative approach has proven successful, and the Government Accountability Office (GAO) generally agrees. The GAO has completed six MDA specific reviews in the past year, with more to come, and we have learned from them and implemented a number of their recommendations.

We have made substantial progress in the missile defense program. We have placed ground-based interceptors in Alaska and in California. We have updated radars and we have modified Aegis ships for long-range surveillance and tracking support. Logistic support is in place. We have connected the elements to the fire control system, and we have a command and control battle management and communications capability in place. We are also conducting increasingly realistic exercises and tests.

Our test program is designed to build confidence in our missile defense capability. While I am now disappointed in the results of the GMD's recent test, I am overall pleased with the program's progress and with the director's response to these conditions. The essential challenge to the program now is to emphasize discipline and quality assurance, and one additional goal I have set out is to improve the turnaround time between these test events.

The President's budget for fiscal year 2006 reflects our priorities, as well as an implementation plan developed by the Secretary and all of his advisors. It responds to the need to prepare for an uncertain future that will require more agile, a more lethal, and a more responsive force in a most cost effective manner.

The Department did reduce missile defense funding in fiscal year 2006 by $1 billion approximately to about $7.8 billion. We have not changed our mission in any way but have adapted to this fiscal discipline and remain committed to fielding effective missile defenses.

In implementing the reduction, the director of the MDA was left to plan how best to structure the program, balancing development, testing, and fielding while mitigating risk. I believe that the President's budget will allow the Department to pursue a missile defense system that meets the needs of the warfighter. I urge the committee to support this President's budget for the important program.

We are grateful for the support of Congress, which has made this bold effort to field missile defense capabilities possible and set it in motion.

Thank you for this opportunity to testify before the committee. I would be happy to answer any questions you might have.

[The prepared statement of Mr. Wynne follows:]

PREPARED STATEMENT BY HON. MICHAEL W. WYNNE

Good afternoon, Mr. Chairman, Mr. Ranking Member, and members of the committee. Thank you for the opportunity to appear before you today to discuss the fiscal year 2006 Department of Defense (DOD) Missile Defense Program and budget submission. I am pleased to provide you this update on the progress of the Missile Defense development program.

The United States and our allies face serious and unpredictable threats to our homelands, populations, and interests. One of these threats is the proliferation of weapons of mass destruction and the means to deliver them, including ballistic missiles. These weapons have proliferated on a global basis and are possessed today by some two dozen States, including some of the world's least responsible regimes.

One of the reasons potential adversaries have sought ballistic missiles is that the United States has historically had no defense against long-range missile attack. President Bush has made it a top priority of his administration to end this vulnerability and to begin fielding missile defenses to protect the U.S., its deployed forces, and its friends and allies. The DOD has made great progress in ending the Nation's vulnerability to missile attack, and I am pleased to appear before you today to discuss this progress.

The National Missile Defense Act of 1999 established that it is the policy of the United States to deploy as soon as technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack. Upon taking office, President Bush directed that the DOD examine the full range of available technologies and basing modes for missile defense that could protect the United States, our deployed forces, and our friends and allies. In light of the changed security environment following September 11 and the progress made in development efforts, the President directed the Department to begin fielding missile defense capabilities in 2004. We have indeed fielded an inherent capability that can be used for limited defense of the United States against long-range threats from North Korea. In 2005, we are enhancing that capability. Last year, I testified to the full Senate Armed Services Committee that we had encountered and solved a number of technical difficulties and can expect further challenges on the path ahead. This year, I must tell you that my statement from a year ago remains true, as our test program has had both successes and disappointments. But I am pleased to report that we have made a dramatic improvement over our previous condition of being defenseless against long-range ballistic missile attack. As we place additional components of our initial configuration in service in 2005, the effectiveness of the missile defense capability will incrementally improve. Further improvements planned for 2006 and beyond will continue to enhance both the capability of fielded missile defense components and the depth of those capabilities.

The Secretary's direction to consolidate ballistic missile defense development activity within a single program and to streamline our oversight process has enabled the Director of the Missile Defense Agency (MDA) to make the program decisions that make the fielding of an initial ballistic missile defense capability possible more quickly than would be the case for a "standard" acquisition program. As I have testified in the past, the Ballistic Missile Defense (BMD) Program differs from the classical major defense acquisition program, so our approach to acquisition differs. Rather than produce and deploy a fixed "objective" missile defense configuration to serve its entire operational life, we plan an ambitious program of technology insertions and additional fielding actions to enhance the capability. This approach is justified not only by the uncertain nature of the security environment in which our missile defense system must work, but also by the advantages it offers from an acquisition strategy perspective.

I am confident that our acquisition approach and the management structure the Department has put into place for the BMD Program reduces decision times and promotes the capabilities-based, incremental development of our highly integrated and layered BMD System. The Director of the MDA reports directly to me; we meet weekly to discuss current issues and quarterly for a full review of the missile defense program. In addition, my predecessor created the Missile Defense Support Group (MDSG), a group of senior and experienced individuals from all the DOD stakeholder organizations to advise the Director of the MDA and support the Department's senior leadership in this critical area. The MDSG has met over 50 times in the past 3 years to discuss complex issues and provide advice to the Director. The frequency of these MDSG meetings far exceeds the amount of senior level oversight and advice we give programs in the "normal" acquisition process. I have also encouraged an active interaction between the Director of the MDA and the Director of Operational Test and Evaluation (DOT&E), as well as their respective staffs. I am satisfied that their relationship has evolved in constructive ways, to the point of the Director of the MDA and the DOT&E jointly approving a master test plan. You will also find that the testing community has people embedded in the management offices of our missile defense elements. These actions give me confidence that the Department's management structure for, and oversight of, the missile defense program facilitates decisive senior leadership action, provides the Director of the

MDA the authority he needs to execute the BMD Program, and also provides Congress extensive and frequent insight into our progress.

I continue to believe our innovative approach is proving successful. Based on recent reviews, the Government Accountability Office (GAO) appears to agree. The GAO has been actively engaged in reviewing the Ballistic Missile Defense Program, having completed six MDA-specific reviews in the past year and with additional reviews on-going at this time. In many ways, our approach to developing the Missile Defense Program shares characteristics of the GAO's knowledge-based criteria for major program decisions. We have worked closely with the GAO and have implemented a number of their recommendations.

We have made substantial progress in the Nation's Missile Defense Program. We have already emplaced ground-based interceptors in Alaska and California, updated radars, and modified Aegis ships for long-range surveillance and tracking support. Logistics support is in place. We have connected the elements to the fire-control system, and we have a command and control, battle management and communications capability in place. We are conducting increasingly realistic exercises and tests, and are learning more about the system with every exercise and test event. By the end of 2005, we will have added still more ground-based interceptors, upgraded additional radars, added a sea-based X-band radar, additional long-range search and track destroyers, and Aegis cruisers with engagement capability using the Standard Missile-3.

Our test program is designed to build confidence in the capabilities we are placing in service. Our sea-based midcourse defense element has had notable success while adding increasing realism. However, we have to remember that we are in the early stages of providing an unprecedented defensive capability. While I am disappointed in the results of the GMD's recent tests, I am pleased with the program's overall progress and with the Director's response. Those setbacks have not shaken our confidence in the system's fundamental capability. This is a complex system with a number of components that must work together. The essential shift we must now make is to emphasize discipline in quality assurance. The problems we have seen recently are not unusual for new programs in this phase of development. The Director of the MDA has taken strong steps to reinforce process and product quality. He has put a plan into place to return the GMD Program to a successful flight test program. I wholly endorse that plan and also want to improve "turnaround" time between test events. The Department will further build its confidence in the BMD System in the intercept tests we have scheduled for this year and next.

I would also note that our advances in the BMD Program have attracted increasing interest and attention from the international community. We have signed formal agreements with the United Kingdom, Japan, and Australia. These agreements cover cooperation across a range of missile defense activities. Japan is acquiring a multi-layered BMD system, and we are working with Israel on improvements to the Arrow system. We are actively working on our collaboration with Russia on theater defense exercises and are in discussions to explore other areas of potential missile defense cooperation.

The President's budget for fiscal year 2006 reflects the priorities set by the President and an implementation plan developed by the Secretary and his most senior military and civilian advisors. The budget was drafted in light of the progress that has been made—and the changes that have taken place—since September 11, 2001. As such, it responds to the need to prepare for an uncertain future that will require a more agile, lethal, and responsive force. At the same time, we must ensure that we maximize the capabilities gained from our defense dollars. In that regard, the budget fully supports the BMD Program. The Department has reduced missile defense funding in fiscal year 2006 by $1 billion, to $7.8 billion, compared to our plan a year ago. We have not changed our mission in any way, and we are fully committed to fielding effective missile defenses. In implementing the reduction, we have allowed the Director of the MDA to plan how best to structure the program, balancing development, testing, and fielding, and I have approved his approach. We will accomplish this by focusing on key aspects of the program, through a thorough scrub of infrastructure needs and overhead, and through careful restructuring of out-year programs while mitigating risk. For example, we have established the Airborne Laser (ABL) program as our primary boost-phase defense program. But because we will not know for several years whether ABL will contribute the capabilities we need, we are continuing with a restructured Kinetic Energy Interceptor (KEI) program that emphasizes critical technology demonstrations. I believe that the President's Budget will allow the Department to pursue a fully capable missile defense system—one that meets the needs of the warfighter. I urge the committee to support the President's budget for this important program.

We are grateful for the support of Congress, which has made this bold effort to field missile defense capabilities possible. Congressional approval of the President's requests for missile defense funding has been critical to our smooth execution of the program. Continued cooperation between the Department and Congress will only grow in importance as we execute our mission to provide for the national security of the United States. I look forward to continuing that cooperation.

Thank you for this opportunity to testify before the committee. I would be happy to answer any questions you might have.

Senator SESSIONS. General Cartwright, STRATCOM Commander.

STATEMENT OF GEN. JAMES E. CARTWRIGHT, USMC, COMMANDER, UNITED STATES STRATEGIC COMMAND

General CARTWRIGHT. Thank you, Mr. Chairman. I will be brief, but I do want to address some of the issues that Senator Inhofe brought up.

In 2004, we set off to build an initial capability that would defend against a limited threat, two to five missiles from North Korea. This was a rudimentary system, in my terms, a thin line, critical mission threads. We had just enough command and control, sensors and weapons that if we had an emergency, we could pull that together and have a capability and present that capability to the Nation.

During that period, we took the time to do, in naval parlance, what we call a shakedown. Behind me is Lieutenant General Larry Dodgen, who is my commander for integrated missile defense. He has put his soldiers through the places to understand the system, to start to understand and have a vision of where this system is going, and the operational challenges that it will bring to the table.

One thing that I walked away with in that shakedown was that I am absolutely convinced that we must have a defensive capability. No longer do we face a single foe like we did in the Cold War. We have a complex threat out there, multiple nations, multiple types of threats. An offense alone is not going to be enough to deter them.

Mr. Chairman, we had this discussion in the closed session, but I think it bears mentioning again. As a marine—and some of the discussion we had with the forces in Iraq—I would not send a marine out into the streets of Fallujah with just an M–16. He has to have body armor. It changes the equation. The enemy that he faces, when he steps into the street, is lurking in the corners. He does not care who gets killed in the cross-fire. It is just a fact of life that this is a more complex environment and we have to change the mind set of the enemy. We have to take away from the enemy the ability to give the first shot and have him have his way with that first shot. We just have to change that calculus. To me this missile defense system starts to give us that capability.

If, at the end of the day, we put the body armor on the marine and we give him a good M–16, then he at least has a fighting chance and he has changed the mind set of the enemy. But again, at the end of the day, it goes to the story that just carrying the M–16 is not going to be enough.

North Korea and others have and will declare their intentions to build weapons of mass destruction (WMD). North Korea and others have and are building delivery systems. The rhetoric is bellicose

out there and also threatening to us. North Korea shows little compassion for its people.

When we started into this shakedown in 2004, one of the things that we had as an objective was to ensure that the warfighter, in going through this shakedown, had the opportunity to contribute and give input to this operationally realistic testing and to start to challenge many of the assumptions that we use to build this system.

We have had that input. We have had an opportunity to contribute, and the operational test community and General Obering in the MDA side of the house have both been responsive to our inputs and the things that we have learned in our shakedown. I find that to be refreshing and very valuable and it contributes to the overall capability of the system.

But as we start to field this system this year, the thing that we are trying to add, the thing that is important to us is a more robust command and control system, one that is distributed and has multiple nodes so that one node cannot be attacked. That is what is happening in 2005. We are fielding that distributed command and control system. We are also fielding fixed and mobile sensors, critical to being able to have redundancy and a layering effect that will be so essential in this system, and we are doing the same with our weapons in that we are now fielding both fixed and mobile weapons systems.

We are moving toward a defensive capability that will defend the United States, our forward deployed forces, our allies, and friends. That is the goal. We have to have that vision and keep it in mind. But again, at the end of the day, what I walk away with from the shakedown is that offense alone is not enough anymore.

I stand ready for your questions, sir.

[The prepared statement of General Cartwright follows:]

PREPARED STATEMENT BY GEN. JAMES E. CARTWRIGHT, USMC

Mr. Chairman and members of the subcommittee: This is my first opportunity to appear before you as Commander of the United States Strategic Command (USSTRATCOM). Thank you for the time you've given me to discuss the missions assigned to us as we continue to prosecute the global war on terror and take on the challenge of combating weapons of mass destruction.

My prepared remarks cover USSTRATCOM's role in the challenging 21st century environment and plans for addressing those challenges with capabilities to serve our Nation's needs in war and in peace.

THE 21ST CENTURY GLOBAL ENVIRONMENT

Global interdependence—economic, political, and social—combined with near instantaneous global connectivity, is a trademark of the new century. It also heightens the importance of strong links between U.S. strategic objectives and regional operations. U.S. strategic objectives have profound influence on individuals, regions, nations, and non-state actors and networks. The tight linkage between U.S. strategic objectives and the conduct of regional operations is evident in our operations in Afghanistan and Iraq, and more recently in Asia in the aftermath of the tsunami. In Afghanistan, the strategic objective to combat global terrorism guided, as well as constrained, our regional decisions. The regional operations in Iraq are clearly influencing cultural, economic, and security considerations around the globe.

Our adversaries are using asymmetric approaches; exploiting social, political, and economic vulnerabilities to avoid confronting superior U.S. forces head on. We continue to see increases in the speed and deceptive scale of proliferation of potential weapons of mass destruction, including delivery and concealment capabilities. We see adversaries who would use improvised explosive devices (IEDs) and suicide bombs against their own people and infrastructure, as well as against deployed mul-

tinational forces. These adversaries have easy access to the same global technology base we do, and can exploit the same communication and information resources as the American public. They have proven they are an intelligent and adaptable enemy.

All operations, while regional in execution, have global consequence and therefore require a global perspective. Regional combatant commanders, who are responsible and accountable for conducting combat and peacekeeping operations in their areas of responsibility (AORs), have long depended upon support provided from outside their AORs. Much of that support, which in the past was provided on an ad hoc basis, has now been codified in the Unified Command Plan as a USSTRATCOM global responsibility. We are positioning USSTRATCOM to advance a distinctly global and strategic perspective on current and emerging capabilities necessary to deter threats to our way of life, particularly those threats involving weapons of mass destruction. USSTRATCOM will enable combatant commanders' regional operations through realization of a comprehensive set of global mission capabilities, soundly integrated to achieve more effective and efficient execution.

We look upon this responsibility as both an exciting challenge and a solemn obligation to the regional combatant commanders, the American men and women who serve in their AORs, and to the American people.

GLOBAL ENABLERS

21st century operations are fundamentally different from those of the last century. Combat operations are being conducted in rapidly changing circumstances, shifting from humanitarian operations to intense firefights within a few hundred yards of each other with little or no warning. This dynamic nature is matched by a varying composition of assisting partners. We must be ready to conduct integrated, distributed operations using global and regional military forces. In many situations, these forces will be augmented by other U.S. Government personnel, coalition and commercial partners, and possibly, nongovernmental organizations. To plan and effectively execute these types of distributed, agile and integrated operations, the regional combatant commands increasingly rely on multiple capabilities the global commands must support or provide.

The Unified Command Plan expands USSTRATCOM responsibilities through the assignment of global mission areas that span levels of authority, cross regional boundaries and intersect with various national and international agencies. USSTRATCOM's missions are:

- Global deterrence;
- Global support from space-based operations;
- Global intelligence, surveillance, and reconnaissance;
- Global strike;
- Global information and network operations;
- Global command and control;
- Global integrated missile defense coordination; and
- Globally combating weapons of mass destruction.

Achieving the full potential of these missions is contingent upon identifying the right capabilities mix and sustaining our global reach through space. However, without the context of advanced situational awareness, and the power of collaboration, even the best tools may be insufficient to deter and defeat a determined adversary. We are placing an emphasis on the following global enablers:

The New Triad

USSTRATCOM supports The New Triad concept; a strategic way ahead in pursuit of a more diverse set of offensive and defensive warfighting capabilities. We are active participants in all three legs of The New Triad: offensive nuclear and non-nuclear strike (including nonkinetic), passive and active defenses, and a defense infrastructure capable of building and sustaining all offensive and defensive elements, including the critical support areas of command and control and intelligence.

Coupled with improved collaboration and shared global awareness, The New Triad concept will enable more precisely tailored global strike operations. With a full spectrum of nuclear, conventional and nonkinetic options available, regional combatant commanders will be enabled to achieve specific local effects against high value targets in the context of the strategic objective.

While we are confident in our ability to support effective global strike operations today, we must continue to evolve that capability to meet the demands of an uncertain tomorrow. For example, I intend to conduct experiments to better understand the value of weapon accuracy within a range of stressing environments. If modeling

and testing confirm the value of such capability, this may lead to new thoughts on the balance between nuclear and conventional strike alternatives.

The new responsibilities assigned to USSTRATCOM have required the command to broaden its Cold War focus from deterring nuclear or large-scale conventional aggression to becoming a major contributor to the much broader defense strategy. Nuclear weapons, however, continue to be important, particularly for assuring allies and friends of U.S. security commitments, dissuading arms competition, deterring hostile leaders who are willing to accept great risk and cost, and for holding at risk those targets that cannot be addressed by other means. As steward of the Nation's strategic nuclear deterrent, we have two specific areas of focus—rationalizing our nuclear forces, and providing for a relevant nuclear stockpile in the context of The New Triad. At the same time we will continue to evaluate and provide a range of options, both nuclear and non-nuclear, relevant to the threat and military operations.

The New Triad concept presents an opportunity to reduce our reliance on nuclear weapons through the evaluation of alternative weapons, defensive capabilities and associated risk. It is our intent to have the upcoming Quadrennial Defense Review address nuclear issues, and the associated infrastructure, to determine transformation requirements for our nuclear capabilities in the 21st century. We will look at rationalizing our nuclear forces as an element of the overall force structure and the proper tailoring of nuclear effects as part of the broad spectrum of national power. These assessments will be important to future operational planning as well as future budget plans.

Space

The importance of the space mission to our national security cannot be overstated. The U.S. economy, our quality of life, and our Nation's defense are all linked to our freedom of action in space. For example, satellites are at the heart of routine financial activities such as simple automatic teller machine operations or complicated international currency and stock market transactions. The telecommunication industry is heavily vested in space. Commercial airliners, container ships, trains, trucks, police, fire departments, and ambulances have also become highly dependent upon space-based global positioning systems to enhance their ability to safely deliver people, goods and services. The fact is, our dependency on space increases every day—a fact not lost on our adversaries. This growing national dependence on space-based and space-enabled capabilities establishes a true imperative to protect our space assets and our ability to operate freely in and from space.

We currently enjoy an asymmetric advantage in space, but our adversaries are gaining on us. Our space support infrastructure is aging and, in some instances, on the verge of becoming obsolete. We will continue to face additional challenges as other nations exploit new technologies and capabilities in attempts to bridge the gap between them and us.

The space environment itself is also rapidly changing. For example, the number of objects in-orbit increases every month, while the size of those objects decreases. This is challenging our space surveillance technology, developed in the latter half of the 20th century, because it was not designed to detect or track the current magnitude of new, smaller objects, including micro-satellites. This increases the chances of collisions, which threatens our manned spaceflight program; opens the door for unwarned action against U.S. satellites by adversaries; and limits our ability to protect our space assets.

We must do a better job of leveraging the capabilities of our space assets—in DOD, national and commercial systems. We must also maintain the ability to protect our own space assets and capabilities, both actively and passively, while denying our adversaries the military use of space—at the time and place of our choosing.

In order to bring these elements of space control together, our near-term plan is to work with the various space programs to identify potential gaps and make sure existing information and applications are available and provided to authorized users on a global network. This plan will serve as the basis for a concept of operations to exploit information from our space assets, providing space situational awareness to the regional combatant commands.

Distributed Operations

For distributed, integrated operations, dominant situational awareness is an imperative—globally, regionally, and locally. It must exist across the full breadth and depth of operations, from planning and combat through post-conflict reconstruction, and ultimately, peacetime.

For our forces to effectively employ collaborative capabilities and capitalize upon situational awareness, we must enable them to create pictures of the battlespace

tailored to their specific needs—what we refer to as User Defined Operating Pictures. It is USSTRATCOM's job to provide the global capabilities to enhance situational awareness, facilitate collaborative planning, and provide a basic User Defined Operating Picture capability for all of the combatant commands.

Many of the capabilities required for agile, distributed operations will be facilitated by space and enabled by a global information environment with ubiquitous, assured access to information, when and where any combatant commander needs it. To achieve this vision, the old mantra to provide information on a "need to know" basis, must be replaced by a "need to share." Critical information that the warfighter didn't know existed, and the owner of the information didn't know was important, must be made available within a global information environment easily accessible to commanders at all levels.

Interdependent Capabilities

Our action plan for global command and control focuses on ensuring the all-source information needed for effective operations is available to all theaters. For the global Intelligence, Surveillance, Reconnaissance (ISR) mission, that also means developing integrated and persistent systems capable of supporting precision targeting. USSTRATCOM has the lead for coordinating global ISR capabilities and will be working closely with the regional combatant commanders, Joint Forces Command and the Services to develop the associated strategy.

The Department's net-centric global information services, currently in development, are essential to our global missions. These services will connect global and regional applications and improve both horizontal and vertical information integration.

We are developing a prioritized plan for transitioning away from stove-piped legacy systems to capabilities that support broader information and applications access. Included in this plan are actions focused on leveraging existing legacy applications and data by making them more broadly accessible. Each user will be allowed the flexibility to select from any available data source, anywhere on the network, those objects most useful to them at any particular time. Additionally, any new data source will be available the moment it comes onto the network, rather than requiring a modification to existing systems, as is the case today.

USSTRATCOM is an advocate for net-centricity. Our focus is on:

- Capability to enable our "internet-like" environment and access to information;
- Realization of a high-bandwidth, ubiquitous communications backbone to deliver information with high assurance and low latency; and
- Robust information assurance required to defend our networks and our information.

Creating a collaborative structure is more than just designing and disseminating tools—it is also about changing human behavior. Our objective is a global, persistent, 24/7 collaborative environment—comprising people, systems, and tools. Our future structure must support real time command and control at both the global and local levels as well as enable dynamic, adaptive planning and execution in which USSTRATCOM, the regional combatant commanders, and other geographically dispersed commanders can plan and execute operations together. Our collaborative environment must also provide the capability to "connect all the dots"—enemy dots, friendly dots, neutral dots, contextual dots—all the dots that matter—as they appear, rather than wait for a post-event analysis when all of the different data stores can be opened. With improved collaboration and shared awareness, we can more effectively conduct operations using the full spectrum of capabilities to achieve desired, focused effects against high value targets.

In that regard, we are actively assessing the currently available collaborative environment and processes and investigating potential pilot programs to encourage organizational information sharing to build trust in shared information. Fundamental to this issue is the establishment of data tagging standards and associated information assurance policies.

With regard to sharing information, we are in some respects navigating uncharted waters. While the value of sharing information with allies, coalition partners, and other Federal departments and agencies is well understood, sharing information with industry or other private sources presents proprietary, intellectual property and privacy concerns which are not well understood. Such information has the potential to be of great value to USSTRATCOM and the regional combatant commanders in accomplishing our missions. We will be attentive to the actions currently being taken throughout the Federal Government in response to Executive Order 13356, "Strengthening the Sharing of Terrorism Information To Protect Americans," which may provide us valuable insight and guidance in this sensitive area.

BUILDING AN ASYMMETRIC ADVANTAGE

In addition to our role as steward of the Nation's nuclear forces and guardian of global deterrence, USSTRATCOM now has the responsibility for working across regional boundaries to address threats in a global perspective. To achieve the asymmetric advantage we desire requires us to build the interdependent, collaborative, operational environment we've envisioned. It is our responsibility to provide global services and global context to the regional combatant commands and their deployed forces so we are collectively a more effective force—for warfighting, peace and all possible combinations of both.

New Command Structure

As the latest step in maturing our approach to fulfilling USSTRATCOM's global mission responsibilities we are implementing a new command structure. This structure is critical to the asymmetric advantage we seek, leveraging essential competencies of associated components and key supporting agencies through an distributed, collaborative environment.

Rather than creating additional organizational layers, we are bringing existing commands and agencies under our global mission umbrella through the establishment of Joint Functional Component Commands. These interdependent Joint Functional Component Commands will have responsibility for the day-to-day planning and execution of our primary mission areas: space and global strike, intelligence surveillance and reconnaissance, network warfare, integrated missile defense and combating weapons of mass destruction.

USSTRATCOM headquarters retains responsibility for nuclear command and control. Additionally, headquarters will provide strategic level integrated and synchronized planning to ensure full-spectrum mission accomplishment. USSTRATCOM will also advocate for the capabilities necessary to accomplish these missions.

This construct will allow us to leverage key, in-place expertise from across the DOD and make it readily available to all regional combatant commanders. Our vision is for the combatant commanders to view any Joint Functional Component Command as a means by which to access all of the capabilities resident in the USSTRATCOM global mission set. Anytime a combatant commander queries one of our component commands, they will establish strategic visibility across our entire structure through our collaborative environment. The fully integrated response USSTRATCOM provides should offer the combatant commander greater situational awareness and more options than originally thought available. Specific Joint Functional Component Command responsibilities include:

- *Space and Global Strike.* The Commander of STRATAF (8th Air Force) will serve as the Joint Functional Component Commander for Space and Global Strike. This component will integrate all elements of military power to conduct, plan, and present global strike effects and also direct the deliberate planning and execution of assigned space operation missions. For plans not aligned with a specific mission set, the Joint Functional Component Command for Space and Global Strike is tasked to work in close coordination with USSTRATCOM headquarters as the lead component responsible for the integration and coordination of capabilities provided by all other Joint Functional Component Commands.
- *ISR.* The Director, Defense Intelligence Agency (DIA) will be dual-hatted to lead the ISR Joint Functional Component Command. This component is responsible for coordinating global intelligence collection to address DOD worldwide operations and national intelligence requirements. It will serve as the epicenter for planning, execution, and assessment of the military's global ISR operations; a key enabler to achieving global situational awareness.
- *Network Warfare.* The Director, National Security Agency (NSA) will also be dual-hatted to lead the Network Warfare Joint Functional Component Command. This component will facilitate cooperative engagement with other national entities in computer network defense and offensive information warfare as part of our global information operations.

Our coordinated approach to information operations involves two other important supporting commands. The Director, Defense Information Systems Agency also heads the Joint Task Force for Global Network Operations. This organization is responsible for operating and defending our worldwide information networks, a function closely aligned with the efforts of the Joint Functional Component Command for Network Warfare. Additionally, the Commander, Joint Information Operations Center coordinates the non-network related pillars of information operations: psy-

chological operations, electronic warfare, operations security and military deception. Both the Joint Task Force for Global Network Operations and the Commander, Joint Information Operations Center will be full members of the USSTRATCOM distributed, collaborative environment.

- *Integrated Missile Defense.* The Commander, Army Space and Missile Defense Command will head the Integrated Missile Defense Joint Functional Component Command. This component will be responsible for ensuring we meet USSTRATCOM's Unified Command Plan responsibilities for planning, integrating, and coordinating global missile defense operations and support. It will conduct the day-to-day operations of assigned forces; coordinating activities with associated combatant commands, other STRATCOM Joint Functional Components, and the efforts of the Missile Defense Agency (MDA). The Joint Functional Component Command for Integrated Missile Defense is a key element of the "defenses" leg of The New Triad concept.
- *Combating Weapons of Mass Destruction.* The Secretary of Defense (SECDEF) recently assigned USSTRATCOM responsibility for integrating and synchronizing DOD's efforts for combating weapons of mass destruction. As this initiative is in its very formative stages, we have yet to formalize any specific componency structure. However, we anticipate establishing a formal relationship with the Defense Threat Reduction Agency as an initial starting point.

This new componency structure is in its infancy and will take several months to fully realize. There are detailed issues to work through, including the proper distribution of subject matter expertise and an assessment of expanding relationships with other U.S. Government departments.

A final element of our evolving organizational structure involves developing relationships with the private sector to build upon efforts under the Partnership to Defeat Terrorism. This important partnership with the private sector supports many of our national objectives and crosses into relatively uncharted territory.

- *Partnership to Defeat Terrorism.* The United States has achieved success in the global war on terrorism by attacking terrorist infrastructure, resources and sanctuaries. Nevertheless, our adversaries continue to plan and conduct operations driven by their assessment of our vulnerabilities. The main vulnerability requiring our constant vigilance is the Nation's economy, and one need look no further than the economic aftershock attributed to the September 11 terrorist attacks to affirm this assertion. The risk is accentuated given the global underpinnings of our economic structure. Even a small-scale terrorist attack against a lower tier provider in a distant land can have wide-ranging and pervasive economic implications.

Given the evolving understanding of terrorist's use of global processes, the Partnership to Defeat Terrorism was created to intercede on behalf of combatant commanders, among others, and positively affect outcomes through connections with the private sector. Since November 2001, the Partnership to Defeat Terrorism has successfully combined private sector global processes with other elements of national power to help fight global terrorism as part of USSTRATCOM's global mission responsibilities. This fruitful relationship with the private sector has proven effective on a number of occasions and has garnered the support of influential leaders both within and outside government.

Yet, the Partnership to Defeat Terrorism is somewhat of an ad hoc process based on trusted relationships. As such, the value of the program is directly related to the availability of the participants. USSTRATCOM was recently contacted by a group of people from various non-military sectors, advocating the creation of a working group to formalize this ad hoc program to begin planning a more permanent approach for the long-term.

On a strategic level, the value of such an effort is the open realization that all elements of national power, which have not traditionally operated in a synchronized and coordinated role in national security, understand the urgent need for their involvement.

Full realization of the benefits inherent in the distributed, interdependent organizational structure described above requires an effective collaborative operation. A truly collaborative environment provides us the asymmetric advantage necessary to deter and defeat the agile adversaries we face in the 21st century environment. In the future, these skills will take on even greater importance as we broaden our partner base within the U.S. Government, with coalition partners, commercial partners, academia, and others, including non-government organizations.

ACHIEVING THE STRATEGIC IMPERATIVE

Agile, responsive distributed operations, enabled by meaningful information exchange, shared objectives, and shared situational awareness, are key to the successful performance of USSTRATCOM's global missions. We have assessed the capability gaps in our global mission areas and have developed action plans, working with our partner commands, to improve our collective ability to carry out operations at all levels.

USSTRATCOM's strategy is focused on:

- Stewardship of the strategic nuclear stockpile;
- Defending against asymmetric approaches used by our adversaries, including weapons of mass destruction;
- Responding effectively in a rapidly changing combat operations environment;
- Achieving prompt, predictable precision operations;
- Coordinating with U.S. and private sector partners in a collaborative environment;

Implementing this strategy relies on new and enhanced capabilities, including:

- Dominant situational awareness,
- A ubiquitous, assured, global information environment,
- Dynamic, persistent, trustworthy collaborative planning,
- User Defined Operating Pictures, using distributed, globally available information, and
- A culture that embraces "need to share" rather than "need to know."

We are not there yet. Working with our partner commands, we have developed plans to improve our global capabilities. We need your continued support to deliver the capabilities needed to combat the threats of the 21st century. We need your support for:

- Pursuit of high capacity, internet-like capability to extend the Global Information Grid to deployed/mobile users worldwide;
- Adoption of data tagging standards and information assurance policies to increase government-wide trusted information sharing;
- Technology experiments to enhance our understanding of the value of accuracy and stressing environments for current and future weapons.

USSTRATCOM recognizes what has to be done to be a global command in support of the warfighter. We are aggressively moving out on actions to ensure USSTRATCOM fulfills our full set of global responsibilities, supporting our national security needs in peace and in war.

Thank you for your continued support.

Senator SESSIONS. Thank you, General Cartwright.

Mr. Duma, you are the acting Director of the Operational Test and Evaluation area of the DOD. We are delighted to hear from you at this time.

STATEMENT OF DAVID W. DUMA, ACTING DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

Mr. DUMA. Thank you. Mr. Chairman, Senators, ladies and gentlemen, I am pleased to have this opportunity to speak with you about the Ballistic Missile Defense (BMD) system test program. As you requested, I will talk about the status of major test activities, the establishment of criteria for operationally realistic testing mandated by section 234 of the National Missile Defense Authorization Act for Fiscal Year 2005, and finally our relationship with the MDA. Given the emphasis placed on fielding a limited defensive capability, my remarks will focus primarily on the two elements of ballistic missile defense that are the principal contributors to this early capability: the GMD and the Aegis BMD systems.

My full statement addresses my observations about testing on other ballistic missile defense elements. I request my full statement be included for the record.

Senator SESSIONS. It will be made a part of the record.

Mr. DUMA. Thank you, Mr. Chairman.

Mr. Chairman, I am encouraged by several developments over the last year. The MDA has constructed a testbed infrastructure and populated it with prototype missiles, six at Fort Greely, Alaska and two at Vandenberg Air Force Base, California. The testbed is a major accomplishment and will address much of the prior criticism from my office regarding the lack of operational realism for testing the GMD system. The testbed supports integration testing, ground testing, and flight testing in more operationally stressing geometries and permits military operators to operate and control the system.

Early in development, capability demonstrations and flight testing focused on the feasibility of hit-to-kill technology. The BMD system testbed significantly improves the test infrastructure by providing operational assets to participate in more operationally realistic, end-to-end ground tests, and flight test scenarios. Integrated ground testing is extremely important because it evaluates system interoperability and provides the best opportunity for assessing operator training and performance.

To evaluate the testbed operational capabilities, the MDA established engagement sequence groups that describe defensive capabilities in terms of available sensors, command and control networks, and interceptors.

The first increment of this capability called Limited Defensive Capability, is defined by four engagement sequence groups to evaluate defense of the 50 States against a limited attack from North Korea. This has been a useful way to coordinate system development, testing, activation exercises, and the development of tactics, techniques, and procedures. Integrated ground testing results to date indicate the testbed has the potential to defend against a limited attack under certain conditions. However, difficulties in the flight test program have delayed the confirmation of intercept capability using the testbed.

Recent flight test failures in integrated flight test 13C and 14 indicate the need to further develop and mature the ballistic missile defense system hardware and software. In flight test 13C, the system aborted the launch of a missile when its internal checks were not satisfied. However, the system performed well from target launch until the system aborted the interceptor launch.

In integrated flight test 14, the system performed as expected until it detected a problem in the launch sequence and again aborted the launching of the interceptor. One of the last steps in the launch sequence is to open the silo doors and retract the silo horizontal stabilizer bars. In this instance, sensors indicated that one of the three stabilizer bars had not retracted, causing the missile launch to abort.

The operational testing community identified 18 operational test objectives that addressed operational realism in both integrated flight tests 13C and 14. In each case, 10 of these objectives were either partially or completely met, and 5 objectives were not met due to the aborted interceptor launch. The Aegis system did not participate in either flight test, which resulted in the deferral of three test objectives in each case.

In both integrated flight test 13C and 14, the target launched properly and presented a good target scene to the ballistic missile defense system. However, from an operational mission perspective, the system problems in these tests are failures. In an operational mission where the full-up testbed is operational, it is possible that other missiles would have been available for the user to select and launch against the target. The MDA has simulated the capability of the system to fail-over to another missile during integrated ground testing.

After both integrated flight tests 13C and 14, General Obering acted quickly to complete root cause analysis and incorporate and verify the fixes through regression testing. I applaud his commitment to a test-fix-test philosophy that results in an event-based test program. These types of setbacks are typical of programs in development and they contribute to maturing the system.

In November 2004, my office approved the MDA's first version of an integrated master test plan. That plan identified developmental testing that the MDA intended to conduct to verify the system design and its adherence to system specifications. The MDA is incorporating operational objectives into system level developmental ground and flight test events to increase the operational realism. This approach adds some operational realism and insight into the system performance and capability during developmental testing.

The maturity of the testbed will not yet support realistic operational end-to-end testing. For example, the sea-based X-band radar, which will not be available until the end of this year, is an essential element to provide midcourse discrimination and track updates.

I believe we have agreements with the MDA to revise the integrated master test plan to continue the combined development and operational testing and include focused operational testing for each block. This strategy would stabilize the system design long enough for the operational test and evaluation community to conduct focused operational exercises, ground tests, and flight tests on a block configuration prior to deploying that capability. It will permit testing of the ballistic missile defense system under realistic operational conditions, confirm integrated warfighter and system performance, and increase confidence of the warfighters' ability to execute their mission with the deployed system. The operational test community will develop the operational evaluation and test plans consistent with the maturity of the system, conduct appropriate analyses, and prepare a formal report.

In September 2004, the MDA began a shakedown period where they systematically activated and tested the integrated system to identify interoperability and performance problems. These exercises provided valuable insights and helped develop procedures for transitioning the systems to alert. In order to support potential activation of the ballistic missile defense system for limited defensive operations, the MDA, the Operational Test Agency team, STRATCOM, and Director of Operational Test and Evaluation (DOT&E) prepared independent assessments of the ballistic missile defense system capability. While these assessments varied widely, the process of developing and coordinating these analyses provided an excellent opportunity to exchange information and perspectives.

The Aegis ballistic missile defense system is an important element of the testbed and contributes to the limited defensive capabilities. The Aegis BMD system is making progress in demonstrating end-to-end capability to defeat short-range ballistic missiles. The Aegis BMD element has demonstrated that it can intercept a unitary, short-range target in the ascent and descent midcourse phases of flight. The operational realism of the Aegis test program has been steadily increasing. The Navy Operational Test Force has provided observations on operational issues during early developmental tests and has introduced more operational realism into recent tests. In the last two flight tests, the Aegis crews successfully engaged the target without prior information regarding the target launch time and direction, and they did this all while on patrol. The first flight test in which the ground-based interceptors will engage a target using Aegis track data is planned later this year.

The performance of the joint operational test team was nothing less than outstanding. Their continuous involvement in characterization of the BMD system provides important insight into its operational capability. The entire operational test and evaluation community has access to all test planning and execution meetings, test data, and data analyses. General Obering and I meet routinely and my staff coordinates daily with the MDA and the element offices. The MDA has not yet planned or executed operational testing. So my role is limited to providing General Obering advice as to the operational realism of the development testing. I also conduct an independent annual assessment and provide a report on the past year's testing activities and demonstrated system capabilities each February.

In summary, General Obering is executing an event-driven, test-fix-test program. Test planning that addresses the requirement in the National Defense Authorization Act for Fiscal Year 2005 for an operationally realistic test in fiscal year 2005 is ongoing. The operational testing community is working with the MDA to incorporate operational realism into the test plan for that event.

Mr. Chairman, this concludes my opening remarks and I welcome your questions.

[The prepared statement of Mr. Duma follows:]

PREPARED STATEMENT BY DAVID W. DUMA

Mr. Chairman, Senators, ladies and gentlemen, I am pleased to have this opportunity to speak with you about the Ballistic Missile Defense (BMD) System test program. As you requested, I will talk about the status of the major test activities, the establishment of criteria for operationally realistic testing mandated by Section 234 of the 2005 National Missile Defense Authorization Act, and finally, our relationship with the Missile Defense Agency (MDA). Given the emphasis placed on fielding a limited defensive capability, my remarks will focus primarily on the two elements of Ballistic Missile Defense that are the principle contributors to this early capability—the Ground-based Midcourse Defense (GMD) and the Aegis BMD systems. I will conclude with a few observations about progress towards testing the other theater defense systems.

I am encouraged by several developments over the last year. The MDA has constructed a test bed infrastructure and populated it with prototype missiles, six in Fort Greely, Alaska; and two at Vandenberg Air Force base, California. The test bed is a major accomplishment and addresses much of the prior criticism from my office regarding the lack of operational realism for testing the GMD System. The test bed supports integration testing, ground testing, and flight testing in more operationally stressing test geometries, and permits military operators to control the system.

Early in development, capability demonstrations and flight testing focused on the feasibility of hit-to-kill technology. The BMD System test bed significantly improves the test infrastructure by providing operational assets to participate in more operationally realistic, end-to-end ground tests and flight test scenarios. Integrated ground testing is extremely important because it evaluates system interoperability and provides the best opportunity for assessing operator training and performance.

To define the test bed operational capabilities, the MDA established engagement sequence groups that describe defensive capabilities in terms of available sensors, command and control networks, and interceptors. The first increment of this capability, called Limited Defensive Capability, is defined by four engagement sequence groups to evaluate defense of the 50 States against a limited attack from North Korea. This has been a useful way to coordinate system development, testing, activation exercises, and the development of tactics and procedures. Integrated ground test results to date indicate the test bed has the potential to defend against a limited attack, under certain conditions. However, difficulties in the flight test program have delayed the confirmation of intercept capability using the test bed.

Recent flight test failures in Integrated Flight Tests –13C and –14 indicate the need to further develop and mature the BMD System hardware and software. In Flight Test–13C, the system aborted the launch of a missile when its internal checks were not satisfied. However, the system performed well from target launch, until the system aborted the interceptor launch.

The operational testing community identified 18 operational objectives that addressed operational realism in Integrated Flight Test–13C. Ten of these objectives were partially or completely met. Five objectives were not met due to interceptor abort. Sea conditions off Alaska prevented Aegis at-sea participation in the test, resulting in the deferral of three additional test objectives to later test events.

In Integrated Flight Test–14, the system performed as expected until it detected a problem in the launch sequence and again aborted the launching of the interceptor. One of the last steps in the launch sequence is to open the silo doors and retract the silo horizontal stabilizers. In this instance, sensors indicated that one of the three stabilizers had not retracted, causing the missile to abort launch.

Again of the 18 test objectives addressing operational realism in Integrated Flight Test–14, 10 objectives were partially or completely satisfied, 3 objectives were deferred due to lack of Aegis at-sea participation, and 5 objectives were not met due to the aborted interceptor launch.

In both Integrated Flight Tests–13C and –14, the target launched properly and presented a good target scene to the BMD System. However, from an operational mission perspective, these tests are failures. In an operational mission using the full-up test bed, it is possible that other missiles would have been available for the user to select and launch against the target. During integrated ground testing, the MDA simulated the capability of the system to fail-over to another missile.

After both Integrated Flight Tests–13C and –14, General Obering acted quickly to complete a root cause analysis, and incorporate fixes. He did not move forward with planning Flight Test–14 until they identified the root cause of the Flight Test–13C failure and verified the corrective action by both analyses and ground testing. General Obering is taking a prudent approach. I applaud his commitment to a "test-fix-test" philosophy that results in an event-driven test program.

It should be noted that Patriot PAC–3 and Aegis missile defense systems have been in development since the early 1990s and are now showing a maturity that has accrued from a comprehensive test-fix-test program. Conversely, the GMD System has only been in development about 7 years. These types of setbacks are typical for programs in development, and they contribute to maturing the system.

The MDA has made progress in documenting their test planning activities. In November 2004, my office approved the MDA's Integrated Master Test Plan. We are working with the MDA and the Operational Test Agency team to increase operational realism through the test planning process, consistent with the maturity of the BMD System test bed. The Integrated Master Test Plan provides a framework for identifying and integrating test requirements from the BMD System elements, the MDA, the Operational Test Agencies, and my office. As a top-level planning document, it identifies criteria for operationally realistic testing that apply to system-level events. It also identifies a series of planned tests that should demonstrate the progress towards developing and maturing the BMD System capability. The operational test community and the MDA have agreed on a test strategy and operational criteria to test the Limited Defense Capability in 2005, consistent with the maturity of the system.

In a developmental program that is employing a test-fix-test philosophy, test plans are necessarily fluid. My office and the Operational Test Agency team are working with the MDA to identify the impact of schedule changes on achieving the

test objectives in the Integrated Master Test Plan. The maturity of the test bed will not yet support Title 10 end-to-end operational testing. For example, the Sea-Based X-Band Radar, which will not be available until the end of this year, is essential to provide mid-course discrimination and track updates. In addition the test bed is limited to one-on-one intercepts against target missiles, and the crew is limited in the amount of control they have over the system.

The MDA is reviewing the live-fire testing programs of the BMD System elements in order to coordinate efforts and provide a consistent approach to assessing system lethality. This will ensure that data from earlier tests and analyses are used to maximum advantage, and that future efforts focus on the most critical data needs. As the BMD System moves through development and maturation, it is essential that we continue our commitment to understanding the lethality of the system against the threats associated with each increment of capability.

In September 2004, the MDA began a "shakedown" period, where they systematically activated and tested the integrated system to identify interoperability and performance problems. These exercises provided valuable insights and helped develop procedures for transitioning the system to alert. In order to support potential activation of the BMD System for Limited Defensive Operations, the MDA, the Operational Test Agency team, the Strategic Command (STRATCOM), and DOT&E prepared independent assessments of the BMD System capability. While these assessments varied widely, the process of developing and coordinating these analyses provided an excellent opportunity to exchange information and perspectives.

The Aegis BMD System is an important element of the test bed and contributes to the Limited Defensive Capabilities. The first flight test in which ground-based interceptors (GBIs) will engage a target using Aegis track data, is planned later this year. The Aegis BMD System is making progress in demonstrating end-to-end capability to defeat short-range ballistic missiles. The Aegis BMD element has demonstrated that it can intercept a unitary, short-range target in the ascent and descent midcourse phases of flight. The operational realism of the Aegis test program has been steadily increasing. The Navy Operational Test Force has provided observations on operational issues during early developmental tests and has introduced more operational realism into recent tests. In the last two flight tests, while on patrol the Aegis operators successfully engaged the target without prior information about the target launch time and direction.

Other elements of the BMD System clearly reflect the success of the MDA's "test-fix-test" philosophy and willingness to restructure program goals when appropriate. In early 2004, the MDA recognized the major technical challenges still faced by the Airborne Laser (ABL) program and restructured the program to focus on developing and demonstrating specific technical goals annually, instead of pursuing future development initiatives. This resulted in the successful "first light" of the high-energy laser through all six modules in the ground aircraft mockup system integration laboratory. It also resulted in the successful first flight of the aircraft with the laser turret, and beam control and fire control installed.

The Theater High Altitude Terminal Defense system also accomplished extensive component and subsystem testing during 2004. The launcher demonstrated the ability to roll-on/roll-off a C–17 transport aircraft. The program successfully performed a short hot launch of a missile round loaded with only a portion of the normal amount of propellant. This test verifies the firing circuits and increases confidence in the success of the first flight-test later this year. A new system radar arrived at White Sands Missile Range in March 2004 for testing. The radar has successfully tracked targets of opportunity, including Patriot PAC–3 flight test missiles and targets.

The performance of the Joint Operational Test Agency team is nothing less than outstanding. Their continuous involvement and characterization of the BMD System provides important insight into its operational capability. The entire operational test and evaluation community has access to all test planning and execution meetings, test data, and data analyses. General Obering and I meet routinely, and my staff coordinates daily with the MDA and the element offices. However, the MDA has no operational testing planned, so my role is limited to providing General Obering advice as to the operational realism of the developmental testing. I also provide an annual assessment report on the past years' testing activities and demonstrated system capabilities to the Department and Congress each February, as required by law.

In summary, General Obering is executing an event-driven, test-fix-test program. Test planning that addresses the requirement in the National Defense Authorization Act for Fiscal Year 2005 for an operationally realistic test in fiscal year 2005 is ongoing. The operational testing community is working with the MDA to incorporate operational objectives and realism into the test plan for this event.

That concludes my opening remarks and I welcome your questions.

Senator SESSIONS. Thank you, Mr. Duma.

Next we will hear from General Henry Obering III, the Director of the MDA. General Obering.

STATEMENT OF LT. GEN. HENRY A. OBERING III, USAF, DIRECTOR, MISSILE DEFENSE AGENCY

General OBERING. Good afternoon, Mr. Chairman and distinguished members of the committee. It is a privilege to be here. I ask that my prepared statement be entered into the record.

Senator SESSIONS. It will be.

General OBERING. We have had many accomplishments and a few disappointments since my predecessor last addressed this committee. While overall we remain on track to execute our mission, I am planning to make some program adjustments which I will describe later in light of our recent flight test failures.

Threats from WMD and proliferating ballistic missiles continue to present grave security concerns. In fact, there were nearly 100 foreign ballistic missile launches around the world in 2004. We must also remember that we have been surprised in this area in the past.

To deal with these threats, we are developing and implementing fielding a joint integrated and layered BMD system to defend the United States, our deployed forces, allies, and friends against all ranges of ballistic missiles. We have put the foundation of this system in place today. Our program reflected, in the fiscal year 2006 budget submission, is structured to balance the fielding of elements of this system with its continued steady improvement through an evolutionary development and test approach. The budget also balances capabilities across an evolving threat spectrum that includes rogue nations with increasing expertise.

We are requesting $7.8 billion to support our program of work in fiscal year 2006, which is approximately $1 billion less than the fiscal year 2005 request. About $1.4 billion covers the continued fielding and sustainment of our block increments of long-range, GMD components, our short to intermediate range defense involving Aegis ships with their interceptors, and the supporting radars, command, control, battle management, and communications capabilities. About $6.4 billion will be invested in the development foundation for the continued testing and system evolution.

To provide the context for our budget submission, I would like to review our progress over the past year, explain the rationale behind our testing and fielding activities, and address the next steps in our evolutionary program.

In 2001 and 2002, we successfully conducted four out of five intercept tests using prototype interceptors against long-range ballistic missile targets. These tests gave us the confidence to proceed with the development and fielding of a system that relies primarily on hit-to-kill technologies. While our testing since 2003 has provided us with a wealth of critical data, long-range interceptor aborts in recent tests have been disappointing. These aborts were due to a minor software problem in the first test and a ground support arm that failed to retract in the last.

Now, while these failures do not threaten the basic viability of the system, I believe that we needed to take strong action to ad-

dress them. Initially I chartered an independent team to review our test program, its processes, procedures, and management. They reported the findings to me last week. The team indicated that we had successfully demonstrated the hit-to-kill technology and achieved a major national accomplishment in fielding initial defensive capabilities. They described the rapid development and the initial deployment of the system as comparable to that of the Minute Man and the Polaris ballistic missile programs.

With the basic functionality demonstrated, the team believed that we should now enter a performance and reliability verification phase in which mission assurance becomes the number one objective. They noted that our system reliability is based on multiple interceptors per engagement, whereas our system testing is focused on single interceptor performance. They also observed that our flight testing has a strategic significance well beyond that normally associated with military systems development.

Therefore, the team recommended specific improvements in five areas: first, increase the rigor in the flight test certification process to include the addition of a concurrent and accountable independent assessment of test readiness; second, strengthen system engineering by tightening contractor configuration management, enforcing process and workmanship standards, and ensuring proper specification flow-down; third, add more ground test units and expand ground qualification testing; fourth, hold the contractor functional organization such as quality and mission assurance experts accountable for supporting the program in a better fashion; and finally, ensure program executability by stabilizing baselines.

I will drive the implementation of these recommendations, along with those provided by a task force I also chartered under the leadership of our newly established Director of Mission Readiness, Rear Admiral Kate Paige. With her formidable leadership, talent and Aegis ballistic missile defense expertise, she has the ability to ensure our return to a successful flight test program and the authority to ensure that mission assurance remains our top program priority.

Mr. Chairman, I can assure you that while these test aborts were major disappointments, they were not major technical setbacks. We maintain our confidence in the system's basic design, its hit-to-kill effectiveness, and its inherent operational capability.

Nevertheless, neither you, the American public nor our enemies will believe in our ground-based ICBM defense until we demonstrate its effectiveness by successfully conducting additional operationally realistic tests.

In planning our future test program, the DOT&E and I have jointly approved an integrated master test plan effective through 2007. The plan includes tests that combine developmental and operational testing to reduce costs and increase test efficiency. Within our range safety constraints, we are committed to increasing the operational aspects of our testing. We have also jointly agreed to criteria for operational realism which will be incorporated into our test planning.

While the recommendations of the Mission Readiness Task Force will impact our testing, we currently plan to conduct a test with operational assets this coming year. In 2006, I expect to execute

three to four integrated flight tests using a variety of flight conditions designed to demonstrate the operational effectiveness of the missile defense system.

Our sea-based test program is proceeding very well. The last standard missile-3 intercept in February was the fifth success of six attempts. We plan to conduct two more tests this year using the Aegis cruiser as the primary engagement platform. We will use upgraded software and an advanced standard missile–3 interceptor to engage a variety of targets, including those with separating warheads.

In completing our initial fielding of the block 2004 components, we are also on track. We have successfully built out the initial GMD capability, including the emplacement of 8 ground-based interceptors in Alaska and California which we will increase to 18 by the end of this year. Currently seven Aegis ships providing long-range surveillance and tracking data are ready for stationing. Ten should be available by the end of the year.

In addition, we completed the outfitting of one Aegis cruiser for standard missile-3 interceptors to provide an emergency engagement capability against the short to intermediate range ballistic missiles, and we will have another cruiser outfitted also by the end of the year.

In our sensor program, the Cobra Dane radar in the Aleutians is ready for missile defense use today, and we are integrating upgraded early warning radars in California, the United Kingdom, and our most powerful sensor the SBX this year. In addition, we are now testing a transportable SBX, which we are planning to forward deploy this year as well.

Since October 2004, we have been in a shakedown period, or check-out period, similar to that used by the U.S. Navy ships before entering the fleet. Working closely with U.S. STRATCOM and the combatant commanders, we have certified missile defense crews and put in place the necessary logistic support infrastructure. We have successfully exercised the command, fire control, battle management, and communications capability critical to the operation of the system.

Since we cannot be certain which specific ballistic missile threats we will face in the future, our long-term strategy is to strengthen our capability and maximize our flexibility. As we proceed with this program into the next decade, we will move towards a missile defense that features greater sensor and interceptor mobility while adding a boost-phase defense.

To meet the long-range threat, the GMD element budget request is about $2.3 billion for fiscal year 2006. This covers continued development, ground and flight testing, fielding and support for up to 10 additional GBIs, their silos, and associated support equipment and facilities. In addition, it funds long-lead items for the next increment.

To address the short to intermediate range threat, we are requesting approximately $1.9 billion to continue development and testing of our sea-based midcourse Aegis ballistic missile defense capability and our land-based terminal altitude area defense (THAAD) element. By the end of 2007, we should have up to 28 standard missile-3 interceptors available for use and three Aegis

cruisers and 8 destroyers. Six additional destroyers will be capable of performing the surveillance and track mission.

The THAAD flight testing resumes this year with controlled flight tests and will continue into fiscal year 2006 when we will conduct the first intercept test. We plan to field the first THAAD unit with its 24 missiles by 2009, with a second unit available by 2011. We will continue to roll out sensors that we will knit together using a strong command, control, battle management, and communications foundation.

In 2007, we plan to deploy another forward based X-band radar and launch two space tracking and surveillance systems testbed satellites, which will demonstrate our ability to close the fire control loop worldwide. We are requesting approximately $520 million to accomplish this work.

In executing our program, we are following a strategy to retain alternative development paths until capability is proven, a knowledge-based funding approach, that is. We are preserving decision flexibility with respect to our boost-phase programs until we understand what capabilities they can offer. We have requested approximately $680 million for these activities.

In our primary boost-phase weapons program, the ABL, we have enjoyed recent success achieving the first light and first flight milestones. The next major steps are to complete the current lasing test, finish the beam and fire control flight test program, and then integrate the laser onto the testbed aircraft. I am pleased with where we are today, but we have many technical challenges ahead and it is too early to rely solely on this capability for boost defense.

Therefore, as a parallel path, we undertook the KEI program in response to a 2002 Defense Science Board recommendation. We will not know for 2 or 3 years, however, whether either of these programs will be viable. But in order to meet our top line budget reductions, I decided to accept more risk in this area and restructure the KEI effort to focus on demonstrating a high acceleration booster flight in 2008. If this is successful, it not only provides risk reduction for the ABL program, it also provides us with an alternative mobile approach for the next generation of boosters for our long-range, midcourse, and terminal programs as well.

Finally, we have been working closely with a number of allies to make missile defense a key element of our security relationships and have signed a number of framework agreements to that end.

The Government of Japan is proceeding with the acquisition of a multi-layered BMD system and is expanding their cooperation with us to develop a more capable Aegis standard missile-3 interceptor.

We have also signed agreements with the United Kingdom and Australia and have received approval from Denmark and the Greenland home rule government to upgrade the radar at Thule.

Our work with Israel to implement the Arrow system improvement program is on track.

We are intent on continuing U.S. and Russian collaboration. Presently we are developing software that will be used to support the ongoing U.S.-Russian missile defense exercise program, and a new proposal for target missiles and radar cooperation is being dis-

cussed within the United States-Russian Federation Missile Defense Working Group.

In closing, Mr. Chairman, I want to thank this committee for its tremendous continued support. I also want to thank the thousands of dedicated and talented Americans working on the missile defense program nationwide. I believe that we are on the right track to deliver the unprecedented capabilities that we need to close off a major avenue of vulnerability for this Nation.

I look forward to your questions.

[The prepared statement of General Obering follows:]

PREPARED STATEMENT BY LT. GEN. HENRY A. OBERING III, USAF

Good afternoon, Mr. Chairman, members of the committee. It is an honor to be here today to present the Department of Defense's (DOD) Fiscal Year 2006 Missile Defense Program and budget. The Missile Defense Agency (MDA) mission remains one of developing and incrementally fielding a joint, integrated, and multi-layered Ballistic Missile Defense (BMD) system to defend the United States, our deployed forces, and our allies and friends against ballistic missiles of all ranges by engaging them in the boost, midcourse, and terminal phases of flight.

Our program, reflected in the fiscal year 2006 budget submission, is structured to balance the early fielding elements of this system with its continued steady improvement through an evolutionary development and test approach. The budget also balances our capabilities across an evolving threat spectrum that includes rogue nations with increasing ballistic missile expertise.

We are requesting $7.8 billion to support our program of work in fiscal year 2006, which is approximately $1 billion less than the fiscal year 2005 request. About $1.4 billion covers the continued fielding and sustainment of our block increments of long-range ground-based midcourse defense (GMD) components; our short- to intermediate-range defense involving Aegis ships with their interceptors; as well as all of the supporting radars, command, control, battle management, and communication capabilities. About $6.4 billion will be invested in the development foundation for continued testing and evolution of the system.

To provide the context for our budget submission, I would like to review what we have accomplished over the past year. While I believe the Missile Defense Program is on the right track to deliver multilayered, integrated capabilities to counter current and emerging ballistic missile threats, I am planning to make some program adjustments in light of our two recent flight test failures.

I also will explain the rationale behind our testing and fielding activities and address the next steps in our evolutionary BMD program.

THE EVOLVING SECURITY ENVIRONMENT

The threat we face from proliferating and evolving ballistic missile systems and associated technologies and expertise continues unabated. There were nearly 100 foreign ballistic missile launches around the world in 2004. This is nearly double the number conducted in 2003 and slightly greater than the number of launches in 2002. More than 60 launches last year involved short-range ballistic missiles, over 10 involved medium-range missiles, and nearly 20 involved land- and sea-based long-range ballistic missiles.

Operations Desert Storm (1991) and Iraqi Freedom (2003) demonstrated that missile defenses must be integrated into our regional military responses if we are to provide adequate protection of Coalition Forces, friendly population centers, and military assets. We must expect that troops deployed to regional hotspots will continue to encounter increasingly sophisticated ballistic missile threats.

Nuclear-capable North Korea and nuclear-emergent Iran have shown serious interest in longer-range missiles. They underscore the severity of the proliferation problem. Our current and near-term missile defense fielding activities are a direct response to these dangers. There are also other ballistic missile threats to the homeland that we must address in the years ahead, including the possibility of an offshore launch.

We have had recent experience with tragic hostage situations involving individuals, and we have witnessed how the enemy has attempted to use hostages to coerce or blackmail us. Imagine now an entire city held hostage by a state or a terrorist organization. This is a grim prospect, and we must make every effort to prevent it from occurring. Any missile carrying a nuclear or biological payload could inflict cat-

astrophic damage. I believe the ability to protect against threats of coercion and actively defend our forces, friends and allies, and homeland against ballistic missiles will play an increasingly critical role in our national security strategy.

MISSILE DEFENSE APPROACH—LAYERED DEFENSE

We believe that highly integrated layered defenses will improve the chances of engaging and destroying a ballistic missile and its payload. This approach to missile defense also makes deployment of countermeasures much more difficult. If the adversary has a successful countermeasure deployment or tactic in the boost phase, for example, he may play right into the defense we have set up in midcourse. Layered defenses provide defense in depth and create an environment intended to frustrate an attacker. The elements of this system play to one another's strengths while covering one another's weaknesses.

With the initial fielding last year of the GMD and Aegis surveillance and track capabilities of this integrated system, we are establishing a limited defensive capability for the United States against a long-range North Korean missile threat. At the same time, we are building up our inventory of mobile interceptors to protect coalition forces, allies and friends against shorter-range threats. With the cooperation of our allies and friends, we plan to evolve this defensive capability to improve defenses against all ranges of threats in all phases of flight and expand it over time with additional interceptors, sensors, and defensive layers.

Since we cannot be certain which specific ballistic missile threats we will face in the future, or from where those threats will originate, our long-term strategy is to strengthen and maximize the flexibility of our missile defense capabilities. As we proceed with this program into the next decade, we will move towards a missile defense force structure that features greater sensor and interceptor mobility. In line with our multilayer approach, we will expand terminal defense protection and place increasing emphasis on boost phase defenses, which today are still early in development.

INITIAL FIELDING OF BLOCK 2004

Since my predecessor last appeared before this committee, we have made tremendous progress and have had a number of accomplishments. We also came up short of our expectations in a few areas.

We stated last year that, by the end of 2004, we would begin fielding the initial elements of our integrated BMD system. We have met nearly all of our objectives. We have installed six ground-based interceptors in silos at Fort Greely, Alaska and two at Vandenberg Air Force Base in California. We completed the upgrade of the Cobra Dane radar in Alaska and the modification of six Aegis ships for long-range surveillance and tracking support. These elements have been fully connected to the fire control system and are supported by an extensive command, control, battle management, and communications infrastructure. In addition, we have put in place the required logistics support infrastructure and support centers.

Since October 2004, we have been in a "shakedown" or check-out period, similar to that used as part of the commissioning of a U.S. Navy ship before it enters the operational fleet. We work closely with U.S. Strategic Command (USSTRATCOM) and the combatant commanders to certify missile defense crews at all echelons to ensure that they can operate the ballistic missile defense system if called upon to do so. We have exercised the command, fire control, battle management, and communication capabilities critical to the operation of the system. The Aegis ships have been periodically put on station in the Sea of Japan to provide long-range surveillance and tracking data to our battle management system. We have fully integrated the Cobra Dane radar into the system, and it is ready for operational use even as it continues to play an active role in our test program by providing data on targets of opportunity. Finally, we have executed a series of exercises with the system that involves temporarily putting the system in a launch-ready state. This has enabled us to learn a great deal about the system's operability. It also allows us to demonstrate our ability to transition from development to operational support and back. This is very important since we will continue to improve the capabilities of the system over time, even as we remain ready to take advantage of its inherent defensive capability should the need arise.

COMPLETING BLOCK 2004

Today we remain basically on track with interceptor fielding for the Test Bed. We have recovered from the 2003 propellant accident, which last year affected the long-range ground-based interceptors as well as the Aegis Standard Missile-3 (SM–3) and Terminal High Altitude Area Defense (THAAD) booster production. We should have

ten more interceptors emplaced in Alaska by December of this year. In October, we received the first Standard Missile-3 for deployment aboard an Aegis ship. To date, we have five of these interceptors with a total of eight scheduled to be delivered by the end of the year. By then, we will also have outfitted two Aegis cruisers with this engagement capability. So, in addition to providing surveillance and tracking support to the integrated BMD system, Aegis will soon provide a flexible sea-mobile capability to defeat short- to intermediate-range ballistic missiles in their midcourse phase.

Our sensor program is also on track. The Beale radar in California is receiving final software upgrades this spring and will be fully integrated into the system. We are now testing a transportable X-band radar, which can be forward-deployed this year to enhance our surveillance and tracking capabilities. Our most powerful sensor capability, the Sea-Based X-band Radar (SBX) will be on station, ported in Adak, Alaska by December. This radar is so capable that, if it were sitting in Chesapeake Bay, it could detect a baseball-sized object in space over San Francisco. This sea-mobile midcourse radar will allow us to increase the complexity of our tests by enabling different intercept geometries. When we deploy it in the Pacific Ocean, it also will have an inherent operational capability against threats from Asia. Finally, the RAF Fylingdales early warning radar in the United Kingdom will be fully integrated for missile defense purposes by early 2006 and will provide the initial sensor coverage needed against Middle East threats.

BMD elements will remain part of the system test bed even after we field them for initial capability. However, the MDA does not operate the BMD system. Our job is to provide a militarily useful capability to the warfighter. Because the BMD system is integrated and involves different Services, the MDA will continue to manage system configuration to ensure adequate integration of new components and elements and the continued smooth operation of the system.

For these reasons, Congress mandated the Agency to maintain configuration control over PAC–3 and the Medium Extended Air Defense System (MEADS) following their transfer to the Army. Regarding the transition of the system elements, we use several models. Each transition, to include time and method of transfer, will be unique. In some cases, it may not be appropriate to transfer a BMD system element to a Service. The SBX, for example, will likely remain a MDA test bed asset and be made available for operational use as appropriate. In other words, the Services and the MDA will have shared responsibilities and will continue to work with the Secretary of Defense (SECDEF), the Services, and the component commanders to arrange appropriate element transfer on a case-by-case basis.

BUILDING CONFIDENCE THROUGH SPIRAL TESTING

The development and fielding of Block 2004 was initiated based on the confidence we built in our test program between 2000 and 2002. We successfully conducted four out of five intercept tests using prototypes of the ground-based interceptors we have in place today against long-range ballistic missile targets. In addition, in 2002 and 2003, we successfully conducted three intercept tests against shorter-range targets using an earlier version of the sea-based Aegis SM–3 interceptors we are deploying today. These tests demonstrated the basic viability and effectiveness of a system that relies primarily on hit-to-kill technologies to defeat in-flight missiles. In fact, we had learned as much as we could with the prototypes and decided it was time to restructure the program to accelerate the testing of the initial operational configurations of the system elements.

In 2003 and 2004, we had three successful flight tests of the operational long-range booster now emplaced in the silos in Alaska and California. The booster performed exactly as predicted by our models and simulations. In addition, between 2002 and 2004, we successfully executed 58 flight tests, 67 ground tests, simulations, and exercises, all of which have continued to bolster our confidence in the basic ballistic missile defense capabilities. In the past year, however, we had several concerns with quality control and, as a result, executed only two long-range flight tests since last spring.

The interceptor launch aborts in Integrated Flight Test (IFT)–13C last December and IFT–14 this past February were disappointments, but they were not, by any measure, serious setbacks. The anomaly that occurred in IFT–13C, in fact, is a very rare occurrence. As the interceptor prepares to launch, its on-board computer does a health and status check of various components. In that built-in test, interceptor operations were automatically terminated because an overly stringent parameter measuring the communications rate between the flight computer and its guidance components was not met. The launch control system actually worked as it was designed when it shut the interceptor down. A simple software update to relax that

parameter corrected the problem. The fix was verified during subsequent ground tests and the next launch attempt. We did enjoy some success in the test. We successfully tracked the target and fed that information into the fire control system, a process that allowed us to successfully build a weapons task plan that we then loaded and, which was accepted, into the interceptor's computer.

In February we used the same interceptor to attempt another flight test. Again, the target successfully launched. The interceptor successfully powered up and worked through built-in test procedures and was fully prepared to launch. Again, the system successfully tracked the target and fed the information to the fire control system, which generated a weapons task plan accepted by the interceptor's computer. This time, however, a piece of ground support equipment did not properly clear, and the launch control system did not issue a launch enable command.

Mr. Chairman, I can assure you that while these test aborts were major disappointments, they were not major technical setbacks. We maintain our confidence in the system's basic design, its hit-to-kill effectiveness, and its inherent operational capability. Because of our recent test launch aborts, I have chartered an independent team to review our test processes, procedures, and management. In addition, I have named the current Aegis BMD program director, Rear Admiral Kate Paige, as the Agency's Director of Mission Assurance with full authority to implement the corrections needed to ensure return to a successful flight test program. We have pursued a comprehensive and integrated approach to missile defense testing under the current program and are gradually making our tests more complex. Missile defense testing has evolved, and will continue to evolve, based on results. We are not in a traditional development, test, and production mode where we test a system, then produce hundreds of units without further testing. We will always be testing and improving this system, using a spiral testing approach that cycles results into our spiral development activities. That is the very nature of spiral development. This approach also means fielding test assets in operational configurations. This dramatically reduces time from development to operations, which is critical in a mission area where this nation has been defenseless. Nevertheless, neither you, the American public, nor our enemies will believe in our ground-based Intercontinental Ballistic Missile (ICBM) defense until we demonstrate its effectiveness by successfully conducting additional operationally realistic flight tests.

We have a very aggressive test program over the next 2 years. After we fly the interceptor which aborted in the last two flight tests to gain confidence in our corrections, we plan to conduct two more long-range interceptor tests this calendar year. These will include: an engagement sequence that uses an operationally configured Aegis ship to provide tracking information to a long-range interceptor and an engagement sequence that uses an interceptor launched from an operational site, Vandenberg; tracking information provided by an operational radar at Beale; and a target launched out of the Kodiak Launch Complex in Alaska. This year we also plan to fly targets across the face of the Cobra Dane radar in the Aleutians and Beale in California. All of these tests are part of an operationally realistic test program as required by law.

In fiscal year 2006, we are adding new test objectives and using more complex scenarios. Also, warfighter participation will grow. We plan to execute four flight tests using the long-range interceptor under a variety of flight conditions and, for the first time, use tracking data from the sea-based X-band radar.

In terms of our sea-based midcourse defense element, this past February, we successfully used a U.S. Navy Aegis cruiser to engage a short-range target ballistic missile. This test marked the first use of an operationally configured Aegis SM–3 interceptor. In the last three Aegis BMD intercept flight tests, we incrementally ratcheted up the degree of realism and reduced testing limitations to the point where we did not notify the operational ship's crew of the target launch time and they were forced to react to a dynamic situation. This year, we will conduct two more tests using Aegis as the primary engagement platform. In fiscal year 2006, Aegis ballistic missile defense will use upgraded software and an advanced version of the SM–3 interceptor to engage a variety of short- and medium-range targets, including targets with separating warheads. We also plan to work with Japan to test the engagement performance of the SM–3 nosecone developed in the U.S./Japan Cooperative Research project.

Four Missile Defense Integration Exercises involving warfighter personnel will test hardware and software in the integrated system configuration to demonstrate system interoperability. War games also are an integral part of concept of operations development and validation. Four integrated missile defense wargames in fiscal year 2006 will collect data to support characterization, verification, and assessment of the ballistic missile defense system with respect to operator-in-the-loop

planning and the exchange of information in the system required for successful development and system operation.

In addition to having laid out a very ambitious test plan, we are working hand-in-hand with the warfighter community and the independent testing community. We have more than one hundred people from the test community embedded in our program activities, and they are active in all phases of test planning, execution, and post-test analysis. We meet with them at the senior level on a weekly basis, and they help us develop and approve our test plans. All data from testing is available to all parties through a Joint Analysis Team and are used to conduct independent assessments of the system.

The MDA and Director, Operational Test & Evaluation (DOT&E) have completed and jointly approved an Integrated Master Test Plan, effective through 2007. The plan includes tests that combine developmental and operational testing to reduce costs and increase testing efficiency. Within our range safety constraints, we are committed to increasing the operational aspects as I stated earlier. This accumulated knowledge helps inform the assessment of operational readiness.

BUILDING THE NEXT INCREMENT—BLOCK 2006

In building the BMD program of work within the top line budget reductions I mentioned earlier, we followed several guiding principles. To keep ahead of the rogue nation threats, we recognized the need to continue holding to our fielding commitments to the President for Blocks 2004 and 2006, including investment in the necessary logistics support. We also knew that we must prepare for asymmetric (e.g., the threat from off-shore launches) and emerging threat possibilities as well in our fielding and development plans.

In executing our program we are following a strategy to retain alternative development paths until capability is proven—a knowledge-based funding approach. This is a key concept in how we are executing our development program. We have structured the program to make decisions as to what we will and will not fund based upon the proven success of each program element. The approach involves tradeoffs to address sufficiency of defensive layers—boost, midcourse, terminal; diversity of basing modes—land, sea, air and space; and considerations of technical, schedule and cost performance.

The funding request for fiscal year 2006 will develop and field the next increment of missile defense capability to improve protection of the United States from the Middle East, expand coverage to allies and friends, improve our capability against short-range threats, and increase the resistance of the integrated system to countermeasures. We are beginning to lay in more mobile, flexible interceptors and associated sensors to meet threats posed from unanticipated launch locations, including threats launched off our coasts.

For midcourse capability against the long-range threat, the GMD element budget request is about $2.3 billion for fiscal year 2006 to cover continued development, ground and flight testing, fielding and support. This request includes up to 10 additional ground-based interceptors, their silos, and associated support equipment and facilities as well as the long-lead items for the next increment. It also continues the upgrade of the Thule radar station in Greenland.

To address the short- to intermediate-range threat, we are requesting approximately $1.9 billion to continue development and testing of our sea-based midcourse capability, or Aegis BMD, and our land-based THAAD element. We will continue purchases of the SM–3 interceptor and the upgrading of Aegis ships to perform the BMD mission. By the end of 2007 we should have up to 28 SM–3 interceptors on 3 Aegis cruisers and 8 Aegis destroyers. This engagement capability will improve our ability to defend our deployed troops and our friends and allies. Six additional destroyers, for a total of 17 Aegis ships, will be capable of performing the surveillance and track mission.

THAAD flight testing begins this year with controlled flight tests as well as radar and seeker characterization tests and will continue into fiscal year 2006, when we will conduct the first high endo-atmospheric intercept test. We are working toward fielding the first THAAD unit in the 2008–2009 timeframe with a second unit available in 2011.

We will continue to roll out sensors that we will net together to detect and track threat targets and improve discrimination of the target suite in different phases of flight. In 2007, we will deploy a second forward-based X-band radar. We are working towards a 2007 launch of two Space Tracking and Surveillance System (STSS) test bed satellites. These test bed satellites will demonstrate closing the fire control loop and the value of STSS tracking data. We are requesting approximately $521 million in fiscal year 2006 to execute this STSS and BMDS Radar work.

All of these system elements must be built on a solid command, control, battle management, and communications foundation that spans thousands of miles, multiple time zones, hundreds of kilometers in space, and several combatant commands. This foundation allows us to mix and match sensors, weapons, and command centers to dramatically expand our detection and engagement capabilities over that achieved by the system's elements operating individually. In fact, without this foundation we cannot execute our basic mission. That is why the Command, Control, Battle Management, and Communications program is so vital to the success of our integrated capability.

Building a single integrated system of layered defenses has forced us to transition our thinking to become more system-centric. We established the Missile Defense National Team to solve the demanding technical problems involved in this unprecedented undertaking. No single contractor or government office has all the expertise needed to design and engineer an integrated and properly configured BMD system. The National Team brings together the best, most experienced people from the military and civilian government work forces, industry, and the Federal laboratories to work aggressively and collaboratively on one of the Nation's top priorities. However, integrating the existing elements of the BMD System proved to be very challenging. Today, we have streamlined the team's activities and realigned their priorities to focus on providing the detailed systems engineering needed for a truly integrated capability. The team has now gained traction and is leading the way to building the system this Nation will need for the future.

MOVING TOWARD THE FUTURE—BLOCK 2008 AND BEYOND

There is no silver bullet in missile defense, and strategic uncertainty could surprise us tomorrow with a more capable adversary. So it is important to continue our aggressive parallel paths approach as we build this integrated, multilayered defensive system. There are several important development efforts funded in this budget.

We are preserving decision flexibility with respect to our boost phase programs until we understand what engagement capabilities they can offer. We have requested approximately $680 million for these activities in fiscal year 2006.

In fiscal year 2006 we are beginning the integration of the high-power laser component of the Airborne Laser (ABL) into the first ABL weapon system test bed and will initiate ground-testing. Following that we will integrate the high-power laser into the aircraft and conduct a campaign of flight tests, including lethal shoot-down of a series of targets. We still have many technical challenges with the ABL, but with the recent achievements of first light and first flight of the aircraft with its beam control/fire control system, I am pleased with where we are today. We have proven again that we can generate the power and photons necessary to have an effective directed energy capability. An operational ABL could provide a valuable boost phase defense capability against missiles of all ranges. The revolutionary potential of this technology is so significant, that it is worth both the investment and our patience.

We undertook the Kinetic Energy Interceptor (KEI) boost-phase effort in response to a 2002 Defense Science Board Summer Study recommendation to develop a terrestrial-based boost phase interceptor as an alternative to the high-risk ABL development effort. We will not know for 2 or 3 years, however, whether either of these programs will be technically viable. With the recent successes we have had with ABL, we are now able to fine-tune our boost-phase development work to better align it with our longer-term missile defense strategy of building a layered defense capability that has greater flexibility and mobility.

We have established the ABL as the primary boost phase defense element. We are reducing our fiscal year 2006 funding request for the KEI effort and have restructured that activity, building in a 1-year delay, in order to focus near-term efforts on demonstrating key capabilities and reduce development risks. We restructured the KEI activity as risk mitigation for the ABL and focused it on development of a land-based mobile, high-acceleration booster. It has always been our view that the KEI booster, which is envisioned as a flexible and high-performance booster capable of defending large areas, could be used as part of an affordable, competitive next-generation replacement for our midcourse or even terminal interceptors. Decisions on sea-based capability and international participation in this effort have been deferred until the basic KEI technologies have been demonstrated. The restructured KEI activity will emphasize critical technology demonstrations and development of a mobile, flexible, land-based ascent and midcourse engagement capability around 2011, with a potential sea-based capability by 2013. A successful KEI mobile missile defense capability also could improve protection of our allies and friends.

We are requesting $82 million in fiscal year 2006 to continue development of the Multiple Kill Vehicle (MKV). MKV is a generational upgrade to ground-based mid-course interceptors to increase their effectiveness in the presence of countermeasures. We look forward to the first intercept attempt using MKV sometime in 2008.

Our flexible management structure allows us to adjust development activities based on demonstrated test results, improve decision cycle times, and make the most prudent use of the taxpayer's money. Using a knowledge-based funding approach in our decisionmaking, we will conduct periodic continuation reviews of major development activities against cost, schedule, and performance expectations. We have flexibility in our funding to support key knowledge-based decision paths, which means that we can reward successful demonstrations with reinvestment and redirect funds away from efforts that have not met our expectations. We have assigned a series of milestones to each of the major program activities. The milestones will provide one measure for decisionmaking and help determine whether a program stays on its course or is accelerated, slowed, or terminated. This approach gives us options within our trade space and helps us determine where we should place our resources, based on demonstrated progress. The alternative is to terminate important development activities without sufficient technical data to make smart decisions. We believe that this approach also acts as a disincentive to our contractors and program offices to over-promise on what they can deliver.

INTERNATIONAL PARTICIPATION

Interest in missile defense among foreign governments and industry has continued to rise. We have been working closely with a number of allies to forge international partnerships that will make missile defense a key element of our security relationships around the world.

The Government of Japan is proceeding with the acquisition of a multilayered BMD system, basing its initial capability on upgrades of its Aegis destroyers and acquisition of the Aegis SM–3 missile. We have worked closely with Japan since 1999 to design and develop advanced components for the SM–3 missile. This project will culminate in flight tests in 2005 and 2006. In addition, Japan and other allied nations are upgrading their Patriot fire units with PAC–3 missiles and improved ground support equipment. This past December we signed a BMD framework Memorandum of Understanding (MOU) with Japan to expand our cooperative missile defense activities.

We have signed three agreements over the past 2 years with the United Kingdom, a BMD framework MOU and two annexes. In addition to the Fylingdales radar development and integration activities this year, we also agreed to continue cooperation in technical areas of mutual interest.

This past summer we signed a BMD framework MOU with our Australian partners. This agreement will expand cooperative development work on sensors and build on our longstanding defense relationship with Australia. We also are negotiating a Research, Development, Test and Evaluation annex to the MOU to enable collaborative work on specific projects, including: high frequency over-the-horizon radar, track fusion and filtering, distributed aperture radar experiments, and modeling and simulation.

We have worked through negotiations with Denmark and the Greenland Home Rule Government to upgrade the radar at Thule, which will play an important role in the system by giving us an early track on hostile missiles. We also have been in sensor discussions with several allies located in or near regions where the threat of ballistic missile use is high.

Our North Atlantic Treaty Organization (NATO) partners have initiated a feasibility study for protection of NATO territory and population against ballistic missile attacks, which builds upon ongoing work to define and develop a NATO capability for protection of deployed forces.

We are continuing work with Israel to implement the Arrow System Improvement Program and enhance its missile defense capability to defeat the longer-range ballistic missile threats emerging in the Middle East. We also have established a capability in the United States to co-produce components of the Arrow interceptor missile, which will help Israel meet its defense requirements more quickly and maintain the U.S. industrial work share.

We are intent on continuing U.S.-Russian collaboration and are now working on the development of software that will be used to support the ongoing U.S.-Russian Theater Missile Defense exercise program. A proposal for target missiles and radar cooperation is being discussed within the U.S.-Russian Federation Missile Defense Working Group.

We have other international interoperability and technical cooperation projects underway as well and are working to establish formal agreements with other governments.

CLOSING

Mr. Chairman, I want to thank this committee for its continued support of the Missile Defense Program. As we work through the challenges in the coming months, we will conduct several important tests and assessments of the system's progress. We will continue our close collaboration with the independent testers and the warfighters to ensure that the capabilities we field are effective, reliable, and militarily useful. There certainly are risks involved in the development and fielding activities. However, I believe we have adequately structured the program to manage and reduce those risks using a knowledge-based approach that requires each program element to prove that it is worthy of being fielded.

I believe we are on the right track to deliver multilayered, integrated capabilities to counter current and emerging ballistic missile threats. For the first time in its history, the United States today has a limited capability to defend our people against long-range ballistic missile attack. I believe that future generations will find these years to be the turning point in our effort to field an unprecedented and decisive military capability, one that closes off a major avenue of threat to our country.

Thank you and I look forward to your questions.

Senator SESSIONS. Thank you, General Obering.

Senator Nelson, our ranking member, has joined us now. I wonder if you have any opening comments before we get started.

Senator BILL NELSON. Mr. Chairman, I will submit a statement for the record. I have some questions that I would like to get into right away.

[The prepared statement of Senator Bill Nelson follows:]

PREPARED STATEMENT BY SENATOR BILL NELSON

Thank you Mr. Chairman. I want to join you in welcoming our witnesses, who represent the operational users, the developers, the acquisition leadership, and the operational testing community for ballistic missile defense (BMD). It is an impressive gathering of talent and experience.

I am pleased that all members of full committee have been invited to this hearing. BMD is an important topic of interest to the whole committee, and to the Nation.

We all want to protect our Nation against all serious threats, from terrorism to missile attacks. But we also want to be sure that any BMD system we build will work effectively, especially since we are investing tens of billions of dollars in the system.

As we hold this hearing, we must acknowledge current reality: we began fielding a system last year that has failed its last three intercept flight tests. People are concerned that we are deploying a system that may not work, or that may require considerable work and expense to fix. As it is, the Defense Department (DOD) plans to spend more than $55 billion over the next 6 years on BMD, and that assumes everything goes well.

We need to have confidence that we are buying an effective system, not a defective system. The best way to gain that confidence is through testing, especially through realistic operational testing.

It would help if there were a plan for operational testing of the system, and a schedule for when that testing would begin. Unfortunately, that is not the case today. While there is a test plan for the development of the system, including an effort to include what is called "operational realism," it is still not operational testing.

I gather that there have been good discussions recently among the organizations represented here today on the need for operational testing, and on the leading role that the Director of Operational Test and Evaluation (DOT&E) will play in establishing a test plan, evaluating the results and reporting them to Congress.

I want to commend our witnesses today for undertaking serious discussions on how to do the right thing when it comes to testing this system and making sure it works. I want to encourage you all to continue working together to get the best possible result. I hope our witnesses will describe the progress they are making and what they hope to achieve. I believe we should consider legislation that would require adequate testing of the BMD system, to help make sure we get it right and produce a system that the American taxpayers can rely on.

I look forward to hearing from our witnesses.

Senator SESSIONS. Thank you.

General Dodgen, we are glad to have you with us. General Holly, it is good to see you and have you with us.

Mr. Wynne, the budget decision 753 reduced the planned budget for missile defense by $1 billion in fiscal year 2006 and $5 billion over the fiscal year 2006–2011 time frame. Can you explain the rationale for these cuts and what guidance, if any, did you or other senior officials provide the MDA regarding the cuts and your observations about them?

Mr. WYNNE. Sir, I only will tell you that this is, as is every budget, a constrained resource environment, number one.

Number two, I think the arguments were not carried well after two successive missile defense tests based on a need to go back and refocus on quality and refocus on flight verification. I think the budget argument could have been better had those both been successful.

I think the partnering that has gone on between the DOT&E and the Missile Defense Director has been excellent since.

I will also tell you that the sole direction the MDA Director received was that he should go back and balance the risk, balance the quality, and balance the performance and meet his mission. He accepted that challenge, sir, and provided us the results.

Senator SESSIONS. Well, you have a good man to take on that challenge, I have no doubt.

General Obering, would you share with us from your perspective the impact these reductions have placed on you, whether or not you will be able to maintain the missile production lines, what it means in terms of other things like KEI? Tell us, based on where you are, what the impact would be.

General OBERING. Yes, sir. What happens when we go in and do a restructure in our budget, what we have to take a look at is balancing the risk. That is exactly what we end up doing. Again, as I said in my statement, we want to try to balance our commitments to fielding, along with the continued development of the program because we know that we are going to have to improve it over time.

Now, specifically we took the $1 billion cut in 2006. I looked across the board. I looked at where we were with the airborne laser program, the fact that we had had significant milestone achievement over the last year. We had started the KEI program as a risk reduction alternative in the boost-phase to that.

Senator SESSIONS. Risk reduction. What do you mean?

General OBERING. That means if ABL does not work out, we need to have a boost-phase defense. We cannot be vulnerable in that phase. We have to have the multi-phased approach.

So I took a look and said we are making good progress on the ABL, but we are not out of the woods yet. We still have a ways to go. But with the first light and the first flight milestones, we have answered many of the technical questions associated with that program. So we restructured the KEI. We stretched it out for a year, and then we focused it down on the demonstration of the capability that we really need from that, which is a very high acceleration booster, much faster acceleration than anything else in our inventory to get to that boost-phase defense.

It turns out that if we can do that—and we planned that flight in 2008 now—it also gives us some tremendous way ahead with respect to upgrading of our midcourse and terminal phases because that high acceleration with the mobile capability of the KEI is very attractive in terms of not being fixed to a fixed line of defense. So that is why I wanted to not cancel that program. I wanted to keep that program, but I also wanted to make sure that it demonstrated its critical technical progress which is a very high acceleration booster. So that is why we focused a lot of our cuts there.

We also delayed the third site that we had planned for the GMD program where we were negotiating with several countries in Europe. We delayed that by a year in order to achieve our budget reductions. What that does, as that moves out, is to provide us with another alternative with our allies, as to whether we want to put a fixed site defense there or have a mobile option available to them as well.

I felt that the advantages of the two configurations we were carrying on the ground-based midcourse program, the Orbital Boost vehicle and the Lockheed Martin configuration, the advantage of having those two configurations were no longer with us. We have proven the Orbital Booster performance, as you said in your opening statement, and we feel comfortable with that configuration. It was very good that we had the dual configurations 2 years ago, when we had the accident in the plant in California, because we were able to go to another supplier and continue on with our program.

The problem we have now is, when we requalified the booster motor supplier after that accident, we now have the same supplier for both boosters. So we do not enjoy the redundancy that we had before in motor suppliers. So I was willing, I thought, to take the further risk in that program by terminating and backing out of the Lockheed Martin Booster program.

Then finally, General Kadish, my predecessor, did a tremendous job in laying the technical foundation for the integration of this system. But we never took a very hard look at the programmatic integration across all the programs we had and how we could get more streamlined in the management of those programs. That is what we are taking a look at to try to generate some efficiencies in the way that we are overseeing and managing the programs. So, that is how we laid in those cuts.

Senator SESSIONS. Can you just give us some round numbers about each one of these programs, about how much reduction from your original plans you took?

General OBERING. I can tell you that, about $300 million the infrastructure overall.

Senator SESSIONS. Does that include the——

General OBERING. That is everything.

Senator SESSIONS. Worldwide?

General OBERING. Yes, sir. The $300 million is the infrastructure worldwide for managing the program. The KEI program, we reduced by about $700 million to $800 million in the near term, in the 1 year. Then across the board, about a total of $5 billion, if I recall—the KEI program reductions accounted for about $4 billion of that total.

Senator SESSIONS. I know you have issued a hiring freeze notice. What can you tell us about that? Does that reflect cuts that may be unhealthy? I mean, a freeze indicates sometimes you are not able to have the money to move the way you would like to. How would you describe that?

General OBERING. Sir, the way I would describe it is, we issued that because we wanted to make sure that we got a good snapshot of where we were as we go into this infrastructure reduction. So, again, we are going to have to take risk. That is part of this, part of meeting our budget top line reductions. But I do believe that we will get more efficient in our management, and I think we will be able to meet our reductions and then continue on because we do not want to keep the hiring freeze around too long, because then you can get yourself into a tailspin that you do not want to come out of.

Senator SESSIONS. I will agree with that.

What about the interceptors 31 through 40? Will you be able to maintain that assembly line? What penalties do we face if you do not maintain that level of production of those launchers?

General OBERING. Well, sir, if we do not get the money we need to do the advanced long lead for that and then we end up with a break in our assembly line, it will be about $260 million to $300 million in terms of the cost of reconstituting the assembly line and production.

The other thing that happens is if we——

Senator SESSIONS. But now, you are saying you are not going to have to see a break. Are you confident that under this budget that you will be able to maintain that production without suffering a break and the Government having to face that kind of penalty?

General OBERING. Sir, I would say that we have managed this to a fine line. We have this down to about the minimum that we can do and not have that production break. So it is critical that we get the budget request that we have asked for, including the long lead for that.

Senator SESSIONS. Senator Nelson, do you want to take your opening now?

Senator BILL NELSON. No. I would like to go right into the questions.

Senator SESSIONS. Go right ahead.

Senator BILL NELSON. Good afternoon, gentlemen. Thank you for being here.

General Cartwright, what we have in the ground in Alaska ready to launch—three attempted intercept flight tests have failed, and what is in the ground, the operationally tested booster and the kill vehicle have never been flight tested. Is that correct?

General CARTWRIGHT. That configuration has never been tested. That is correct.

Senator BILL NELSON. Now, the organization represented by Mr. Duma does not believe, as testified here today, that there has been sufficient testing to provide confidence that the system would work effectively, that which you have in the ground. So do you think, General, that it would be wise to focus on more testing and development of the system, or do you believe that the system is ready now for operational alert status?

General CARTWRIGHT. As I stated in my opening comments, our focus in 2005 is on more realistic operational testing. If the Nation needs it, we have a thin line. We have an emergency capability, but the focus needs to be on increasing the depth of the sensors, the command and control, and the weapons, and realistic operational testing.

Senator BILL NELSON. So what you are saying is that if the focus is on continued testing and development, you think that it could be brought up to alert if needed in an emergency.

General CARTWRIGHT. Yes, sir.

Senator BILL NELSON. Then is there any reason not to use the testbed to learn more about how well the system works and to improve the capability of the system?

General CARTWRIGHT. If I understand your question, that is the objective of the shakedown capability or what we are trying to do is take operators, put it on the testbed, use the testbed to further our knowledge both on this limited capability and what we would desire to have in a more expanded and comprehensive capability.

Senator BILL NELSON. I want you all to know that I appreciate your candor because the previous representation that we have had here to this committee was that what is in the ground up there in Alaska is ready to go and it is operational.

General CARTWRIGHT. Again, if asked, one, we have the crews trained. We have a thin line of command and control, what we are calling rudimentary command and control. We have a system of sensors and a system of weapons. We have questions about different components of that. It has no depth. In other words, there are not redundant systems behind it, but we would put that system on alert. I am confident of the training of the soldiers that operate that system, and we would use it. But I think it has to be characterized as rudimentary and one that is thin line.

Senator BILL NELSON. If I were asked to climb on it and ride it, it has not exactly been checked out, ready to go.

General CARTWRIGHT. I think that that is a fair statement, but I still would use it.

Senator BILL NELSON. Mr. Duma, would you agree that the GMD system is not mature yet and that it needs continued development and testing?

Mr. DUMA. Yes, Senator, I would. In fact, what we have laid out with the MDA is continued testing of that system to accomplish exactly what General Cartwright addressed, to get that redundancy and get out of the thin line aspect, as he puts it, so that you have a greater confidence that if the emergency came and you had to use it, you would have a greater degree of confidence that it would work.

Senator BILL NELSON. Specifically with regard to confidence, is it your opinion that given the lack of flight test data, there is no demonstrated basis yet for confidence that the system would work in an operationally effective and reliable manner?

Mr. DUMA. The system exists. We have the people. We have the equipment. We have the procedures. What we do not have is a demonstration that they all work together yet. There are still things in development in terms of algorithms. The sea-based radar is an example that I had in my statement. Those things need to

be tested to show that we have that capability. It does not mean we do not have the assets and we have them to try.

Senator BILL NELSON. Again, I am not being critical here. What we want from this committee is we want a set of rockets with a kill vehicle on top of it that is going to hit its mark. That is what all of us around this table want. Would you agree that given the GMD flight test failures, that the system has problems with quality and reliability that need to be fixed?

Mr. DUMA. I do. In fact, I testified to that before the House subcommittee, and that is the action that General Obering has taken with his independent review teams to identify the root causes. There is a quality problem.

Senator BILL NELSON. Just to nail it down for the record, am I correct in understanding that the GMD system is undergoing developmental testing and not operational testing, even though you tried to squeeze as much operational realism out of each developmental flight test?

Mr. DUMA. I believe that is an accurate assessment, Senator.

Senator BILL NELSON. Thank you. Thank you for your candor, General and Mr. Duma. That is not the spirit of the testimony that this committee has received in the past.

Senator SESSIONS. I do not know about the spirit.

Let us see. Senator Reed or Senator Cornyn. You are okay, Senator Reed? We will go to Senator Cornyn. You were here earlier I know.

Senator CORNYN. He was here earlier.

Senator REED. John, go ahead.

Senator CORNYN. Thank you very much, Mr. Chairman. Thank you, gentlemen for being here today.

In light of the questions that you just heard, I want to make sure I have the story straight. What we have is not so much a program budget that is based on a demonstrated ability to function and knock down ballistic missiles before they hit us but is predicated more on the basis of what we perceive the threat to be at this point. Would you agree with that, General Cartwright? Maybe my question is not clear. If it is not, just let me know.

General CARTWRIGHT. I think what you are saying is that we have a perceived threat, which I outlined in my statement is both in my mind real, in the judgment of the intelligence agencies, and is growing, against which we are trying to match a capability that will both influence the way that threat behaves and potentially if that threat were realized, could defeat it.

Senator CORNYN. You said it so much better than I did. [Laughter.]

That is my understanding as well.

What I also understand is that if we waited until we went through a traditional test and operation before we then concerned ourselves with possibly deploying these, in the case of an emergency, it really might be too late. Would you agree with that, General Obering?

General OBERING. Yes, sir. You have hit on a very key aspect of what we are doing, and it is something that goes back to what Mr. Wynne talked about. In this area, where you have no defense, it makes sense that as you demonstrate the basic functionality of a

system, to go ahead and get it out there so you can take advantage of that inherent functionality and continue to improve the system.

That is exactly the risk-benefit equation that we are going through. We have actually flown the booster that is in the ground in Alaska and California three times successfully. We have flown the kill vehicle in a prototype fashion that is about 67 percent the same hardware and 62 percent the exact same software in those intercept tests that were successful several years ago. So we think we have demonstrated all the basic functionality and now we are taking advantage of that inherent capability because, as you said, sir, if we had followed the traditional model, we would just now be getting to the point where we may be entering operational testing and we would be 3 or 4 years from having any inherent capability.

Senator CORNYN. Thank you very much.

Mr. WYNNE. If I could add, Senator Cornyn.

Senator CORNYN. Certainly.

Mr. WYNNE. In a bipartisan way, this is the committee where this system started in 1999, and I think we have met, in fact, the intent, which is to field, as quickly as possible, the potential for defeating such a threat.

The President has actually accelerated, as much as he can, the deployment of the system, and what we are doing, in the true spirit of spiraling, is allowing the operators as much time on this system so that they might train almost in a parallel fashion so that as the system comes on line and the capabilities are realized, we can meet this greater and greater threat. What we are doing now by essentially putting into a shakedown, this X-band radar is going to so dramatically increase our ability to detect, to track the incoming missiles, that maybe we will have an effective deterrence against ever having to use it, which as all of my friends that used to be in the Strategic Air Command and are now in STRATCOM would say, peace is our actual profession.

Senator CORNYN. My understanding is there are an awful lot of countries that we cannot depend on their peaceful intentions, that have weapons of mass destruction. They have ballistic weapons, and if we did not have what we have now in terms of our missile defense system, we would be absolutely naked given an unexpected attack. These weapons are capable of being used potentially not only against the continental United States but against our allies.

So let me just ask General Obering one last question about this. You alluded to the GBI prototypes that flew successfully, successfully intercepted four out of five targets in the 2000 to 2001 time frame, and the current GBI booster that flew successfully three times in the 2003–2004 time frame. I believe you also talked about the last two failures. One, as I understand, was too restrictive a parameter in the software that caused the system to shut down.

General OBERING. Yes, sir.

Senator CORNYN. Then the second had to do with a stabilizing arm that failed to get the signal that it actually separated from the rocket. Those were not failures of the interceptor itself. I understand they are serious. I think you call them major technical concerns but they do not cause you major concerns about the functionality of the system overall.

General OBERING. Yes.

Senator CORNYN. Could you just explain that better than I did?

General OBERING. Yes, sir. It is almost like we cannot get our starting quarterback on the field because he keeps tripping over the bench. [Laughter.]

But we have addressed the software timing issue that caused the abort in the first attempt on IFT–13C in December, and we are looking at the root cause of this battle support arm and its failure to clear.

Now, unfortunately, we have been able to check out our abort system very well. So it works extremely well. [Laughter.]

In both of those tests, there are some things that we have really learned. I do not want this to sound trite, but we have learned a lot in terms of, it was the configuration of the fire control software that we have in the field today, that was used in both of those tests. We were able to get the target information, feed that into that fire control system, generate the fire control solution to the weapons test plan, and send that to the interceptor. The onboard interceptor computer accepted that through a number of checks, and sent it into the guidance control system. We have the same guidance control algorithms on board the vehicle that we have flown in the past. So we think that the basic viability, the basic function of the system, we still maintain confidence in, sir.

Senator CORNYN. Thank you very much.

Senator SESSIONS. Thank you.

Senator Reed.

Senator REED. Thank you, Mr. Chairman. Thank you, gentlemen for your testimony.

I assume if you are accepting a $1 billion cut in your budget, then you do not feel that additional resources would affect the operational status of either the midcourse system, the ABL system, or the space architecture you need and any radars you need. Is that a fair assumption, Mr. Secretary?

Mr. WYNNE. There is always the unique question, sir, of what would you do if you had an extra dollar, which probably I would tell you that we, in fact, have structured a program that we feel like is sufficient to meet our mission. But we would probably spend it on the ABL/KEI risk reduction program, which might assist us with moving towards a more mobile system.

Senator REED. But it would not affect the operational status of the midcourse system, for example.

Mr. WYNNE. The GMD system, as it sits, I think is going through some retrospection and some quality checks, and I think, sir, that it is, in fact, converting the two failures into ground-based test articles, which are going to allow people to finally count down through 0, which Senator Nelson knows is kind of a valuable thing to have. That will actually enhance the training of operational crews which otherwise would have always to launch and could not count through 0.

So I think by converting those vehicles, we are, in fact, creating test articles from, if you will, not spent but refurbishable rockets. I would tell you that that is probably what will happen to all of these vehicles that we are currently thinking about either long-lead fielding or have bought is that they will all turn into test articles.

Senator REED. Let me ask General Obering and Mr. Duma. Will you conduct an operationally realistic test of the system by October 1st pursuant to the Defense Authorization Act, General Obering?

General OBERING. Sir, I will have to answer that question after I get the full results from the Mission Readiness Task Force that I talked to you about. After they have been able to go through the recommendations from the independent team, we will know better in a clear picture of what our test outlook is. However, I will tell you this. We certainly have plans to be able to conduct the operationally realistic testing as quickly as we can.

Senator REED. But at this juncture, you cannot say with confidence whether you will be able to meet that deadline?

General OBERING. I will not know until I get the full information.

Senator REED. Mr. Duma, do you have anything to add?

Mr. DUMA. We do have that in the plan, Senator. Certainly it is up to General Obering to define what corrective action he may need to take within the program. That always has a potential to impact the plans.

Senator REED. Again, General Obering, Mr. Duma, when do you foresee scheduling an end-to-end flight test of the system from target acquisition to target destruction?

General OBERING. Sir, as I said, in terms of a schedule, I cannot give you that, but I can tell you what our plans are. We intend, as quickly as we can, to fly a target out of Alaska, fly it across the face of the Beale radar in California, an operational radar, fly an operationally configured interceptor out of an operational site at Vandenberg, have the operational fire control system, the battle management communication links in place to support that, and have operational crews supporting the test.

We also plan to have that similar type of scenario using an Aegis ship, what we call the "engage-on" sensor, using that information to build a weapons task plan, as well as to have a salvo launch in which we fire two interceptors against a target. We have all those in our test plan.

Senator REED. But again, there is no date that you can give with any confidence now of when you can execute.

General OBERING. Not until I get the results of the review team.

Senator REED. These tests are important, but probably just as important is who grades the test. Both MDA and the Office of Operational Test and Evaluation are essentially grading the tests with different criteria, as I understand it. Just for an initial question, Mr. Wynne, who does the DOD look to for the evaluation of limited defense operations?

Mr. WYNNE. Actually, sir, what we are looking for is the STRATCOM commander, who sits here beside me, to grade all of our paper, just like an acquisition program should deliver to the warfighter. The tests hopefully are, as you say, representative. Using his operational forces, trained and ready, I think he is the one who has to grade our paper on that.

Senator REED. Let me then ask General Cartwright. As you look at the technical aspects—I know you have operational aspects, the crew training, many things, but when you look at the technological issues, what date are you looking at? Is it a successful test even

though it launches, flies, and whatever? How do you decide between what Mr. Duma is concluding versus MDA?

General CARTWRIGHT. I think what will be important, one, is to have access to all the data, which we now have; two, to have access and some say in how the tests are conducted and do they actually get it realistic; and three, going back to the original assumptions of the system, and making sure they are, in fact, operationally relevant and that when we do this test, it is in an operationally relevant scenario. All of those will be criteria that we will put together and pull together. I will use Lieutenant General Dodgen and his capabilities at Space and Missile Defense Command as the analytic arm and as the operator arm to make sure that this is operational.

It will not be perfect. In other words, the missile will not originate in Korea, things like that. But to the extent that we can get every factor as close to operational as we can, it will impinge on how we see the system and our ability to use it and its ability to defend against the threat that we think is out there.

Senator REED. When do you think you will have that data and can reach that conclusion, which I would think would be the minimum for declaring the system operational?

General CARTWRIGHT. Again, it will be event-driven. I will have to allow General Obering to get through his review and conduct the tests. But the good news is we have had input into those tests. We are getting operators up on the consoles now rather than waiting until the day of the test. So I feel more comfortable that the operators will actually be able to understand what is happening technically and operationally and give me good input. I feel much better about that right now.

Senator REED. Thank you very much. Thank you, General.

Senator SESSIONS. Thank you.

Senator Nelson.

Senator BEN NELSON. Thank you, Mr. Chairman, and thank you, gentlemen, for being here with us today.

General Obering, we talked yesterday briefly and you mentioned something about an independent review team that is looking at the latest testing efforts. Can you tell us a little bit more about what that would consist of and what you would expect to get from them more specifically?

General OBERING. Yes, sir. I mentioned in my opening statement that they gave us specific recommendations in about five different areas. Primarily the way the leader of the team characterized it to me is that we are 90 percent there. We have about 10 percent to get over the hump. This has to do with enforcing better discipline in our quality control processes, primarily strengthening some of the system engineering initiatives to make sure that we have proper flow-down in some of the specifications, all the way through the system, to include silo construction. One of the things we ran into, we believe, with this latest failure, is that we are able to reach out and touch more of the functional experts within the contractors' organizations and get some of the quality missions assurance experts to bring to bear on the program. In general, the way I characterize it is to install better test certification and test discipline in our process as we go.

Senator BEN NELSON. Well, in doing that, will we find out to what extent something that is technologically at risk or at fault versus what may be a personnel or human risk or human fault?

General OBERING. Yes, sir. As a result of the review—and this is expanded, as I mentioned to you yesterday, to include all the ground support equipment and everything else—we should be able to determine that.

Senator BEN NELSON. Then, Mr. Duma, would that, do you think, contribute significantly to what you would call a defense realistic operational interceptor effort once you get the report back and you are able to sift through it and make changes that might be suggested?

Mr. DUMA. Clearly the answer to that lies in the corrective action taken as a result of the report and the findings. For instance, in integrated flight test 13C, where there was a software problem and I am reasonably confident that they found the root cause and there has been sufficient testing and ground testing to confirm that that aspect of it works. The issue with the silo at this point I do not have that because we do not have the findings back yet. So with the corrective action for that, to do another flight test and get that booster to fly with the kill vehicle, so we can verify the separation and the maneuvers that are required, that will be the first step to looking at a more comprehensive operationally realistic test.

Senator BEN NELSON. How confident are you that they will have identified everything or every key factor for your consideration?

Mr. DUMA. Well, that is why you have test programs, Senator. You design the system as well as you can, but the test program is designed to ferret out if you have made a mistake in the design, and if the design is helping carry out the mission that you intended. If you have a design problem—and we did in 13C. It was fixed. But that is why you do testing. We have had successful booster launches in the past, and now this time we had two that did not go and for very different reasons.

Senator BEN NELSON. So part of it is just based on experience. Can a lot of the testing that you are doing be done without operational or through the developmental side?

Mr. DUMA. That is exactly what is happening right now. It is developmental testing when we are trying to, as Senator Nelson put it, infuse as much operational realism in that developmental testing as possible. We cannot do everything because not all of the system is available. But with what we can do, every time you get a successful launch, your confidence goes up because every time you do another flight test, you challenge the system a little more. So even though you get a launch, the next one is a little more difficult scenario profile. You have already repeated what you have done and have demonstrated works. So over a period of time, that confidence grows.

Senator BEN NELSON. Yes. I think Senator Nelson said something about getting on it and riding it. He has been up in space. I have not had that experience and I do not intend to get on and ride anything like that anywhere. [Laughter.]

Senator SESSIONS. But if an incoming missile were coming at him, I suspect Senator Nelson would like to push the button to respond. [Laughter.]

Senator BEN NELSON. If it is coming at me, I will try to get out of the way.

Senator SESSIONS. Well, we hope one of these would work.

Senator BEN NELSON. If a ballistic missile were launched against us tomorrow and with the systems we have in place right now and with what we know and what we believe we do not know, what we know we do not know, what is the expectation on a percentage basis of being able to have an effective response to an incoming missile with the ground defense based system? Anyone who wants to respond to that.

Mr. WYNNE. I would say under our current guidelines, sir, specific percentages have to be worked out over a longer period of time. We do not have the reliability and statistics to really add a variability. Of course, our operational procedures, as General Cartwright's is, is to launch twice for one. We actually test one on one, but our operational procedures test twice.

We are building a reasonable confidence level and perhaps in a more classified section you can get what our reasonable confidence level is. Had the two failed tests been achieved, we would be talking to you far more confidently.

Reverting to something that happened to me personally, I lost three commercial Atlas rockets in the space of 3 years. We still launched about 15 rockets over that period. I went through tense agony getting a quality program installed in my system. They have since launched about 80 without failure. So that was a successful intervention, if you will, and putting in place a quality system.

I am very confident that General Obering has heard my message very, very clearly and is now focused on that. The fact of our budget defense was not up to, I would say, Senator Sessions' standards maybe has refocused our efforts on getting more successes in the future.

Senator BEN NELSON. Well, I will leave you with this sort of question. You do not have to answer it. Is anyone willing to say that in this testing that very often we are going to learn more from our failures than we do our successes? Obviously, you have to analyze what went wrong, but sometimes you do not spend as much time on what went right. Is that a fair statement, that success and failure depend on how you evaluate what it is that you get from the experience?

Mr. WYNNE. There is no doubt, Senator, that success can mask future failures.

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

Senator SESSIONS. Thank you, Senator Nelson. I think you make a good point, but I suppose it is fair to say that we did not, as a result of the failures get to test as far through the system as you would like to have tested. Therefore, those portions of the system were not proven to be failures. They just did not have the opportunity to prove to be successful. Is that right?

Mr. WYNNE. That is correct.

Senator BEN NELSON. That is quite a spin. [Laughter.]

Senator SESSIONS. Well, I think that is where we are. With regard to 13C, there was a very low tolerance for ambiguity there, and you discovered that it could have been, what? 100 times more

lenient? We still could have had a successful launch. That software has been adjusted and you think that problem has been eliminated. Is that right, General Obering?

General OBERING. Yes, sir. We discovered it. It was not quite 100 times, but we had more significant margin than we needed. So we have adjusted that, yes, sir.

Senator SESSIONS. Then with regard to the 14, I was there at Kwajelein and looked down that silo where the arm actually came back, and I do not know if this will be the final report, but information was provided to me that the pad that arm came to rest against was thicker than previous pads, and as a result, the arm did not kick the switch.

General OBERING. Yes, sir.

Senator SESSIONS. If that part was incorrectly supplied by some contractor and that cost us considerable sums of money and it did not meet the specifications, it was somewhat different than the parts they had been supplying, are you prepared to take punitive action and to make clear that we expect contractual performance to meet the high standards also?

General OBERING. Sir, we already have. We have an award fee structure in our contracts in which there are substantial amounts of money, tens of millions of dollars, that are riding on these tests. Those measures have been taken. That money has been lost to those contractors, and they know that.

Senator SESSIONS. Well, I think that is good. I just think you have to hold people accountable. It did seem to me a maddening kind of error, the kind of error, I guess, that could happen in something as complex with as many thousands of parts that must all come together. But I know it was maddening to you also.

General Obering, you talked about the testing and your evaluation that is ongoing. First of all, tell me what you had planned in terms of testing for this calendar year and this fiscal year and whether or not you expect to complete the next tests before the end of fiscal year 2005.

General OBERING. Yes, sir. We had planned after IFT–14, had that been successful, we would have launched the target out of Kodiak that I mentioned to you. We would engage with an interceptor out of—initially we were going to engage with an interceptor out of Kwajelein with a track from Aegis. Then we were going to proceed into the next test where we launched the target out of Kodiak and then engaged with an interceptor out of Vandenberg, an operational site, and we were going to have both of those intercept tests completed by the end of this calendar year. That was the original plan.

We still plan to fly two more radar characterization flights where we fly across the face of some of these operational radars, Cobra Dane and Beale, to make sure we understand that they are operating the way that they should be.

Senator SESSIONS. For a system and a launch to be effective and knock down an incoming missile attack in the United States, there has to be tremendously sophisticated communication between advance radar systems and the actual launch site. Is that correct? You have to test that in the course of this too.

General OBERING. Yes, sir, and we have been successful with that.

Senator SESSIONS. So you feel good so far about the ability to read and transmit the radar signals to your launch site and be able to launch a missile at an appropriate time.

General OBERING. Yes, sir. In fact, the major focus of a lot of our integrated ground test is where we connect all of that up. We actually ring that out and we input the data and process that in our ground testing. We also did it with our flight testing in terms of communications capabilities. In part of the shakedown period that General Cartwright alluded to, we have had some of these communication links up with some of our forward deployed ships. They have been very stable and very reliable, and I am very happy about that.

Senator SESSIONS. I do not know that I have ever explicitly asked this, but we have had the SM–3—the Navy—they have four?

General OBERING. Five of six successes.

Senator SESSIONS. Five of six hit-to-kill successes.

General OBERING. Yes, sir.

Senator SESSIONS. We have had hit-to-kill successes with the GBI. The PAC–3 is a hit-to-kill technology. THAAD will be a hit-to-kill technology. That consistently proves itself technologically achievable. A lot of people thought it would never happen. I must admit I was pleased to see it happen because it seems like such an incredibly technologically difficult thing to do. But it has proven to be successful.

My question to you is are there any larger technological problems in making that hit-to-kill technologically work from a ground-based interceptor on a strategic missile attack than for the SM–3, from a lower missile? I mean, is it basically the same technology? Is there any real difference except you have to get your missile up to a higher altitude to make the intercept?

General OBERING. Yes, sir. That is one of the aspects of it. It is the same basic technology. The speeds are different. There is a much higher speed associated with an ICBM than with the shorter or the medium or intermediate range missiles.

But again, we feel comfortable, to answer your question directly, that we have satisfied all the major technical challenges associated with the programs. Now, it is a matter of making sure we can do it reliably and on demand.

Senator SESSIONS. Mr. Duma, just briefly. Would you agree that testing has demonstrated the hit-to-kill technology and that it is now incumbent on us to do operationally realistic testing to make sure the entire system works effectively in a realistic situation? Is that our next challenge, to increase our confidence that this system will work as a whole?

Mr. DUMA. Partially, Senator. Certainly we have to get into the operational realistic testing, but the technology is there.

But just to give you an example of the growth that we need to go through, the SM–3 missile, for instance, has had a good success rate, but in this coming year, we are increasing the difficulty that they have to encounter by having a separating target from the target vehicle. It has not done that yet. So while the hit-to-kill technology is there, we now want to challenge that to a greater degree

with a separating target vehicle from the launched missile. That is why we have this road pattern in the testing, to try to get more operationally realistic, to give General Cartwright something that he can handle other than just the basic threat.

Senator SESSIONS. Thank you.

Senator Levin. We are delighted our full committee ranking member is with us. Senator Levin, I recognize you at this time.

Senator LEVIN. Thank you, Mr. Chairman. I would yield to Senator Nelson, if that is okay, first.

Senator SESSIONS. Fine.

Senator BILL NELSON. Thank you, Mr. Chairman.

Of course, we all are hoping and praying that these tests are going to be successful because this is an important system.

I guess I approach this discussion kind of old-fashioned. I came up in the idea that what you do is you research and then you develop before you deploy, especially before you deploy in an operational system. It seems to me that in some cases we have so-called operationally deployed before we have done all of the RDT&E that is necessary to get to where we are ready for operations.

We had this, for example, in the space shuttle. After four flights, they said it was operational. Of course, it was not operational. Every one was still an experimental kind of thing. Yet, that was a risk that we were willing to take.

So too, what you all are telling us, that basically this is a risk that you are willing to take. Our question, as people who have to look out for the resources of the American citizens, is are we spending it in the right way as we are trying to get to the ultimate goal that all of us are trying to get to.

Now, for example, General Obering, has the kill vehicle that is in the ground on top of the booster ever been tested with that booster?

General OBERING. In terms of flight tested, sir, no. In terms of obviously the ground test and check-out, yes, sir. A prototype of the kill vehicle that is in the ground has been tested with the booster.

Senator BILL NELSON. I understand, but I remember what you said that the prototype that flew off the kill vehicle was 67 percent of the components. That means that in this kill vehicle that is in the ground, 33 percent is new.

General OBERING. Yes, sir.

Senator BILL NELSON. You also said that 62 percent of the software. So that means that in this kill vehicle that is there on top of the booster in the ground, 38 percent of it is new. So we do not know that this kill vehicle on top of that existing booster—what is your confidence in that?

General OBERING. Well, sir, first of all, the reason why we were trying to fly IFT–13C and IFT–14 was to prove out that capability. Again, the improvements that we have made to the kill vehicle had to do primarily with producibility and manufacturability because we were, again, going with the prototypes earlier. I am confident that the kill vehicle will work, sir, but we have yet to prove that.

Senator BILL NELSON. Are you confident when this target separates from the booster, that it is going to work as well?

General OBERING. Now, you are talking about the Aegis program there, not the GMD program. So that is a different kill vehicle. Yes,

sir. In fact, one of the key milestones there was to demonstrate a much higher performing what we call a divert attitude control system to accomplish that. That was done successfully just this last week.

Senator BILL NELSON. If there is any confusion there, I am not talking about the Aegis. I am talking about the other one, the ground-based interceptor.

General OBERING. Yes, sir. In fact, the targets that we have flown against, even with the prototype vehicle were a separating warhead. That is what the long-range interceptor does.

Senator BILL NELSON. Mr. Duma, we had a couple of similar sounding phrases here, and if you could clear it up for us, I would appreciate it. Can you explain the difference between operationally realistic developmental testing and realistic operational testing?

Mr. DUMA. If you are talking about developmental testing, the primary purpose of that is to determine the functionality of the system. That is generally under the complete control of the program manager and the development team. When you are talking about realistic operational testing, in our traditional title X role, that testing is conducted with operators on the system and by an independent operational test agency. The Services, for example, each have their own independent operational test agency which conducts those tests.

The MDA operates under a different set of rules, as Mr. Wynne addressed earlier. So we are in the mode of providing advice to add operational realism to those developmental tests. The system is in development. It is an RDT&E system. That is clear. We are trying to get as much operational realism out of each test as we can so that we can get some confidence that the equipment, the people, and the procedures that exist will, in fact, function in an emergency if we had to use it.

Senator BILL NELSON. Is it correct that your organization is responsible for realistic operational testing and not responsible for operationally realistic developmental testing?

Mr. DUMA. I am responsible for operational testing in the DOD. Adding operational realism to developmental testing is a unique role for my office associated with the MDA.

Senator BILL NELSON. If I may, I am going to do an interview right next door and I will be back.

Senator SESSIONS. Very good.

Senator Levin.

Senator LEVIN. Thank you again, Mr. Chairman.

The line between developmental testing and operational testing has perhaps been blurred a bit because you are giving advice to the program managers to try to make that as realistic as possible. But they are still responsible for developmental testing. Is that correct?

Mr. DUMA. Yes, sir.

Senator LEVIN. Has this program gone beyond developmental testing yet?

Mr. DUMA. No, Senator.

Senator LEVIN. Approximately how many more tests, if you can put it that way, would have to be successful before it gets to realistic operational testing?

Mr. DUMA. In the current rules under which we operate for the MDA, there is no operational testing, as you might understand it, from our traditional title X responsibility.

Senator LEVIN. It may never get to operational testing under the traditional system.

Mr. DUMA. That is correct. Remember, when the MDA was first created, there was a plan to transition systems from development in the MDA to the Services at which time an operational test agency would be identified and title X operational testing would occur to be done by the Services. Over the years, as the system has developed, that is no longer the plan. There are no transition plans to move this into the service for a procurement or operation.

General OBERING. Senator, if I may add some light to this, if I could.

Senator LEVIN. Let me ask a question first of Secretary Wynne and then I will come back to you if this does not clarify it. Secretary Wynne and I have had correspondence.

First of all, congratulations on your appointment, Secretary Wynne.

Mr. WYNNE. Thank you, Senator.

Senator LEVIN. I know it was a long time in coming and it is well-deserved.

Last June, Secretary Wynne wrote me the following: I will ensure that the Department conducts operational testing as required by statute. The Department is committed to adequate testing, even at this early stage of the BMDS program. Therefore, a focused operational test and evaluation, consistent with the capability demonstrated during combined developmental and operational testing, will be conducted on each future block configuration of the BMDS. The Director of OT&E will approve the operational test planning, evaluate test results, and provide a characterization of operational effectiveness, suitability, and survivability.

Now, does that statement of yours in that letter still stand?

Mr. WYNNE. Yes, sir. There was a section 234 of the National Defense Authorization Act for Fiscal Year 2005 which colors some of this, but I tried to live to the spirit of the interchanges you and I had by asking the DOT&E's staff and MDA to partner on the test and evaluation master plan and the specifics of increasing the operational experience of each of these test spirals. I think they are a long way along that line. It is, I would say, a watershed change from where we have been, and I credit Mr. Duma and General Obering in articulating that.

Senator LEVIN. Do we still need operational testing?

Mr. WYNNE. Sir, we need effective, focused operational experience and testing is one of the ways to achieve that. I would say to you that the closer and closer we get to having a full-up test, the better. I note that the demand for end-to-end would, in the world of the Atlas, have actually had a missile shot all the way to a target. We never really did that, but we are doing something very similar to what we tested on Atlas in the early days of setting out that vehicle by stipulating parameters by which the vehicle would fly to and testing against that set of parameters. Putting the operational crew onto the consoles, which are getting more and more

hours, and allowing them to essentially train in parallel has allowed more operator testing than we had ever previously expected.

Senator LEVIN. If I phrase the question, though, very simply, do we still need realistic operational testing, are you able to give a yes or no to that?

Mr. WYNNE. Sir, that is the intent of the partnership between Operational Test and MDA, to actually move as close as we can to achieve that. As I have mentioned to you, with each spiral of capability that we get out there, I am hoping to not only check out the components as close as I can get to an operational test, but as close as I can get to a realistic test.

Senator LEVIN. So that we may never get to realistic operational testing despite those efforts to get close to it, in other words, it does not necessarily mean we will ever achieve it. Is that accurate?

Mr. WYNNE. We have asked the Operational Test people to establish criteria. We are behaving to the operational criteria. We are working and having Missile Defense achieve those operational criteria. I think, sir, if we accomplish all of these goals, we will have, de facto, accomplished an operational realistic test.

Senator LEVIN. Do we have those criteria? Have they been made available to the committee?

Mr. WYNNE. That part I do not know.

General OBERING. I believe there was a draft that has been made available, and Mr. Duma and I have signed off on that draft that delineate what those criteria are.

Senator LEVIN. If you could just give us the final signed-off draft to make sure that what we have is what you signed off on, General, we would greatly appreciate that.

[The information referred to follows:]

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DEPARTMENT OF DEFENSE
MISSILE DEFENSE AGENCY &
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7100 Defense Pentagon
Washington, D.C. 20301-7100

Ballistic Missile Defense System
Response to Sec. 234
Increasing Operational Realism

Version 1.5
April 4, 2005

FOR OFFICIAL USE ONLY

APPROVED BY:

Henry A. Obering III 6 Apr 05	DW Duma 4-7-05
HENRY A. OBERING III Date	**DAVID W. DUMA** Date
Lieutenant General, USAF	Acting Director, Operational Test and
Director	Evaluation

1. Background

Section 234 of H.R. 4200, the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, includes the following language:

SEC. 234. BASELINES AND OPERATIONAL TEST AND EVALUATION FOR BALLISTIC MISSILE DEFENSE SYSTEM.

(a) TESTING CRITERIA- Not later than February 1, 2005, the Secretary of Defense, in consultation with the Director of Operational Test and Evaluation, shall prescribe appropriate criteria for operationally realistic testing of fieldable prototypes developed under the ballistic missile defense spiral development program. The Secretary shall submit a copy of the prescribed criteria to the congressional defense committees.

(b) USE OF CRITERIA- (1) The Secretary of Defense shall ensure that, not later than October 1, 2005, a test of the ballistic missile defense system is conducted consistent with the criteria prescribed under subsection (a).

(2) The Secretary of Defense shall ensure that each block configuration of the ballistic missile defense system is tested consistent with the criteria prescribed under subsection (a).

This report expands on the criteria for operationally realistic testing provided in the Ballistic Missile Defense, Integrated Master Test Plan, in accordance with Section 234, Paragraph (a). It also provides a brief description of the significant Ballistic Missile Defense System tests planned for the next two years. These tests exercise the two most mature elements of the Ballistic Missile Defense System: the Ground-based Midcourse Defense and Aegis Ballistic Missile Defense Systems

In general, the Ballistic Missile Defense System test program will increase the operational realism with each successive test as the system matures. The MDA Test Strategy to demonstrate and evaluate operational realism exploits all flight, ground tests and war games. Immediate planning activities are focused on the GMD intercept mission planned for early summer.

With the concurrence of DOT&E and the Operational Test Agencies, MDA intends to assess FTG 04-3 against the criteria described in this report. This intercept, designated as a GBI Engage on AN/SPY-1, includes an operational interceptor launched from an operationally configured silo using the operational control software and equipment. To support the evaluation of operational realism, a detailed comparison of this mission and the appropriate operational engagement will be made jointly by MDA, OTA, and DOT&E analysts.

The remainder of this document briefly describes the next two years of system level flight testing, and illustrates how this testing becomes increasingly realistic.

Section 2 of this document describes the criteria for operationally realistic testing of the Ground-based Midcourse Defense System and the Aegis Ballistic Missile Defense System.

Section 3 of this document contains a synopsis of each test of the Ground-based Midcourse Defense System and the Aegis Ballistic Missile Defense System, planned through calendar year 2006. The scope and timing of some of these tests differ from the November 9, 2004. Integrated Master Test Plan. These changes result from the unsuccessful IFT-13C and IFT-14 missions and from budget changes following Program Budget Decison 753. The changes will be reflected in a future update to the IMTP.

Appendix A contains two matrices that show estimated test schedules as well as the relationship between the individual test events and the operational realism criteria. Additional information contained in the summary is an estimate of the time frame of each test.

Appendix B contains the specific criteria and methodology that DOT&E will use to evaluate the operational realism and Limited Defensive Capability system performance in FTG 04-3.

Appendix C contains a tutorial on the common system test nomenclature used to designate Ballistic Missile Defense System tests.

2. Operational Realism Criteria

2.1. Ground-based Midcourse Defense

2.1.1. Fieldable Prototype GBI

The Ground Based Interceptors (GBI) planned for use in all intercept flight tests for the next two years are operationally representative modified to support mandatory flight safety and test data collection requirements. Modifications include the installation of a flight termination system, precise performance and trajectory measurement instruments, and supporting telemetry kits.

2.1.2. Threat Representative Target

Threat representative target trajectories, target signatures, and target complexity are issues addressed in the development of operationally realistic test scenarios. Flight test planning and targets will increasingly employ flight profiles that emphasize the dynamics and timing of operational missile defense scenarios. Mandatory flight safety and test data collection requirements may require alterations to the target that result in reducing the threat representative fidelity of the target. These alterations include, but are not limited to radio (transmit and receive) antennas that may enhance the visibility of the target for some radar frequencies. The specific frequencies of the planned tracking radar are considered in the design of the targets for specific tests.

2.1.3. Complex Countermeasures

One specific characteristic of threat representative targets is the inclusion of increasingly complex countermeasures. These countermeasures include target dynamics and penetration aids. The type and number of these to be included in each test is being increased at a prudent pace so as to maintain an appropriate level of technical risk.

2.1.4. Operational Sensor

All future GMD intercept flight tests include operational sensors in Ground-based Midcourse Defense engagements. These plans are predicated on the ability to safely fly a target missile within the field of view of operational detection and tracking sensors. Initiation of interceptor operations from Vandenberg Air Force Base is a major milestone in that it allows the use of the Beale Upgraded Early Warning Radar as the principle sensor to provide target track data as opposed to a Global Positioning System based radar surrogates. Data and knowledge gained from these Beale operations will be applicable to the other, similarly designed, Upgraded Early Warning Radars. The introduction of mobile (Sea Based X-band and Aegis Ballistic Missile Defense capable ships) and re-locatable (Forward Based X-band-THAAD and Terminal High Altitude Area Defense) operational sensors will add additional flexibility, executing operational test scenarios that better represent operationally realistic engagements. Global Positioning System based systems will continue to be included in the targets in support of range safety

requirements and the acquisition of truth data. With the full integration of operational sensors into the Ballistic Missile Defense System Testbed the continued role of GPS based "surrogate" sensor models will be as risk reduction backups to the primary sensor.

2.1.5. Operational Fire Control Software

The Fire Control hardware and software that is integral to the GMD Fire Control system used for GMD flight test execution is the most current version of the Operational Fire Control configuration that can be properly integrated into the test process at a time consistent with test planning, analysis and pre-test crew training. All software used in flight tests must be fully tested and certified through the formal software acceptance process.

2.1.6. Tactics, Techniques, and Procedures

War Games, Ground Tests, and Flight Tests are all exploited by the warfighter to develop and evaluate Tactics, Techniques, and Procedures related to the operation of the Ballistic Missile Defense System. Tactics and procedures thereby evolve to exploit the increasing capabilities (sensors, interceptors, and C2BMC) of the BMDS.

2.1.7. Warfighter Participation

Warfighter participation in GMD flight tests with respect to control of engagements is currently consistent with what would occur in a real world scenario. The continuing development and integration of C2BMC capabilities will provide additional opportunities for warfighter participation. The planning for this type of participation must be done with appropriate attention given to safety and technical risk issues.

2.1.8. Unannounced Target Launch

Future flight tests may become less scripted with a concurrent reduction in the quantity of *a priori* information provided to the defensive operations. The perceived advantage of members of the test team having *a priori* information regarding the launch location, the planned trajectory, and the planned launch time are not typically a concern in developmental flight testing with one target against one interceptor. The complexity associated with an Unannounced Target Launch is best addressed in a test venue with multiple engagements where war fighter decisions regarding the allocation of resources are required. War Games provide a more cost effective venue to evaluate these complex decisions. The level of scripting of each test will be evaluated to ensure proper attention to safety of life and property and reasonable technical risk.

2.1.9. End-to-end Test

End-to-end testing of the Ballistic Missile Defense System is the ultimate challenge to minimize the introduction of artificialities and the direct use of operational assets where possible. Priorities of safety and test data collection require modifications to both targets and interceptors to provide for truth and diagnostic data. Again, every effort is made to understand and minimize the impact of these test limitations on observed system performance.

2.2. Aegis Ballistic Missile Defense

2.2.1. Operational SM-3.

The Aegis Ballistic Missile Defense Weapon System (Aegis BMD) used a SM-3 Block I missile for intercept flight test FTM 04-1. This missile was one of 5 Initial Deployment Rounds delivered in October 2004. The remaining rounds and the first Aegis BMD Engagement Cruiser, the USS Lake Erie (CG-70) are available for emergency use. The SM-3 Block IA missiles incorporate improvements which will provide additional capability. The two Japanese Cooperative Development missions (JCTV-1 and JFM-1) will use a modified nose cone on the SM-3 Block I missile. The future decision to incorporate this modified nose cone into the operational SM-3 will be based, in part, on the outcome of these two flight tests.

2.2.2. Threat Representative Targets.

All targets used in the Aegis BMDS test program are operationally realistic. Different targets are used to demonstrate capability in the potential battle space and to provide validation data for the detailed models and simulations used to predict performance.

2.2.3. Complex Counter Measures.

Aegis BMD has tested against short to medium range ballistic missile targets in increasingly realistic operational scenarios and war-fighting environments. At times, the targets challenged the system with unanticipated, unintentional exoatmospheric dynamics and unplanned signatures – adding difficulty to the tests. Aegis BMD is not testing against targets with advanced countermeasures in the time frame shown. However, Aegis BMD will become increasingly capable through its block upgrade process. Countermeasures will be introduced in later test phases.

2.2.4. Operational Sensor.

The Aegis BMD Weapon System primary operational sensor is the AN/SPY-1 Radar. This radar is installed on all US Aegis warships. Aegis ships must be equipped with the Aegis BMD 3.0 weapon system to have a Ballistic Missile Defense capability. The Aegis BMD 3.0 weapon system used in FTM 04-1 incorporates all the required radar, missile, launcher, command control and communication upgrades necessary to execute BMD

2.2.5. Operational Fire Control Software.

The software used in FTM 04-1 was the Aegis BMD 3.0 computer program. This program is an integral part of the overall Aegis BMD 3.0 Weapon System capability. This software will be used for all remaining Block 04 BMD system tests. In calendar year 2006, Aegis BMD will complete Block 04 capability testing and transition to the BMD 3.1 weapon system. The Aegis BMD 3.1 system integrates and restores additional multi-warfare capabilities into the Aegis Combat System. All of the planned three Aegis BMD Engagement Cruisers and fifteen Long Range Search and Track and Engagement Destroyers will receive this initial Aegis BMD weapon system over the next few years.

2.2.6. Tactics, Techniques and Procedures (TTPs).

Aegis BMD test ships use Navy developed Tactics, Techniques, and Procedures during flight tests. Early tests contained some artificiality for test convenience and test control purposes. As testing progressed, more and more artificialities were eliminated. During the recent FTM-04-1 test and associated Stellar Dragon Campaign, the ship conducted multi-warfare exercises in conjunction with simulated engagements of ballistic missiles. Lessons learned from Stellar Dragon and other flight tests are used to develop new and refine existing TTPs. The Aegis crew operates the missile defense system during all testing.

2.2.7. Warfighter Participation.

MDA requests operational test issues and requirements from Commander, Operational Test and Evaluation Force (COMOPTEVFOR). This allows the concerns of the operational community to be addressed early in the test planning process. Requirements are allocated to tests and COMOPTEVFOR is involved in the entire test planning process. COMOPTEVFOR is invited to have personnel aboard ship during flight tests to make observations and record data used in operational assessments of the system under test.

2.2.8. Unannounced Target Launch.

To increase operational realism, the time of target launch is not known to the test ship's crew. For safety purposes, the commanding officer and ship's safety officer know of the time of launch. Selected observers on board know of the launch time, but strict measures are used to avoid letting the information get to the crew. Those people manning the consoles and operating the equipment do not know the target launch time.

2.2.9. End-to-End Test.

By the nature of the Aegis weapon system, all tests with real targets and SM-3 missile launches are end-to-end tests. The Aegis radar detects and tracks the target. The Aegis Command and Decision System determines the target type. The Aegis Weapon Control

System determines if the target is engageable and engages the target. From the BMDS perspective, the data on the engagement is transmitted to other units by voice, Link 16 or Satellite TADIL J. BMDS elements and nodes can receive and monitor these communications for situational awareness, or battle management, and command and control. In the recent Stellar Dragon Campaign, Commander Third Fleet, monitored the events and ordered simulated retaliatory strikes against the ballistic-missile launch complex, and authorized defensive operations against surface patrol craft, mine layers, cruise missiles, and a hostile submarine.

3. Flight Test Descriptions

3.1. Ground-based Midcourse Defense

3.1.1. **IFT-14B:**

IFT-14B is a Ballistic Missile Defense System non-intercept flight test of the Limited Defensive Capability configured Ground-based Midcourse Defense System with an interceptor to be launched from the Reagan Test Site. The objective of this test is to verify the proper operation of the interceptor launch system. This flight was added to the test schedule as a result of the failures of the Ground Based Interceptor to launch in IFT-13C and IFT-14. Target trajectory data recorded in IFT-14 will be used to stimulate the fire control system.

3.1.2. **FTG 04-3:**

FTG 04-3 is a Ballistic Missile Defense System intercept test of the Limited Defensive Capability configured Ground-based Midcourse Defense System. The objective of this test is to exercise the "Ground-Based Interceptor engage on AN/SPY1" engagement sequence group. A long range target will be launched from the Kodiak Launch Complex, in Alaska, toward the broad ocean area north of the Reagan Test Site. The interceptor will be launched from Reagan Test Site to support a GBI engage on Aegis Ballistic Missile Defense engagement sequence group. The Aegis Ballistic Missile Defense System will provide AN/SPY1 target track data to the Ground-based Fire Control system. FTG 04-3 was added to the schedule to address the System Test Objectives that had been originally allocated to IFT-14. IFT-14 was modified to address the objectives of IFT-13C.

3.1.3. **FT 04-5:**

FT 04-5 is a Ballistic Missile Defense System non-intercept flight test of the Limited Defensive Capability configured Ground –based Midcourse Defense System. The objective of this test is to collect characterization data on the operation of the Cobra Dane radar as used in the "Ground-Based Interceptor Engage on Cobra Dane" engagement sequence. A Long Range Air-Launched Target, dropped from a C-17 aircraft, will fly a trajectory from the broad ocean area south west of Cobra Dane along a North-easterly course to a broad ocean area north of Cobra Dane. The radar track data will be used to plan and execute a simulated launch of an interceptor from Fort Greeley, AK. Data collected from this test will be used to validate the computer model used as a substitute for Cobra Dane target tracking data in IFT-13C and IFT-14.

3.1.4. **FTG 04-1:**

FTG 04-1 is a Ballistic Missile Defense System intercept flight test of the Limited Defensive Capability -configured Ground-based Midcourse Defense System with a target launched from Kodiak in a south-southeasterly direction to the broad ocean area off the coast of California with an interceptor launched from Vandenberg AFB, CA. The objective of this test is to exercise the "Ground-Based Interceptor Engage on UEWR" engagement sequence group. This will be the first intercept from VAFB, CA. The Beale radar will provide target data to the Ground-based Fire Control system.

3.1.5. **FT 06-1:**

FT 06-1 is a Ballistic Missile Defense System non-intercept test of the Limited Defensive Capability configured Ground-based Midcourse Defense System augmented with the additional Sea Based X-band radar. The objective of this test is to collect characterization data on the operation of the Sea Based X-band radar. The long range target, launched from Vandenberg Air Force Base, will fly a westerly trajectory to the broad ocean area.

3.1.6. **FTG 04-2:**

FTG 04-2 is a Ballistic Missile Defense System intercept test of the Limited Defensive Capability configured Ground-based Midcourse Defense System with a target launched from Kodiak in a south-southeasterly direction to the broad ocean area off the coast of California and an interceptor launched from Vandenberg AFB, CA. The objective of this test is to exercise the "Ground-Based Interceptor Engage on UEWR" engagement sequence group. The threat representative target used in FTG 04-2 has radar and infrared characteristics that are different from those targets used in the most recent intercept flight tests. The Beale radar will provide target track data to the Ground-based Fire Control system.

3.1.7. **FTG 04-5:**

FTG 04-5 is a Ballistic Missile Defense System intercept test of the Limited Defensive Capability -configured Ground-based Midcourse Defense System with a target launched from Kodiak in a south-southeasterly direction to the broad ocean area off the coast of California with an interceptor launched from Vandenberg AFB, CA. The objective of this test is to exercise the "Ground-Based Interceptor Engage on Sea Base X-band radar" engagement sequence group. The Sea Based X-band radar will provide target track data to the Ground-based Fire Control system.

3.1.8. **FTG 06-1a,b:**

FTG 06-1a,b is a Ballistic Missile Defense System intercept test of the Limited Defensive Capability configured Ground-based Midcourse Defense System with a target launched from Kodiak in a south-southeasterly direction to the broad ocean area off the coast of California with multiple interceptors launched from Vandenberg AFB, CA. The objective of this test is to exercise the "Ground-Based Interceptor Engage on UEWR/Sea Base X-band radar" engagement sequence group. This test is the first intercept test to include the salvo launch of two interceptors. The Beale radar target track data and the Sea-Based X-Band radar track data will be fused to produce a single target track.

3.1.9. **FTG 06-2:**

FTG 06-2 is a Ballistic Missile Defense System intercept test of the Limited Defensive Capability configured Ground-based Midcourse Defense System with a target launched from Kodiak in a south-southeasterly direction to the broad ocean area off the coast of California with an interceptor launched from Vandenberg AFB, CA. The objective of this test is to expand the demonstrated Ground-based Interceptor engagement envelope by increasing the fly out time of the interceptor. Either Beale or Sea-Based X-band radar target track data will be provided to the Ground-based Fire Control system.

3.2. Aegis Ballistic Missile Defense

3.2.1. **FTM 04-1:**

FTM 04-1 was an intercept system test of the Aegis Ballistic Missile Defense System. The SM-3 interceptor was launched by a US Navy ship against Target Test Vehicle (TTV) fired from Pacific Missile Range Facility. Satellites provided initial detection and track data to the firing ship, which acquired and engage the target. The test supported the SM-3 Cued/Uncued engagement sequence group.

3.2.2. **FTM 04-2:**

FTM 04-2 is an intercept System test of the Aegis Ballistic Missile Defense launching a SM-3 interceptor from a US Navy ship against a medium range ballistic missile target with a simulated bulk chemical payload launched from PMRF. The engagement is the first against a separating target and supports the SM-3 Cued/Uncued engagement sequence group. Satellites will provide initial detection and track data to the firing ship, which will acquire the target in the presence of clutter, and engage the RV.

3.2.3. **JCTV-1:**

JCTV-1 is a joint United States/Japan non-intercept system test of the Aegis Ballistic Missile Defense launching a SM-3 BLK I (MOD) interceptor from a US Navy ship

against a simulated ballistic missile target. This test is a flight test of a Japanese developed modification to the SM3 aeroshell. The flight test will be executed in the area north of Hawaii. While not explicitly a Ballistic Missile Defense System test, this test will utilize principally the same equipment and personnel as FTM 04-2, in a similar mission, and therefore provide an opportunity to observe and collect data on system performance and repeatability, and builds confidence in the system capability.

3.2.4. **FTM 04-3:**

FTM 04-3 is an intercept system test of the Aegis Ballistic Missile Defense launching a SM-3 interceptor from a US Navy ship against a medium range ballistic missile target with a simulated bulk chemical payload launched from PMRF. The test supports the SM-3 Cued/Uncued engagement sequence group. Satellites will provide initial detection and track data to the firing ship, which will acquire the target in the presence of clutter, and engage the RV.

3.2.5. **JFM-1:**

JFM-1 is a joint Japan/United States Intercept System test of the Aegis Ballistic Missile Defense launching a SM-3 BLK I (MOD) interceptor from a US Navy ship against a medium range ballistic missile target. This intercept test is a follow on to the interceptor verification test JCTV-1. While not explicitly a Ballistic Missile Defense System test, this test will utilize principally the same equipment and personnel as FTM 04-3, in a very similar mission, and therefore provide an opportunity to observe and collect data on system performance and repeatability, and builds confidence in the system capability.

3.2.6. **FTM 06-1 a/b:**

FTM 06-1 a/b is an intercept system test of the Aegis Ballistic Missile Defense launching a SM-3 BLK IA interceptor from a US Navy ship against a medium range ballistic missile target with a simulated bulk chemical payload launched from PMRF. This is the first test using the upgraded interceptor and upgraded operating system. This test campaign is a combined Development and Operational test that supports the SM-3 Cued/Uncued engagement sequence group.

3.2.7. **FTM 06-2 a/b:**

FTM 06-2 a/b is an intercept system test of the Aegis Ballistic Missile Defense launching a SM-3 BLK IA interceptor from a US Navy ship against a medium range ballistic missile target with a simulated nuclear payload launched from the broad ocean area. This is the first test using the upgraded interceptor and upgraded operating system against a separating warhead. This test campaign is a combined Development and Operational test that supports the SM-3 Cued/Uncued engagement sequence group.

Appendix A. Summary Matrices of Flight Test and Operational Realism Criteria

Operational Realism Criteria	Test Event								
	IFT-14b 2QCY05	FTG 04-3 2QCY05	FT 04-5 3QCY05	FTG 04-1 4QCY05	FT 06-1 1QCY06	FTG 04-2 1QCY06	FTG 04-5 2QCY06	FTG 06-1a/b * 3QCY06	FTG 06-2 4QCY06
Operational GBI (Test Configured)	RTS	RTS	RCF/Sim	VAFB	RCF/Sim	VAFB	VAFB	VAFB	VAFB
Threat Representative Target	Sim Target	GROW	MBRV-4	GROW	MTRV	MTRV	MBRV-2	MBRV-2	MBRV-2
Complex Countermeasures									
Operational Sensor		SPY-1	Cobra Dane	Beale	SBX	Beale	SBX	Beale/ SBX	Beale/ SBX
Operational Fire Control Software									
Tactics, Techniques, and Procedures									
Warfighter Participation									
Unannounced Target Launch	Sim Target								
End-to-End Test									

Beale	Beale AFB Upgraded Early Warning Radar (UEWR)
GROW	Generic Rest Of World
MBRV	Modified Ballistic Reentry Vehicle
MTRV	Medium Target Reentry Vehicle
RCF	Radar Certification Flight
RTS	Reagan Test Site
SBX	Sea-Based X-Band Radar
Sim	Simulated
VAFB	Vandenberg AFB

Capability Not Demonstrated by Flt Testing

Some Block Capability Demonstrated

Most Block Capability Demonstrated

* Two interceptors, salvo launched against a single target

Figure 1 SUMMARY OF MDA / GMD FLIGHT TEST OPERATIONAL REALISM

Increasing Operational Realism *1.5*

Operational Realism Criteria	Test Event						
	FTM 04-1 1QCY05	FTM 04-2 3QCY05	JCTV-1 3QCY05	FTM 04-3 1QCY06	JFM-1 1QCY06	FTM 06-1 a/b 2QCY06	FTM 06-2 a/b 3QCY06
Operational SM-3	SM-3 BLK I	SM-3 BLK I	SM-3 BLK I (MOD)	SM-3 BLK I	SM-3 BLK I (MOD)	SM-3 BLK IA	SM-3 BLK IA
Threat Representative Target	TTV	MBRV-2	Sim Target	MBRV-2	MBRV-2	TTV MBRV-2	SRALT GROUP B+
Complex Countermeasures							
Operational Sensor							
Operational Fire Control Software	BMD 3.0	BMD 3.0	BMD 3.0	BMD 3.0	BMD 3.0/3.1	BMD 3.1	BMD 3.1
Tactics, Techniques, and Procedures							
Warfighter Participation							
Unannounced Target Launch							
End-to-End Test			Sim Target				

MBRV Modified Ballistic Reentry Vehicle
Sim Simulated
SRALT Sort-Range Air Launched Target
TTV Test target Vehicle

Capability Not Demonstrated by Flt Testing

Some Block Capability Demonstrated

Most Block Capability Demonstrated

Figure 2 SUMMARY OF MDA / AEGIS FLIGHT TEST OPERATIONAL REALISM

Appendix B. DOT&E Test Criteria for FTG 04-3

DOT&E will use Missile Defense Agency (MDA) flight test FTG 04-3 to evaluate the operationally realistic flight test of the Ballistic Missile Defense System (BMDS) required by Section 234 (b) of the FY 2005 National Defense Authorization Act. In 2005, FTG 04-3 objective is to test the *Engage on Aegis* engagement sequence group. *Engage on Aegis* uses Aegis track data to develop the Weapon Task Plan and provide In-Flight Target Updates. For this engagement sequence group, the Ground-Based Midcourse Defense Fire Control (GFC) software is made to think that other sensors (especially Cobra Dane) are not available during the engagement. This will be the first time Aegis has operated "in-line" in a flight test. This is an excellent candidate for the congressionally mandated operationally realistic test, since Aegis is an operational sensor.

If a problem occurs that prohibits executing the *Engage on Aegis* engagement sequence group, MDA is reserving the option to switch to the *Engage on Cobra Dane* engagement sequence group. The decision to switch will be made in real time depending on the quality of Aegis data. The *Engage on Cobra Dane* engagement sequence group uses the Cobra Dane Upgrade Surrogate (CDUS) software. CDUS software uses global positioning system data from the target vehicle, i.e. de facto target discrimination. Once the GFC thinks Cobra Dane (or CDUS) is available, it will preclude testing the *Engage on Aegis* engagement sequence group.

DOT&E will use the attached criteria for the evaluation of FTG 04-3. These criteria are tailored to this specific flight test. Other operational criteria exist that will be addressed by other flight tests, ground tests, analyses, and modeling and simulation. This assessment will consider specific measurements, demonstrations, or observations of BMDS functionality as well as the operational realism of the flight test.

The attached criteria are associated with the effectiveness and suitability of the BMDS system to defend against a limited attack. Effectiveness will be assessed against functional area criteria derived from the Joint Chiefs of Staff (JCS) Basic Defense Criteria listed in JCS Publication 3-01.1, Aerospace Defense of North America. Suitability criteria are associated with the availability, maintainability, and survivability of the system, as well as the capability to transition between development and operations. Mission capability depends on a system being both effective and suitable. The following tables provide detailed criteria in these general categories:

Increasing Operational Realism *1.5*

- Detect
  - Includes infrared/radar sensors (ground, sea, air and space-based)
  - Surveillance
  - Situational awareness
  - System activation
- Classify
  - Attack assessment
  - Threat assessment
- Track
  - Sensor cueing
  - Track correlation
- Discriminate
  - Re-entry vehicles
  - Debris
  - Countermeasures
- Intercept
  - Engagement planning
  - Weapons authorization
  - Weapons allocation
  - Communications task planning
- Destroy (negate)
  - Hit assessment
  - Kill assessment
- Manage
  - Manual and automated processes for handling data throughout the mission
  - This criteria is addressed throughout all critical functions
- Suitability
  - Supportability
  - Survivability in hostile environments
  - Concurrent test and operations

Functional Criteria

Detect

Operational capability of BMDS sensors to detect threat missiles and Reentry Vehicles (RVs).

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
Characterize the detection function of the Cobra Dane.		Not applicable	X	Cobra Dane Upgrade Surrogate (CDUS) does not attempt to model Cobra Dane detection because the GPS position of the target is an input to the CDUS.
Characterize the contribution of Defense Support Program (DSP) / Space-Based Infrared System (SBIRS)/ Interim SBIRS Missile Defense Capability (ISMDC) to detection.	X	Interim SBIRS Missile Defense Capability (ISMDC) not manned by Warfighters	X	ISMDC not manned by Warfighters
	√	DSP satellites in operationally representative configuration	√	DSP satellites in operationally representative configuration
	√	Operational communications (comm) paths from DSP to Ground-based Midcourse Defense (GMD) system	√	Operational comm paths from DSP to GMD
Characterize the contribution of Aegis to detection.	√	Ship and radar manned by Warfighters using their operational tactics, techniques, and procedures		Not applicable
	√	Ship positioned at operationally representative threat range		
	√	Operational hardware and software		
	√	Target launch time unknown to Warfighters		
	√	Operational comm paths from Aegis to GMD		

√ marks indicate criteria expected to be evaluated based on FTG 04-3 results.
X indicates criteria not directly measured due to test limitations.

Functional Criteria

Classify

Characterize the operational capability of BMDS to classify ballistic missiles (as threat or non-threat to the defended area).

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
Capability of BMDS to determine if a missile event meets certain Rules of Engagement criteria.	√	Engagement controlled by Warfighters on station at the JNIC Missile Defense Element and Ft. Greely Fire Direction Center using their operational tactics, techniques, and procedures	√	Engagement controlled by Warfighters on station at the JNIC Missile Defense Element and Ft. Greely Fire Direction Center using their operational tactics, techniques, and procedures
	√	Operational hardware and software	√	Operational hardware and software
	√	Target impact point defined as defended area	√	Target impact point defined as defended area
Capability of DSP/SBIRS/ISMDC to provide data supporting threat assessment.	√	Operational reporting methodology and timing	√	Operational reporting methodology and timing
	X	DSP does not contain missile characteristics to properly type the target missile. Some limited capability may be demonstrated for launch point and impact point predictions.	X	DSP does not contain missile characteristics to properly type the target missile. Some limited capability may be demonstrated for launch point and impact point predictions.
Characterize the capability of Aegis to provide data supporting threat assessment.	√	Operational reporting methodology and timing		Not applicable
	√	Operational missile typing, launch point, and impact point databases and methodology		
	√	Ship and radar manned by Warfighters using their operational tactics, techniques, and procedures		

Functional Criteria

Track

Characterize the operational capability of BMDS sensors to track threat missiles and RVs.

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
Characterize the capability of Cobra Dane to provide tracking data to support generation of Sensor Task Plans, Weapon Task Plans, and In-Flight Telemetry Updates.		Not applicable	X	Tracking is not controlled by Warfighters using their operational tactics, techniques, and procedures
			X	Simulated operational hardware and software
			X	Simulated operational communications to GFC
Characterize the capability of DSP/SBIRS to provide tracking data to support generation of Sensor Task Plans.		Not applicable	√	Operational reporting methodology and timing
		Not applicable	X	ISMDC not manned by Warfighters and sensor tasking is scripted.
Characterize the capability of Aegis to provide tracking data to support generation of Sensor Task Plans and Weapon Task Plans.	√	Operational tracking and reporting methodology and timing		Not applicable
	√	Operational tactics, techniques, and procedures.		
	√	Ship and radar manned by Warfighters using their operational tactics, techniques, and procedures		

Functional Criteria

Discriminate

Characterize the operational capability of BMDS sensors to discriminate RVs.

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
Characterize the capability of Cobra Dane to discriminate RVs from other objects.		Not applicable	X	Cobra Dane performance is entirely scripted. CDUS uses true track data for a limited set of target objects. No actual Cobra Dane function is tested with respect to this step.
			X	Simulated operational hardware and software
			X	Simulated operational communications to GFC
Characterize the capability of Aegis to discriminate RVs from other objects.	√	Engagement controlled by Warfighters using their operational tactics, techniques, and procedures		Not applicable
	√	Operational hardware and software		
	√	Operational communications to GFC		

Functional Criteria

Intercept

Characterize the operational capability of GBI to intercept threat RVs.

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
Capability of the Command Launch Equipment (CLE) to support interceptor launch and flyout to the designated location in space and time.	√	Launch planning controlled with operational hardware and software at operational launch site	√	Launch planning controlled with operational hardware and software at operational launch site
	√	Operational communication paths	√	Operational communication paths
	√	Operational knowledge database	√	Operational knowledge database
	√	Operational launch procedures and built-in-test	√	Operational launch procedures and built-in-test
Capability of the Ground Based Interceptor (GBI) boosters to support launch and fly-out to the designated location in space and time.	√	Operationally configured missile and silo	√	Operationally configured missile and silo
	√	Launch from operationally configured silo using operational procedures	√	Launch from operationally configured silo using operational procedures
	X	Range safety and space debris concerns limit threat intercept geometries unrealistically	X	Range safety and space debris concerns limit threat intercept geometries unrealistically
Capability of the Exoatmospheric Kill Vehicle (EKV) to intercept	√	Operationally configured EKV and In-Flight Interceptor Communications System.	√	Operationally configured EKV and In-Flight Interceptor Communications System.
	√	Realistic threat intercept point uncertainty volume	X	Uncertainty of the track volume is simulated by CDUS algorithm
	√	Operational employment of threat characteristics and acquisition and discrimination algorithms	√	Operational employment of threat characteristics and acquisition and discrimination algorithms

Functional Criteria

Destroy

Characterize the operational capability of BMDS components to destroy (negate) threat RVs.

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
EKV lethality.	√	Operationally configured EKV hardware, software, and algorithms	√	Operationally configured EKV hardware, software, and algorithms
	√	Threat realistic EKV and RV velocities and RV dynamics	√	Threat realistic EKV and RV velocities and dynamics
	X	Some aspects of target presentation are not threat realistic. Details are classified. Impact point will be measured.	X	Some aspects of target presentation are not threat realistic. Details are classified. Impact point will be measured.
Capability of the BMDS to perform kill assessment.	X	No operational sensor will view the intercept so kill assessment data will not be gathered	X	No operational sensor will view the intercept so kill assessment data will not be gathered
	√	Operational GFC hardware, software, algorithms, and communication paths	√	Operational GFC hardware, software, algorithms, and communication paths

Additional Criteria

Supportability

Characterize the operational supportability of BMDS.

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
	Assumes that the system is maintained by trained operational personnel during testing, and that failures will be treated as operational failures and corrected using approved procedures.			
Operational dependability	√	Measure mission launch timeliness barring weather, range safety or target constraints	√	Measure mission launch timeliness barring weather, range safety or target constraints
Element life-cycle maintainability	√	Measure mean time to restore system operations, repair components, etc.	√	Measure mean time to restore system operations, repair components, etc.
Logistics supportability and sustainment	√	Assess the availability of spare parts and the adequacy of maintenance support	√	Assess the availability of spare parts and the adequacy of maintenance support
	√	Employ operational maintenance documentation and procedures	√	Employ operational maintenance documentation and procedures

Additional Criteria

Hostile Environments

Characterize the ability to operate in hostile environments

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
	No data on Hostile Environments performance will be gathered in this test.			
Operations in a nuclear environment	X	Measure change in threat negation rate when flying through a nuclear environment	X	Measure change in threat negation rate when flying through a nuclear environment
	X	Measure the effects of high energy electromagnetic pulses on ground systems	X	Measure the effects of high energy electromagnetic pulses on ground systems
Operations in a chem-bio-radiological environment	X	Demonstrate ability of warfighters to operate the BMDS using collective protection equipment	X	Demonstrate ability of warfighters to operate the BMDS using collective protection equipment
Physical security	X	Demonstrate ability to maintain operations while under attack from hostile military/ para-military forces	X	Demonstrate ability to maintain operations while under attack from hostile military/para-military forces
Information security	X	Demonstrate ability to maintain operations while under computer systems attack (hacking, malicious software, etc.)	X	Demonstrate ability to maintain operations while under computer systems attack (hacking, malicious software, etc.)

Additional Criteria

Concurrent Test & Operations

Characterize the ability to support concurrent test and operations.

Detailed Characterization Objective	Engage on Aegis		Engage on Cobra Dane	
	No data on Concurrent Test and Operations will be gathered during this test.			
Ability to perform system testing while performing 24/7 operational mission	X	Measure time necessary to switch from FTG 04-3 test operations to combat operations under warfighter control	X	Measure time necessary to switch from FTG 04-3 test operations to combat operations under warfighter control
	X	Demonstrate ability of warfighter in operational locations to maintain global situational awareness during test operations	X	Demonstrate ability of warfighter in operational locations to maintain global situational awareness during test operations

Appendix C. Common System Test Nomenclature

Testing of the Ballistic Missile Defense System continues to evolve from single Element development testing to more complex, multi-component System Testing, with increasing operational realism. Consistent with this evolution, the Deputy for Test and Assessment, MDA has implemented a common test nomenclature to designate Ballistic Missile Defense System flight test, ground test, and war games. Contractual constraints and large volume of existing documentation preclude immediate application of the common nomenclature to all tests. The common nomenclature is being phased in, starting for Ground-based Midcourse Defense with the test formerly designated IFT -16A.

Common Test Nomenclature:

First Two Letters
FT Flight Test
GT Ground Test
WG Wargame

Third Letter Designates Interceptor (no third letter for non-intercept tests)
G GMD
M Standard Missile-3
T THAAD
P Patriot
L Airborne Laser
A Arrow
B BMDS

First Number Series is The Block
04 Block 04
06 Block 06
08 Block 08

Second Number Series is in Sequential Order
1 Test 1
2 Test 2
3 Test 3

Senator LEVIN. Could I just take one more question?
Senator SESSIONS. Go ahead.
Senator LEVIN. Senator Nelson, would that be all right with you?
Senator BEN NELSON. I have to go anyway.
Senator LEVIN. We have not yet demonstrated through testing, as I understand it, that we have an operationally-effective and reli-

able system. It has not yet been demonstrated. Is that a fair statement, General Cartwright or General Obering, either one?

General CARTWRIGHT. I would say, sir, that is a fair statement.

Senator LEVIN. About what test would we have to get to, if things go well, before we could reach that conclusion? How many more tests would we have to have, assuming things go reasonably well, that would get us to that point?

General OBERING. Sir, if I may, that was the point I was going to make earlier. We are in a different mode, and I mean that in a very positive sense. In the classic model, the developer develops a system, they turn it over to the tester to test, and they turn it over to the warfighter, and the developer is never to be seen again, for the most part. You go through that one-time testing and they clear it out the door and off it goes. We are not in that mode.

We are in a continual spiral development and therefore continual spiral test cycles that we want to engage with DOT&E, with the operational test agents as well, as we go through the development. So to answer your question, we continually build out the system and continually improve it, we will continually go through these cycles, and we will continue to apply the operational criteria that we have agreed upon as we go through that.

So it applies not only to the long-range midcourse system. It also applies to Aegis. It applies when you bring in the sea-based X-band radar. It applies when we continue to add layers such as boost-phase defenses. We are in a constant engagement with the operational test community.

Senator LEVIN. We are moving in a spiral way, but nonetheless, we have not gotten to the point where we know that we have an operationally-effective system, and whether we go linearly or spirally, that is what we need to get to.

General OBERING. Sir, we have deployed systems in the past in combat zones that have not been proven to be operationally reliable——

Senator LEVIN. I am very much aware of that, but we usually do not manufacture all of those systems before we put them in a combat zone.

General OBERING. No, sir, and in fact, that is why we are going to continually spiral test and develop this one.

Senator LEVIN. But we are also at the point where we may be producing and manufacturing all of these missiles before we complete the spiral development. Is that not correct, at the rate we are going?

General OBERING. Sir, like I said, we are going to produce them as part of the spiral development program.

Mr. WYNNE. I would say to you, sir, that as a result of the fiscal restrictions, General Obering has actually trimmed back as much as he can to get to a warm line, the missile production. I think he has acted prudently without incurring a penalty, yet making sure that there is not an impact economically to the fact that the testing has been delayed.

Further, I would tell you that as we go through the test program, we have already converted two of the missiles, even though they were not successfully flown out of the thing, to essentially ground test articles, which is really going to enhance the ground testing

and, in fact, the operational crew testing of the system. So I would tell you that over the course of several years, as we do these spirals, in each case we are probably going to be consuming these rockets as quickly as we are producing them.

Senator LEVIN. Mr. Duma, you are independent. Is that right? OT&E is independent?

Mr. DUMA. Yes, Senator, that is correct.

Senator LEVIN. Has that independence been retained during this spiraling experiment?

Mr. DUMA. It has. Our role as an advisor in the development phase is somewhat unique for us. However, I think we have had an impact. For instance, in the document that you just discussed about having a draft and that General Obering and I recently signed, the difference there is that we, as the operational test community, that is, my organization and the operational test agencies, in this case led by the Army Test and Evaluation Command, are preparing the evaluation plan and the test plan for certain tests that have that opportunity to be as operationally realistic and as end-to-end as can be. That document that you are talking about—we have done that for one of the tests in this fiscal year 2005. That is a developmental test to which we have applied operational realism. I believe I have that same agreement with General Obering to do that for subsequent tests for each block before that capability is fielded for General Cartwright.

Senator LEVIN. But not before it is produced?

Mr. DUMA. Well, the test program is going to consume those test articles. Just in the next 2-year period for the GMD system, there are nine flight tests scheduled, six of which are intercepts. So if that goes as planned, we will consume six ground-based interceptors in that portion of the test program.

Senator LEVIN. Where would that get us to? Number what? Number 35, number 40, number 30? Where does the use of those six missiles get us to in terms of the production of these missiles?

General OBERING. Well, sir, we have requested the funds to have 21 through 30 in the 2006–2007 time frame and a long lead for 31 through 40.

Senator LEVIN. Is that where those six are?

General OBERING. We have test missiles as part of our development program at about 3 a year, 4 a year as well.

Senator LEVIN. But are those six that were referred to part of 31 to 40?

General OBERING. Sir, we would like to take the interceptors and we would like to test those, as I think my predecessor talked about, where we can take the interceptors and rotate them through the test program, very similar to the ICBM testing that we do.

Senator LEVIN. Mr. Chairman, I appreciate the extra time. Thank you.

Senator SESSIONS. Thank you, Senator Levin. I know you have studied this issue for many years and asked some questions that are important to us all.

I do not think it is just a choice between testing and deployment. It seems like to me we are doing the only thing that realistically is practical to do today. We have a threat. We need to be building the radar systems. We need to be building the launch pad systems.

We need to be building the interceptor systems. We need to be proving the technology. Just to sit and prove to an absolute certainty that the hit-to-kill technology can work and then wait to develop the next phase and the next phase and the next phase and then finally, sometime in the far distant future, test them all together, to me is guaranteeing a delay beyond which our Nation should take, considering the risk we are facing. Is that the fundamental principle, General Cartwright?

General CARTWRIGHT. I tend to agree with you, Senator. We have a realistic threat here. We have an imperative, and we are trying to get the best we can out of the system by operationally realistic testing mixed with the developmental, getting operators on the system as early as possible, having an emergency——

Senator SESSIONS. We have personnel actually working on these radar systems, computer systems, and launch systems right now. So as you continue this technology, they will be ready immediately to utilize it. Is that correct?

General CARTWRIGHT. That is correct.

Senator SESSIONS. Well, I think that is important.

Is there a legal definition somewhere of developmental and operational testing, Mr. Duma, or is it just accepted lingo in defense procurement?

Mr. DUMA. There actually is a legal definition of operational testing in the title X statute that created my office back in the mid-1980s.

Senator SESSIONS. So you have been asked all of these questions about operational and development and testing and realistic, operationally realistic development testing, and so forth. Your answers have been, insofar as possible, consistent with those definitions in that statute, as you have tried to answer those questions here?

Mr. DUMA. Yes, Senator. The definition talks about field testing in an operationally realistic environment using the soldiers, airmen, seamen to operate the system.

Senator SESSIONS. Well, let us take an artillery piece. Somebody develops the artillery piece and the manufacturer, I am sure, does developmental testing while they are designing the piece. Then in a classic artillery piece, you take it out and the soldiers actually fire it in a realistic situation at targets. Is that correct?

Mr. DUMA. It is actually even more robust than that, Senator. Not just firing it, but actually conducting a battle scenario where they have missions to accomplish where firing is just one element of that. They have the command and control, the tasking from commander's intent, and things like that that they have to execute, move, shoot, et cetera. So it is a true wartime scenario or battle scenario that we put them through in operational testing.

Senator SESSIONS. The only way you can do that in a national missile defense system is really have someone, at surprise times, launch a bunch of missiles directed at the United States, which is not a very practical thing for us. We have to construct testing in a way that does not endanger our country or our citizens, and yet, at the same time, get realistic testing accomplished.

Mr. DUMA. Operational testing we try to make as realistic as possible. There are always test limitations that we have to deal with if for no other reason than safety because it would be untenable to

place our personnel at risk during a test. Risk is an inherent factor of warfare but not for testing.

Senator SESSIONS. It is just harder to do in this kind of system, I do not think there is any doubt.

Mr. Wynne, when we did this proposal to go forward and deploy as soon as technologically feasible a national missile system that we passed in 1999—Congress did—we decided to go with the spiral development. Is that correct? Did we do something legal there or did we just direct you to proceed in that fashion?

Mr. WYNNE. Sir, the key phrases were deploying and technologically feasible. Now, technologically feasible is I think all of those tests that General Obering put together as far as knowing that we have checked the square on hit-to-kill, that we have checked the square on the guidance equations, we have checked the square on checking out the kill vehicle, we have checked the square on the missile, and we have seen all of those maybe separately, as Senator Nelson pointed out, but collectively works out. That is technology feasibility.

Deployment of that technologically feasible set is exactly where we are. So I think, sir, we are approaching the mission fulfillment, if you will, of what Congress asked us to do.

Now, there is another set of responsibilities which we owe to the warfighter, which is to increasingly grow the reliability of, first, the rudimentary system that General Cartwright talked about, and then as we get more and more and better sensors on board, to effectively test those sensors and that layered defense in an effective manner to increase the confidence of not only the soldiers, sailors, and airmen that are operating this system, but to ourselves and to the American people, and then where we would really like to make the most effect, of course, is on anybody who is contemplating a launch towards us believing that that launch is fruitless.

Senator SESSIONS. I believe that is exactly correct. I believe that we need to continue to develop this system so that any enemy would realize that they are going to be incapable of making a missile system that could penetrate our defense. Therefore, they would be wasting money to do it. Not only that, I think if we do not have that and we face a nation that has a missile capable of hitting the United States, it puts the President in an awfully weakened position if this person, this nation threatens us in a way because he cannot have confidence that the American people would be protected.

General Cartwright, I guess that is your bailiwick. I guess that is what you deal with on a daily basis as you look at the strategic defense of America. Would you comment on that?

General CARTWRIGHT. I think to take it back again to the opening statement, what we are compelled with right now is that the offense alone is not enough. We have to have a combined offense-defense capability to change the mind set of the enemy so that he or she cannot believe that just because they get a sneak first shot, that that is going to be determining.

Senator SESSIONS. The stress, General Obering, will continue on you to not only make the system that we have work, but to enhance it ad infinitum, I suppose, to deal with potential targets that

may be difficult or disguised or evasive in some ways. Is that correct?

General OBERING. Yes, sir, and that is a great point that you are bringing up, which is what we are asking for in 2006, in terms of our budget, the results of that work will not manifest itself for several years. It is incumbent that we realize that, that we are playing about 2 years ahead, for the most part, in terms of developing our capabilities, and we have to try to judge where we need to be that far in advance. It is important we continue that momentum as we look out into an uncertain world.

Senator SESSIONS. Would you comment on using your plans to use this testbed to continue to do GMD testing while maintaining some degree of operational alert status? How do you envision managing this tension between having an operational alert status and testing at the same time?

General OBERING. The first thing there, sir, as you said, we have been working very, very closely with General Cartwright and the STRATCOM folks, as well as Admiral Keating in Northern Command, as well as Pacific Command (PACOM), in setting up the shakedown period. So we have been developing and working out the tactics and the procedures for being able to transition from a development state, as we call it, to an operational state and back. We feel increasingly confident day to day that we are working that out.

On the materiel side, a lot of the money that we are looking at is how do we better develop concurrent tests and operational capability so that we do not have, as General Cartwright said, single strings through some of our testbed such that we can do the duality of continuous operations eventually and continuous improvement at the same time.

Senator SESSIONS. Well, it is a challenge. We can make errors. I think with Mr. Duma watching and Mr. Wynne and some of our Members of this Senate are helpful in monitoring how you are progressing, and we will be looking closely. But I think it is the only way to go. I think we have to proceed in this way. I think it will mean that you will be asked to come back more often and you will have to continue to explain how we are going because if we get off track and make some errors, it could end up costing more money than we ought to spend.

Senator Nelson.

Senator BILL NELSON. You all are relying totally on R&D funding. At what point do you expect to move away from R&D funding?

General OBERING. Well, sir, we would like to continue that as we continue the spiral development mode into the future, and as we continue to add layers to the system and improve the robustness because of the flexibility that gives us with respect to the development.

Senator BILL NELSON. You are planning to go to one contractor for the boosters.

General OBERING. Yes, sir, we are.

Senator BILL NELSON. Why?

General OBERING. As I said, part of our budget reduction that we had to meet the top line, I had to look out to say where could I accept more risk, sir.

There were two reasons why we had the dual contractor.

One was we did not, at the time that we initiated that second contract effort, have confidence in the configuration of one booster in terms of its performance. So that was one of the reasons.

The other reason was when you deal in energetics, as you are well aware of, you want to have more than one supplier for the booster motors. Because of the accident that was suffered in the one booster program, we had to move that motor supplier to the same supplier basically that we have for the Orbital Booster Vehicle (OBV) program.

Also as I said, we have flown the booster successfully three times. It flew exactly as predicted and the performance was exactly as predicted. That is another key point. A lot of it that is overlooked in our flight test, in addition to just press, is the fact that we use those to anchor our models and our simulations, because we want to be able to get to where we have comfortably got predictable performance. So since we did have the success in that, I determined that we could accept more risk in that area, and that is why we went to this.

Now, we have another booster that is coming down the——

Senator SESSIONS. Does it save money to go to one supplier?

General OBERING. Yes, sir, it does, considerable.

Senator BILL NELSON. Well, of course, that is also a question that another part of the Air Force was asking with regard to assured access to space on the EELVs, and they concluded that you have to have two.

General OBERING. Yes, sir, and that is what I was getting ready to say. We have another booster, an interceptor program that is on line, and that is the KEI. That is with a totally different, a very much different configuration, much more capable with respect to acceleration. It is a mobile, containerized missile that could be moved worldwide, a different contractor, a different set of suppliers there. This is a temporary state which we will find ourselves in as we go through this.

Senator BILL NELSON. Has that system been tested?

General OBERING. No, sir. We have static tests this year, and we will begin the flight test of that in the 2008 time frame.

Senator BILL NELSON. Well, how about overall production? Can one manufacturer produce reliably the boosters at the numbers that are planned for two manufacturers?

General OBERING. Yes, sir, they can. That was part of the cost, by the way, in which the result of the accident that occurred 2 years ago, where we had to basically go to the one supplier. Part of the cost of accelerating boosters with the Orbital Boost configuration was due to that.

Senator BILL NELSON. Are we in the range of spending about $10 billion a year to develop these systems?

General OBERING. Sir, we have, as I said, a $7.8 billion request this year, and we have been trying to manage within the top line of between $7.5 billion to $8 billion for development and $1.5 billion to $2 billion for fielding. So yes, sir, in general.

Senator BILL NELSON. Well, if we are looking at operating this system over the next 30 years, are we talking about $10 billion a year for 30 years?

General OBERING. No, sir. That gets into, obviously, what it takes to sustain the system, the contractor logistic support. That is considerably smaller than that. What you have done is you have addressed or rolled in the development, as well as fielding, as well as the operational support costs.

But if I could put it in perspective, Senator, if you go back and look at every dollar we have spent that has been authorized by Congress since 1983 when we started the missile defense program, it is about $95 billion. The cost of September 11, one attack, not a weapon of mass destruction, according to the GAO was about $83 billion. So we would recoup the entire cost of this system since its inception if we can prevent one attack, and that is especially in light of a weapon of mass destruction, which was not used in the September 11 attack. So, yes, sir, it is a lot of money. It is still less than 3 percent of our defense budget, but we think that the return on that investment is considerable.

Senator BILL NELSON. Well, that is the choice we have to make because the enemy does not necessarily launch off of an ICBM toward us. He may be coming across the Arizona-Mexico border.

General OBERING. Yes, sir, that is correct. Unfortunately, we do not have the choice to say either this or that. We have to cover both of those situations. You are correct, sir.

Senator BILL NELSON. Let me ask something down in the weeds here. In the budget justification that is not included in the original budget submission, there is a new funding line that ostensibly would begin in 2008 and indicates an intention to add about $7.6 billion to the overall funding level through fiscal year 2011. But as I look at the budget, the funding is not actually in the budget. It is money that you all are planning to spend. Thus, you hope that it is in future budgets. So it has not been through the process of forcing hard budget choices and then all the other calculations that we have to make with regard to the deficit and so forth.

Some of the tables in the justification book show negative dollar levels of more than $3.5 billion to make the plan's spending totals balance with the actual budget request. I would like you all to give some clarification to this.

So, General, can you explain whether this additional $7.6 billion that MDA plans to spend in those years of 2008 to 2011 is in the actual budget or is it planning to spend the money that has not been budgeted, and therefore it is not counted against the Federal deficit?

General OBERING. Yes, sir, I can address that. That is part of the fielding money that I talked about earlier, the $1.5 billion to $2 billion that the Department has provided. We have been given roughly that amount of money I believe since the 2004 time frame initially, 2004, 2005, and 2006 and 2007. We were told to plan on that for 8, 9, 10, and 11, but it has not been allocated to us. It is part of the spiral funding approach that the Department is taking.

Senator BILL NELSON. Well, Mr. Secretary, let me ask you. Is this the sort of budget that you consider a standard practice and it is it an acceptable practice for the Department?

Mr. WYNNE. Senator, that is not quite my lane to respond to in that I am not one of the budget makers. However, let me just address it as far as I know.

That money would come from the service O&M budgets as a transfer item into the MDA. There is a huge debate over who would budget for that money that is really at the Comptroller, Deputy Secretary and SECDEF level. I think they asked to put it somewhere in the planning documents so that it would not be forgotten.

That was one thing that I tried to push as well. I do not want it to be forgotten that once we get this system up and started, that as it transitions into a service, which is what we planned for PAC–3, as you recall, and we are trying to plan for THAAD, even if Missile Defense keeps it to operate, through the good offices of General Cartwright, somebody has to pay for the logistics, the sustainment, the weather-related problems that might go on, and somebody has to pay the Navy to sail the ships to go on out and be, if you will, sensors. So all of that has to be taken care of. What I was fearful of is, though we all have great respect for the MDA and the fact that it is a separate agency, gone but not forgotten is the classic budget exercise. So that is kind of what it is and how I would relate it to you.

Senator BILL NELSON. Thank you, General.

Senator SESSIONS. Thank you.

Do any of you gentlemen have anything else to add, you feel like you need to clarify or make any comments?

Mr. WYNNE. I would just like to thank you, Senator Sessions, for holding this. Thank you, Senator Nelson. Your words ring true as far as getting us as close as we can to have something here. Thank you, sir.

Senator SESSIONS. Well, it is a pleasure to be with you. I think an incredible achievement has occurred. We have gone from a vision of a hit-to-kill technology that many doubted would occur to make that a reality. We have rockets that are capable of launching that hit-to-kill technology. We have radars that give us warning. The question is whether we can make them all work together at the same time and be effective. I believe that is basically achieved now, but we need, as Mr. Duma said, continual testing, continual stress, continual determination to improve and make the system better to handle more complex targets, more difficult targets, targets coming when we are not expecting them. Those kind of things are important. But I just think there is little doubt that you have gotten us to a point where we can know that we are going to get there.

I thank each of you to your service to your country. We believe it is important to our Nation's national security and the ability of this Nation to be a lead player in the world events of today. Thank you.

We are adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JEFF SESSIONS

BOOST VEHICLE

1. Senator SESSIONS. General Obering, when you appeared before our committee recently, you indicated you wanted to stop producing the Boost Vehicle (BV+) because the same contractor (ATK) was now providing rocket motors for both the BV+ and the Orbital Boost Vehicle (OBV), which removed any risk reduction. It seems now that we have put all of our eggs into one basket rather than try to keep two

boosters and two rocket motor suppliers active until we have confidence in the OBV, especially considering the devastating effects of the recent CSD explosion. Can you explain how this is a prudent decision?

General OBERING. Our booster confidence has improved dramatically since the dual booster strategy was introduced. There are several advantages to selecting a single booster. First, the challenges of planning and integration, associated with manufacturing multiple booster vehicles are reduced. Second, we can avoid having to fund enough boosters to keep two assembly lines open and viable. Third, the costs attributable to restart and lost learning and trained personnel, are less severe if a manufacturing break is imposed. Lastly, a single booster strategy is inherently cheaper to operate and maintain.

The Missile Defense Agency (MDA) established the Ground-Based Interceptor (GBI) dual booster vehicle strategy as part of the Ground-based Midcourse Defense (GMD) program to mitigate the risk of relying on a single booster vendor, and to take advantage of a complementary booster performance mix. In late fiscal year 2003, two catastrophic accidents at the fuel mixing facility of the vendor that manufactures the Lockheed Martin Booster Vehicle Plus, "BV+", second and third stage rocket motors, validated the dual booster strategy. The impact to the program was only a 3-month delay in fielding of GBIs 6–8.

The Orbital Sciences Corporation booster has been flown successfully in three missions: Taurus Lite (a near operationally configured booster), Booster Verification Flight 6 and Integrated Flight Test 13B (both operationally configured boosters with Exoatmospheric Kill Vehicle emulators). The Lockheed-Martin BV+ flew successfully as an operationally configured booster with an Exoatmospheric Kill Vehicle emulator in Booster Verification Flight 5. These tests demonstrated that the technology and design of both boosters are viable.

I recognize, however, that there are challenges and risks if the dual booster vehicle strategy is terminated. Lockheed Martin, or its suppliers, would not be available as near-term alternatives to the Orbital Sciences Corporation, if a manufacturing failure occurs. Lockheed Martin has much more experience and infrastructure developing, manufacturing, and sustaining ballistic missiles, a capability that would be lost if the dual booster strategy were eliminated. Additionally, recent flight test failures have left unverified the Orbital booster's performance as part of an operationally configured Ground Based Interceptor.

While it is still our intention to terminate the Booster Vehicle Plus program for the reasons stated earlier, MDA is looking at several options as to the timing of that decision to minimize the risks. Regardless, MDA will maintain the dual booster strategy until after another successful flight test of an OBV-configured GBI. The options being considered are: purchasing no additional BV+ boosters beyond the current contract, partially terminating the BV+ booster effort after taking delivery of a limited number of boosters, and canceling the BV+ booster altogether in favor of the Orbital Sciences Corporation Boost Vehicle.

The favored option at the present time is to complete the current contract and deliver eight Booster Vehicle Plus (three for flight and ground test and five to be deployed at Fort Greely, AK). This option provides the taxpayer with the best return on investment provides the warfighter with a complementary booster capability, and strikes a balance between the benefits and challenges discussed above.

2. Senator SESSIONS. General Obering, are all of the motors and booster stages actually produced at the same geographical location or are they spread out across the country? What is the risk associated with these locations and how is it being mitigated?

General OBERING. Alliant Techsystems, Inc., is the vendor for the rocket motors for both the OBV and the Lockheed Martin Boost Vehicle-Plus. The OBV rocket motors (1st, 2nd, and 3rd stages) and the Boost Vehicle-Plus 1st stage rocket motor are cast at the vendor's Magna, Utah facility. However, this facility includes geographically separated redundancy in both its mixing and casting facilities capable of handling both of the ongoing booster activities. The Boost Vehicle-Plus 2nd and 3rd stage rocket motors are cast at the vendor's Elkton, Maryland facilities. Risk is also minimized by the availability of additional Alliant Techsystems Inc. mixing and casting facilities at Magna and Promontory, Utah that could be modified to support either booster.

Orbital Booster stages are manufactured and integrated into a booster stack at the Orbital Sciences Corporation facility at Vandenberg Air Force Base, California. The Payload Avionics Module (the front end of the interceptor which includes the Exoatmospheric Kill Vehicle) and the Booster Stack undergo final assembly, test, and checkout at the Missile Assembly Buildings at Fort Greely, Alaska or Vandenberg Air Force Base, California.

Boost Vehicle-Plus booster stages are manufactured and integrated into a booster stack at the Lockheed Martin Courtland, Alabama facility. The Payload Avionics Module and the Booster Stack undergo final assembly, test and checkout at the Redstone Arsenal, Integration, Assembly, Test, and Checkout facility in Alabama.

The geographical separation of these facilities reduces risk to the program in the event of an accident at one of the sites. The manufacturing sites have been selected by our industry partners because they possess the requisite skills sets, facilities and equipment to deliver interceptor assets safely, on time and on cost. The MDA works closely with our industry partners to ensure that manufacturing quantitiesare adequate to sustain the existing manufacturing lines, skilled workers, and 2nd and 3rd tier suppliers.

3. Senator SESSIONS. General Obering, I find it strange that we have invested quite a lot of money in perfecting the BV and we are now casting it aside to make the untested, high-risk Kinetic Energy Interceptor (KEI) booster the alternate for OBV. Can OBV be tweaked to handle that mission and would it be high-risk?

General OBERING. The Orbital Boost Vehicle booster cannot be modified to handle the KEI's boost-phase mission requirements. The boost phase mission requires the high acceleration and short bum times that have been designed into the KEI's motor set. It is not possible to modify the OBV's motors for the boost mission as their bum time is three times longer than the requirement.

QUESTIONS SUBMITTED BY SENATOR JAMES M. INHOFE

BUDGET FOR MISSILE DEFENSE

4. Senator INHOFE. Secretary Wynne and Mr. Duma, this year's budget request for MDA is $7.8 billion. This is $1 billion less than last year. Further testing is planned on the GMD system for compliance with the National Defense Authorization Act for Fiscal Year 2005, section 24 which requires that you conduct tests using operationally realistic criteria by October 2005. Understanding that not all $7.8 billion requested by MDA is spent on GMD, I am concerned that you are not going to have the appropriate level of funding to carry out this testing and continue production as planned. Further, Program Budget Directive 753 has directed a budget cut of an additional $5 billion through fiscal year 2011, which means that further down the road, we are going to encounter additional challenges. Please comment on this cut and its impact on the program overall and on the ability to conduct testing. Is more funding needed to stay on the production and testing schedule?

Mr. WYNNE. The fiscal year 2006 President's budget request provides sufficient funding for testing and production, as these were priorities during its formulation. The Department evaluates its capabilities and makes adjustments in programs based on analysis of evolving challenges and capability needs. Program Budget Decision (PBD)–753 reduced MDA funding by $1 billion in fiscal year 2006 and $0.8 billion/year in fiscal year 2007–2011 for a total reduction of $5 billion. The resulting $7.8 billion fiscal year 2006 budget request reserves $1.4 billion for fielding and $6.4 billion for testing and other RDT&E; 35 percent of the overall request is reserved for testing.

Mr. DUMA. General Obering is managing the budget for all the Ballistic Missile Defense program activities. He is strongly committed to a robust, event driven testing program. The MDA, the Service Operational Test Agencies, and DOT&E are working together to plan and execute a realistic operational test that satisfies the requirements in section 234, as soon as the program is technically and operationally ready to conduct the test. General Obering is committed to planning and executing an adequate, long-term "block" testing program before fielding or producing a Ballistic Missile Defense (BMD) System "block" configuration. Given his commitment to resource this testing out of his core budget, additional funding is not needed for testing.

TESTING OF MISSILE DEFENSE SYSTEMS

5. Senator INHOFE. General Obering, I want to commend you for the work thus far on the testing associated with missile defense. The GBI prototype successfully engaged four of five targets in 2000–2001 and the current GBI booster flew successfully three times in 2003–2004. You have put in place an aggressive, operationally realistic test plan that schedules two flight tests in 2005 and four intercepts in 2006. Further you have established an independent review team to analyze recent test failures and whose data can be used by Congress to determine if any systematic

problems exist. What do we need to stay on course with the GMD testing schedule that has been planned by MDA?

General OBERING. In addition to the Independent Review Team that you mentioned, I have also established the position of Director, Mission Readiness, and have asked Rear Admiral Kathleen Paige, United States Navy, to assume this responsibility. As Director of the Mission Readiness Task Force, Rear Admiral Paige will initially address processes and procedures to enhance the verification of the operational readiness of the GMD Weapon System. As a key part of this effort, Rear Admiral Paige will focus at least the next 6 months on GMD and its flight test program. This mission readiness effort will include proposing a plan for the next several flight tests, including objectives and schedules. In order to stay on course, this initial flight test plan will be part of a larger plan including ground testing, which addresses processes and procedures to enhance the verification of operational readiness of the GMD weapons system. It is imperative that we continue to allow Rear Admiral Paige's team to complete their assessment and provide a recommended way ahead for the GMD test program.

6. Senator INHOFE. General Obering, if the results of the tests currently planned determine additional flight intercepts are needed, do you have the ability to add in additional tests before the end of 2006 and remain on schedule with production?

General OBERING. The interceptor manufacturing schedule must support both the emerging test schedule and the emplacement of operational missiles. Since the lead time on an interceptor is 24 months, to add additional tests by the end of 2006 requires that operational missiles be diverted to test events and then subsequently replaced with new test assets diverted to operational use. Additionally, the current schedule for emplacing operational missiles may not be achieved.

GMD is executing a rigorous and systematic test program to demonstrate that hit-to-kill technology is mature and to gain confidence in system performance against increasingly complex threat representative targets and scenarios. The flight test events are carefully and systematically designed to measure technical performance and maturity of new hardware / software technology and demonstrate a desired engagement sequence group.

Evaluating the results of each flight is required before proceeding to the next test event. Time to analyze the test data and prepare for the next event usually takes 3 to 4 months. Based on available resources, prudent analysis, personnel tempo and depending upon the as-yet unreleased recommendations by the Mission Readiness Task Force, the flight test schedule can support up to four flight tests in fiscal year 2006 and four more in fiscal year 2007. Adding additional flight tests will be difficult within time and resource limitations, however, additional ground testing is also under consideration.

THREAT DRIVES MISSILE DEFENSE

7. Senator INHOFE. General Cartwright and General Obering, some believe that we can continue to push the budget and schedule for missile defense production to the right more and more each year and that there is no reason that we need to push as aggressively for this system. We can't afford a production break for military and cost reasons. I think everyone understands that a break in building these systems only means it will cost more in the future; estimates as high $300 million have been quoted for break in production. However, I am not sure that everyone understands that we need to maintain production to keep pace with the threat. Without getting into any classified information, please tell, from a military perspective, about the threats posed that make GBIs a critical program for America's missile defense and national security. It is my understanding that North Korea's Taepo-Dong 2 is capable of reaching the U.S. with a nuclear warhead and Iran is only about 10 years away from ICBM development.

General CARTWRIGHT. North Korea is developing the Taepo Dong 2 (TD–2) missile, which may have the capability to strike the continental United States. The integration of a nuclear payload with the TD–2 will probably take several years, however, that timeline could be accelerated. In addition to developing ballistic missile and nuclear capabilities, North Korea has also shown an interest in proliferating their missile technology.

Iran is a Middle Eastern leader in ballistic missile forces with an ambitious development program. Iran's progress in the development of longer-range ballistic missiles is, in part, due to assistance from North Korea and other countries. Additionally, Iran's nuclear programs increase the possibility of future nuclear warhead development.

General OBERING. Yes, your statement is correct. As Vice Admiral Jacoby described in his prepared testimony on February 16, the Taepo Dong-2 intercontinental ballistic missile could deliver a nuclear warhead to parts of the United States in a two stage variant and target all of North America with a three stage variant. In addition, the Taepo Dong-2, which has never been tested before, may be ready for testing. It is assessed that Iran will have the technical capability to develop an intercontinental ballistic missile by 2015, though it is not clear whether Iran has decided to field such a missile.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

OPERATIONAL VERSUS TEST GROUND-BASED INTERCEPTORS

8. Senator LEVIN. General Obering, the MDA has provided briefing charts to the committee which clearly show a differentiation between GBIs intended for operational use and those intended as flight test articles. The briefing charts indicate that MDA plans to purchase 50 operational interceptors (GBIs 1–50), and 28 flight test interceptors through fiscal year 2011. Can you confirm that these are MDA's current plans, or provide the correct information on how many of each type of GBI missile (operational versus test) MDA plans to procure through the Future Year Defense Plan (FYDP)?

General OBERING. Yes, the MDA plans to purchase 78 interceptors as described above. However, it should be noted that 2 of the 50 operational interceptors were already re-allocated for test and are not available for operational emplacement. I will review the plan once I receive recommendations from Rear Admiral Paige and her Mission Readiness Task Force Review.

9. Senator LEVIN. General Obering, please describe the differences between operational missiles and flight test missiles.

General OBERING. Flight test missiles are the same configuration as operational missiles with the exception of certain non-tactical equipment. This equipment is required for capturing booster performance and flight environment data and also for range safety tracking and flight termination.

10. Senator LEVIN. General Obering, will MDA maintain a distinction between each type of interceptor? In other words, will operational GBIs be emplaced in operational silos and maintained as operational assets, and will flight test articles be used for flight testing, but not for operational use?

General OBERING. Our current plan is to maintain a distinction between operational assets and flight test articles and to convert between the two only on a limited basis. Operational interceptors may be removed from operational silos for possible future service life and reliability testing. Use of an operational interceptor for flight test requires only the addition of non-tactical equipment for transmission of booster performance and environment data as well as range safety tracking and flight termination. Removal of non-tactical equipment from a flight test interceptor would restore it to an operational configuration.

11. Senator LEVIN. General Obering, will a certain number of operational missiles be test launched for reliability and shelf-life verification? If so, when will such verification flight tests begin and how many operational missiles are planned to be test launched for this purpose?

MDA collects reliability, maintainability, and availability information on all BMD System test events. In addition, a Joint Reliability and Maintainability Evaluation Team reviews, characterizes and scores reliability and maintainability field data on components. Reliability, maintainability, and availability data gathered is controlled through a centralized database. Reliability analyses are performed concurrently with development so that design problem areas can be identified and corrective actions can be cycled back into the spiral development process.

MDA does not have a plan in place for shelf-life verification testing for Ground Based Midcourse Interceptors (GBIs); MDA is still investigating methods for shelf-life verification testing of operationally configured GBIs. Accordingly, a certain number of operational missiles have not yet been specifically identified for reliability and shelf-life verification testing.

Aegis BMD is using operational SM–3 Block I missiles for the current series of test flights. Only two SM–3 Block IA missiles will be built specifically as flight test rounds, the remainder of the SM–3 Block IA flight tests will use operational missiles. Future flight tests will use missiles of varying age. Specific missiles have not

yet been allocated to specific flight tests, so we cannot state the exact quantity. MDA collects reliability data on each missile flight test and compares it to the reliability predictions for each missile section. The overall reliability estimates are then adjusted accordingly. Similar to other U.S. Navy developed missiles, Aegis BMD has planned for aged rocket motor ground tests of varying aged motors to verify and potentially extend the shelf-life of the rocket motors, which are notionally the limiting component in missile shelf-life.

12. Senator LEVIN. General Obering, how many GBIs are emplaced in operational silos now that are not intended for flight testing this year?

General OBERING. There are currently eight interceptors emplaced in operational silos; six at Fort Greely, Alaska, and two at Vandenberg Air Force Base, California. They are not intended for flight testing in 2005. However, we are collecting environmental and aging data on these interceptors.

13. Senator LEVIN. General Obering, how many GBIs are planned to be placed in operational silos by the end of 2005 that are not intended for flight testing in 2006?

General OBERING. There are 10 additional interceptors planned for emplacement in operational silos at Fort Greely, Alaska, by the end of 2005. At this time, they are not intended for flight testing in 2006.

14. Senator LEVIN. General Obering, are the missiles currently deployed in operational silos equipped with the prototype Exoatmospheric Kill Vehicles (EKVs) used in earlier flight tests, or with the upgraded operationally configured EKV?

General OBERING. The interceptors currently deployed in operational silos are equipped with the upgraded operationally configured Exoatmospheric Kill Vehic1es.

OPERATIONAL VERSUS FLIGHT TEST SILOS

15. Senator LEVIN. General Obering, the briefing charts provided to the Committee indicate that MDA plans to build 40 operational silos at Fort Greely and four operational silos at Vandenberg AFB, two of which are intended for testing, but capable of operational use. Is it correct that the operational silos built and planned at Fort Greely are not currently intended as flight test silos?

General OBERING. That is not correct. It is our intention to fly out of Fort Greely at some future date. However, we have not completed the environmental assessments required for a final decision. Additionally, we have not yet completed any formal plans to use silos at Fort Greely for flight testing. Prior to such plans being completed or a final decision on conducting such flight testing, significant additional environmental and range safety analysis would be required.

16. Senator LEVIN. General Obering, what is the difference between an operational silo and a flight test silo?

General OBERING. The GMD silos at Fort Greely and Vandenberg AFB were designed and built for operational use, but can be converted for flight test. A silo can be converted for flight test use by the addition of support equipment and sensor devices in the silo and adjacent infrastructure (the so-called Silo Interface Vault at Fort Greely or the Launch Equipment Room at Vandenberg AFB). Two of the silos at Vandenberg AFB are already equipped to support either operations or flight testing.

A silo configured for flight test will typically have various heat probes, pressure measuring probes, and cameras for the purpose of data collection. The silo data is collected using a Data Acquisition System mounted inside the Silo Interface Vault or Launch Equipment Room. Real-time monitoring is achieved through the transmission of the collected data over both physical and radio frequency links to other data collection systems. The necessary transmitters and receivers, to include associated antenna, would also be required for a flight test silo.

PLAN FOR USING FIRST 20 MISSILES FOR FLIGHT TESTING

17. Senator LEVIN. Secretary Wynne, in your June 17, 2004 letter to me, you wrote that "we plan to deploy a developmental, prototype system as an initial defense against long range missile attack. Congress has authorized and appropriated funding for 20 interceptors for this deployment. These eventually will be expended in testing, and replaced over time with interceptors requested in the fiscal year 2005 President's budget. The latter interceptors will have improved reliability and dis-

crimination capability." Please provide the plan and schedule for when any of the first 20 deployed interceptors will be expended in flight tests, and the plan and schedule for replacing them with interceptors 21–30 authorized and appropriated in fiscal year 2005. Please provide a detailed description of the improvements in GBIs 21–30 compared to GBIs 1–20, and when those improved versions will be flight tested.

Mr. WYNNE. MDA intends to utilize some of the earliest deployed interceptors to support future flight test objectives and reliability testing. The formal plan for conducting reliability or shelf life testing has not been completed. It is likely all of the original interceptors will eventually be used for testing. Interceptors 21–30 will replace those and will be used to increase the number of interceptors on alert.

General Obering has created a Mission Readiness Task Force to address issues associated with two recent GBI flight test failures. We must resolve those issues before we set future flight tests and reliability testing activities.

Key improvements in GBIs 21–30 include the addition of a Booster Global Positioning System Receiver, which will improve interceptor accuracy through booster position error improvement. Another improvement is the Exoatmospheric Kill Vehicle Electronics Unit Replacement, which will replace the obsolete processor, will upgrade processor throughput and memory size, and improve software for target selection. Increased processor throughput and memory size will facilitate future discrimination upgrades. A third improvement includes an enhancement in sensor producibility, which will increase yield and improve manufacturing timelines.

CONFIDENCE IN DEPLOYED GROUND-BASED INTERCEPTORS

18. Senator LEVIN. Mr. Duma, is it correct to say that, for the eight GBIs deployed in operational silos by the end of 2004, you do not yet have confidence that the system will be operationally effective based on successful intercept flight tests of the operationally configured booster with the operationally configured EKV?

Mr. DUMA. Yes. The configuration of the eight testbed missiles has not been flight tested. The boosters have been flight tested three times with mock payloads, and performed as expected. However, the operational kill vehicle has not flown on this new booster. Previous problems with kill vehicle-booster separation make this a critical aspect of the flight test.

19. Senator LEVIN. Mr. Duma, is it accurate to say that, for the 18 GBIs that are planned to be deployed in operational silos by the end of 2005, you will not have confidence that the system will be operationally effective unless there are successful intercept flight tests of the operationally configured booster with the operationally configured EKV?

Mr. DUMA. That is accurate. Successful intercept flight tests are necessary to characterize performance and build confidence in the operational capabilities of the deployed system. However, intercept testing must be augmented by robust ground testing to establish confidence in the performance of the system in the likely defensive scenarios. Integrated ground tests, using operational hardware, software, and operators in the loop, are also critical for building confidence in the system capabilities and for characterizing system effectiveness. MDA has a significant ground testing effort ongoing, with more planned this year. Some of the ground testing has included dedicated operational tests to check out the system with operators in the loop. The integrated ground testing will continue to address realistic operational issues.

PARTNERSHIP FOR TEST PLANNING AND EXECUTION

20. Senator LEVIN. Mr. Duma, at the hearing there was discussion of a new partnership between MDA and the Director of Operational Test and Evaluation (DOT&E) for planning and executing the testing program for the Ballistic Missile Defense (BMD) System. Your testimony indicated that the agreement includes "focused operational testing for each block" of the BMD system "prior to deploying that capability." You also stated that the "operational test community will develop the operational evaluation and test plans consistent with the maturity of the system, conduct appropriate analysis, and prepare a formal report." Can you explain exactly what your role and responsibilities are under this new partnership, and what you expect the resulting products to be?

Mr. DUMA. My role and responsibilities on the MDA programs have significantly increased over this past year. Section 234 of the National Defense Authorization Act for Fiscal Year 2005 required an operationally realistic test of the deployed Ballistic

Missile Defense System test bed infrastructure. DOT&E and the operational testing community worked with the MDA to prepare the first Integrated Master Test Plan, which MDA and DOT&E both approved. We are also preparing a detailed test and evaluation plan specifically for the operational testing that satisfies section 234.

Beyond the testing that satisfies section 234, General Obering and I have agreed that each BMDS block configuration will be operationally tested, consistent with the capability of the system in the block, before deploying and producing that system configuration. My staff is leading the operational test and evaluation planning efforts for the next block level tests. During the detailed test planning for these test events, I will work with the Service Operational Test Agencies and MDA to incorporate test objectives that measure performance with respect to realistic operational mission-level test objectives. I have a strong commitment from General Obering to support these efforts, which will produce tangible results in two areas. The first area is up-to-date test plans for operationally realistic testing (developmental testing with operational flavor) and realistic operational testing (primarily addresses operational realism and objectives for mission accomplishment). This will include periodic updates to the Integrated Maser Test Plan and detailed event plans with specific operational test objectives identified for both developmental and operational tests that are consistent with the system's capability. The second area is test reports that clearly identify demonstrated BMD System operational capabilities and limitations.

21. Senator LEVIN. Secretary Wynne and General Obering, do you concur with Mr. Duma's characterization of the agreement on future test planning and execution?

Mr. WYNNE and General OBERING. Yes. This agreement is consistent with section 234 of the Ronald Reagan National Defense Authorization Act for Fiscal Year 2005. The statute required that the Secretary of Defense (SECDEF) prescribe criteria in consultation with DOT&E for operationally realistic testing of fieldable prototypes under the spiral development program. I understand you have been provided a copy of the signed agreement, which explains the criteria for operationally realistic testing.

PROCUREMENT OF UNPROVEN GROUND-BASED INTERCEPTORS

22. Senator LEVIN. Secretary Wynne, the Department plans to buy 50 operational GBIs by fiscal year 2011, and has requested long-lead funding for operational missiles 31–40 in the fiscal year 2006 budget request. Since there have not yet been any successful intercept flight tests of the operationally configured interceptor, we don't know if the system works. What protection does the Department have that it is not buying faulty interceptors?

Mr. WYNNE. I am confident the interceptors we have procured and placed in silos are capable of providing a limited defensive capability and that we have minimized risk with the integrated testing we have completed to date. Testing begins at the component level and progresses to complete Missile Defense integrated exercises and ground tests, culminating with flight tests. The two recent flight test failures have been frustrating as they have prevented testing all of the system's capabilities; we did learn from those tests however, and have taken corrective actions to ensure we evaluate and strengthen our emphasis on quality systems and processes within the program. Future flight testing will demonstrate the full capabilities and quality of the Ground-based Interceptor and the entire BMD System.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

INTEGRATED MASTER TEST PLAN

23. Senator BILL NELSON. Mr. Duma, what role did DOT&E have in the preparation of the Integrated Master Test Plan (IMTP) of November 2004? What portions of the IMTP did DOT&E approve?

Mr. DUMA. Together with the Service Operational Test Agencies, DOT&E wrote Section 4 of the Integrated Master Test Plan. Statutorily, I can have no authority over developmental testing. Thus, my approval of the Integrated Master Test Plan is limited to Section 4, Combined Developmental and Operational Testing.

REALISM IN TESTING

24. Senator BILL NELSON. Mr. Duma, MDA plans to conduct developmental tests of the BMD System with added elements of operational realism. Are the planned developmental tests with added realism the same as realistic operational tests?

Mr. DUMA. No, developmental tests with added realism are not the same as realistic operational tests. There are several important differences. A developmental test is precisely controlled to minimize the number of variables introduced into the test so specific test objectives can be accurately addressed.

Traditional operational testing employs production representative hardware and software to execute an operational mission against a Defense Intelligence Agency (DIA) validated threat. Trained military personnel operate and maintain the system in accordance with approved tactics, techniques, and procedures. The contractor's participation in operational testing is prohibited, or limited to the same role they would have with an operationally deployed system, as defined in the system concept of operations. Further, the Service Operational Test Agency plans and executes the operational tests, analyzes the data, and prepares a final report. System maturation during developmental test phase allows the operational testing to focus on realistic operation of the system, system interfaces, and warfighter performance under realistic threat conditions.

25. Senator BILL NELSON. Mr. Duma, do you consider the flight test required by section 234 of the National Defense Authorization Act for Fiscal Year 2005 to be a realistic operational test? If not, please explain why.

Mr. DUMA. We are working with the MDA to make the flight test that satisfies section 234 as operationally realistic as possible. The immaturity of the BMD System testbed, the lack of a mid-course sensor to provide target discrimination, and the lack of a mobile target launch capability limit the test from being fully operationally realistic. The deployment of the Sea-Based Radar (SBR) in late 2005 will greatly improve the capability to conduct realistic operational testing on the BMD System. Since the MDA is delaying the test date for the section 234 flight test to resolve technical issues with the test bed system, it is possible that we can find ways to improve on the operational realism of the test.

SEPARATION OF EKV FROM GBI BOOSTER

26. Senator BILL NELSON. General Obering and Mr. Duma, there has not yet been a successful flight test of the operationally configured GBI equipped with the operationally configured EKV. The GBI booster has considerably greater velocity than the previous prototype booster, and the EKV is about 35 percent different from the previous prototype EKV. In a flight test in December 2002, the EKV failed to separate from the booster. What are the major technical and operational challenges of such separation?

General OBERING. The major technical challenges of EKV separation are related to the booster shock and vibration stressing of the EKV electrical and mechanical components and proper operation of the payload-separation laser firing units and ball lock mechanisms.

The design and qualification of the operational EKV is based upon the flight environments induced by the operational, high-velocity booster. The operational booster does exhibit greater vibration and shock loads than the prototype booster, but the operational EKV was tested to this operational environment via ground testing.

Mr. DUMA. Prior flight tests demonstrated problems with EKV separation, as well as postseparation seeker performance. Design changes have been made to correct these problems. The initial technical challenges are to demonstrate that these corrective actions are adequate. The operational challenge is to execute separation and subsequent seeker functions in a realistic deployment sequence against various dynamic threat conditions.

27. Senator BILL NELSON. General Obering and Mr. Duma, do you have any concerns about potential EKV separation problems with the new high velocity booster?

General OBERING. We have high confidence in the operational performance of the EKV separation system with the operational Orbital booster. Successful in-flight separation of an EKV was demonstrated during Integrated Flight Test 13B in February 2004. This successful flight test verified upgrades precipitated by the December 2002 separation failure, including an upgraded Laser Firing Unit on the EKV's separation subsystem. A comprehensive ground test campaign to verify separation functionality for the operational EKV has also been completed. This campaign included over 500 successful tests of the critical separation device (laser diodes) as

well as shock and vibration testing of an operating Laser Firing Unit. In addition, each Laser Firing Unit intended for an operational or flight test EKV is rigorously tested at component assembly and prior to acceptance for integration.

Mr. DUMA. The new booster and new kill vehicle have never flown together. At the significantly higher booster motor velocity, the primary concern is that the kill vehicle properly separates from the booster motor and aligns itself so that it can successfully maneuver to intercept a target. Kill vehicle separation from the booster has never been conducted at these higher velocities. Vibration measurements taken on flight tests of the new booster design, with mock payloads, suggest that the shock and vibration environment on the new booster is more benign than the surrogate booster. MDA has made changes to the kill vehicle mounting hardware design to reduce vibration and increase the clearance needed to separate from the new booster. Successful kill vehicle separations over several flight tests will increase confidence that this should not be a major concern.

SECTION 234 TESTING CRITERIA

28. Senator BILL NELSON. General Obering and Mr. Duma, section 234 of the National Defense Authorization Act for Fiscal Year 2005 requires, among other things, that "each block configuration of the BMD System is tested consistent with" the criteria required in section 234(a). Can you confirm that you will jointly develop such operationally realistic criteria for future tests, as you have for FTG 04–3, and that future testing of each block of the BMD System will be consistent with the future criteria you develop for operationally realistic testing?

General OBERING and Mr. DUMA. I believe this is exactly the agreement that General Obering and I have reached. Within the structure of section 234, we will include appropriate operational realism and develop operational criteria for each block configuration of the BMD System, and will conduct focused operational testing consistent with those criteria and the capability of the system. We will continue to combine developmental and operational testing, and will conduct focused operational testing on each BMD System block configuration before fielding. This will include appropriate configuration control on the tested system.

OUTYEAR FUNDING WEDGE

29. Senator BILL NELSON. Secretary Wynne, at the hearing you explained that the $7.6 billion unbudgeted outyear funding wedge for the MDA represented costs that the military departments are expected to pay starting in fiscal year 2008. Have the Services been informed that they are expected to pay these additional costs, and have they budgeted for them?

Mr. WYNNE. The Department allotted approximately $1.5 billion to $2.0 billion per year to go to either the Services or BMD System deployment. Since fiscal year 2004, MDA has budgeted for deployment, including this year's fiscal year 2006 budget request; and they were told to continue to budget for it over fiscal year 2008–2011.

30. Senator BILL NELSON. Secretary Wynne, are these additional funds based on agreed plans between MDA and the Services for transition of the missile defense system elements from MDA to the Services? If not, what is the basis upon which the Services would be expected to pay for the additional $7.6 billion?

Mr. WYNNE. The Department, the Services, and MDA are still working to finalize current and future element transition plans. To date these funds have been used for initial BMDS element deployment and have not been expenses the Services have been asked to budget for; the Services have only been asked to budget for certain Operations and Support costs.

DOT&E ASSESSMENT OF GMD EFFECTIVENESS

31. Senator BILL NELSON. Mr. Duma, your organization issued a report in February concerning the capability of the GMD system. Although it is a classified report, it contains many unclassified portions. From those unclassified parts of the report, it is clear that DOT&E and the MDA have different assessments of how likely the GMD system is to work effectively. Can you describe, in unclassified terms, the major reasons for that difference? For example, does it depend on the difference between actual test data—or lack thereof—and estimates based on predictive models?

Mr. DUMA. The most significant reason for the disparity between the two Ballistic Missile Defense System capability estimates is that the DOT&E estimate is based

on actual test data available from all credible ground and flight test sources, and MDA estimates are based on using the same test data, plus data generated from predictive models. Predictive models are used to develop the system's design and they reflect how the system is designed to work. Once realistic testing has been completed over a range of conditions or scenarios to yield data that validates these models, they can be used with confidence to estimate performance in a wider variety of conditions. However, sufficient data is not available at this time to validate these models, thus data from the predictive models were not used in the DOT&E assessment.

32. Senator BILL NELSON. General Obering, the DOT&E February report includes an unclassified list (on page 17) of nine areas where they have concerns about the ability to characterize the capability of the BMDS for limited defensive operations. What is MDA doing to resolve these concerns?

General OBERING. The MDA is addressing each of the concerns that have been highlighted by the DOT&E report. Overall, the testing program for the Ballistic Missile Defense System is one that is building on successes, and not taking unreasonable risks when anomalies are discovered. We are increasing the comprehensiveness of the testing program starting with increased component testing and integrated system testing, both in laboratories (using hardware-in-the-loop techniques) and in field environments (flight test configurations and distributed ground testing of fielded components). In addition I will address each area of concern.

The first area of concern for the DOT&E, was System Maturity. To address this concern I have implemented an Evolutionary Acquisition program to design, build, integrate, test, and field increasingly mature capabilities for missile defense in a Block step-increment progression. The Evolutionary Acquisition approach is capability-based, with each Block providing a suite of reliability and producibility improvements coupled with improved performance capabilities. Each successive Block builds upon the previous Block, applying lessons learned to improve the system. This evolutionary approach incrementally provides decision makers the ability to field militarily useful capabilities based on their technological readiness, maturity and suitability for operational use, and ongoing threat developments. Each MDA Block is 2 years in duration.

Another concern was the lack of system level test data on the Limited Defensive Operations configured elements. We do have limited test data on the Limited Defensive Operations configured GMD as an element of the BMD System that was collected from the Integrated Ground Test 2–4 events and System Integration and Checkout 6B. The Integrated GMD ground test (GT 04–1) and the Distributed GMD and system-level ground test events (GT 04–2 and GT 04–6) will provide more detailed system level test data for the Block 2004 configuration by the end of 2005.

A third area of concern was the lack of end-to-end flight test engagements. To address this concern, I have implemented a Mission Readiness Task Force (MRTF). The Mission Readiness Task Force will make recommendations to address flight test engagements with the operational realism necessary to meet or exceed the Congressional requirement, and the timeline over which these tests can reasonably be expected to occur. I will determine the timing, objective and schedule of each flight test after receiving those recommendations.

The DOT&E also addressed test realism and the need for it to improve in future testing. As we move forward, our flight tests become more stressing and more realistic. That was always our plan. We will fold in more and more data from operational sensors (Aegis Ballistic Missile Defense Long Range Surveillance and Tracking Destroyers, Upgraded Early Warning Radar, Sea-Based X-Band Radar, and the Forward-Based X-Band Radar) and will add the capability of launching test missiles from an operational site (Vandenberg Air Force Base). The azimuth of the target vehicle (launched from Kodiak Island) and increasingly more complex target suites will add to the realism. For our ground tests we employ simulation techniques and high-fidelity, hardware-in-the-loop system components to make our test cases more realistic. We will continue to work closely with the Operational Test Agencies and the warfighters. As the system maturity improves and is demonstrated in test, we will increase the test realism even further, commensurate with risk, in a measured fashion, to help us understand the system's capabilities.

Another area of concern I would like to address is the alleged lack of government configuration control documentation. The GMD element of the BMD System employs a rigorous configuration, control, and documentation process that addresses both development and deployment.

Configuration of the deployed GMD element is captured in a configuration-controlled matrix listing deployed hardware and software. All proposed changes are processed through the Engineering Review Board chaired by the System Engineer.

Recommended changes are reviewed and approved by the Program Director for Level 1 ECPs and by myself for Level 0 ECPs. I have signed off on the official operational baseline for the BMDS. MDA/SE has initiated an Operational Configuration Control Board (OCMB) that includes MDA and warfighter representatives and the OCMB charter is currently being staffed. The Board's approval will be required for changes to the approved baseline for tests and for permanent changes for upgrades. In summary, there is a rigorous configuration control process for the BMDS and the fielded configuration is documented.

The DOT&E expressed concern over MDA's reliance on non-validated models and simulations. To address this concern we have employed a GMD program policy that requires a disciplined Verification, Validation, and Accreditation effort to obtain accreditation of simulated portions of ground test events. For Integrated Ground Tests 1,2,3, 4a, and 4b, we validated models and simulations used in the Integrated Ground Tests when authoritative real world data was available to compare with the simulation's output. Our Integrated Ground Tests were conducted using simulations for only a limited number of specific components of the GMD element. The Integrated Ground Test configurations are approximately 20 percent simulation and 80 percent actual GMD hardware and software. Where there is no flight test data for final validation of the simulation, we make note of the fact that we did not have sufficient validation data to say with high confidence that the simulation is representative of actual component behavior. Once flight tests are completed and data becomes available, the data is applied to characterize the behavior and functioning of the simulation. This completes the Verification, Validation, and Accreditation effort.

The lack of reliability and maintainability data has also been a concern for us. Since the DOT&E Report, the GMD program established and is using the GMD Situation Report to supplement the Prime Contractor Computerized Inventory Maintenance Management System to identify both scheduled and unscheduled maintenance events and provide maintainability data for the Limited Defense Capability Prime Mission Equipment and contractually provided facilities. To further resolve this concern, we are currently negotiating a change to the MDA GMD Prime Contract to provide for the development and implementation of a Non-Conformance Tracking System. The tracking system will be used to collect and consolidate all failure and maintenance data from the GMD Prime Mission Equipment, and government provided facilities. The data from the system will be used by both the Prime Contractor and the Government to identify root cause for failures and to assist in the tracking of corrective actions and failure trends.

The DOT&E expressed concern that our developmental flight-tests to date have flown against precisely characterized target complexes in a scripted manner. In response to that concern I would note that some degree of scripting is required to address flight safety considerations, and to ensure maximum engineering flight test value through carefully considered test objectives. Limited scripting also helps us learn and verify system attributes, capabilities, and limitations through empirical data analysis and verification. This is accomplished in a measured, step-wise fashion. As the system matures, a more operationally oriented test program (that is, less a priori information and more randomness in certain test conditions) can be achieved. In future flight tests, as we gain confidence in components and as system level developmental test objectives are sufficiently demonstrated, less a priori information will be made available.

Another issue concerned prime contractor personnel responsibility for conducting flight test missions. I will say that such is not unusual in developmental testing. Again, as developmental test objectives are satisfied, more and more military operators are included in testing. Military operators did man some of the system consoles during Integrated Flight Test l3C. This will continue and increase for future flight tests. For ground tests conducted for the operational system, we use a ground test hardware-in-the-loop system to accomplish required developmental objectives. The hardware-in-the-loop system is then turned over to military operators for Operational Testing use. This practice will also be continued.

The DOT&E was concerned that ground testing with the deployed hardware and software has just recently begun, and is not part of this assessment, and that Limited Defensive Operations hardware and software configurations have not yet been flight tested. I want to note that Distributed GMD and system-level ground tests (GT 04–2 and GT 04–6) are scheduled for the end of the calendar year 2005. These two events coupled with the preceding laboratory hardware-in-the-loop integrated ground test (GT04–1) will provide a comprehensive test of the fielded Block 2004 operational hardware and software. Hardware and software configurations from these ground tests will be included for the next flight tests. Those tests will add to our knowledge of hardware and software components of the BMD System that were

tested during IFT–13C and IFT–14. The GBI will be flight-tested but I will defer setting a definitive schedule until I receive the recommendations of the Mission Readiness Task Force.

Lastly, the DOT&E was concerned that due to the contractor personnel maintaining the system, reliability and maintainability data are very limited. The DOT&E stated that although these data voids are normal for a program in this early stage of development, the desire to deploy the system for operational missions increases the significance of these data voids and increases the risk associated with deployment. The GMD Element is comprised of a combination of legacy systems, modified legacy systems, contracted Prime Mission Equipment, and government provided facilities. The legacy systems, such as Cobra Dane and the Early Warning Radar (Beale), have their own existing sustainment programs to collect and archive reliability and maintainability data. That data is provided to the MDA. The GMD Prime Mission Equipment was designed and developed for contractor logistic support. As such, the GMD prime contractor is responsible for the reliability and maintainability data for the Prime Mission Equipment and the government provided facilities. As I discussed earlier, the GMD Element has processes to collect reliability and maintainability data. This data is made available to the Joint Reliability and Maintainability Evaluation Team (Operational Test agency, Warfighter, MDA, and Prime Contractor personnel). Although the data is as yet limited, when the previous discussed changes to the Prime Contract are made later this year, the GMD Program expects sufficient reliability and maintainability data will be available over the next year to be able to determine the expected availability of the Element and, if necessary, what corrective actions are needed. We believe the course we have laid out, will mitigate the risks associated with the decision to deploy the developmental system.

MILITARY UTILITY ASSESSMENT OF GROUND-BASED MIDCOURSE DEFENSE (GMD) SYSTEM

33. Senator BILL NELSON. General Cartwright, you led the military utility assessment of the GMD. Did you conclude that the system as it is today provides significant military utility and capability, or that it needs more time for testing and development to achieve such utility and capability?

General CARTWRIGHT. The Military Utility Assessment has been forwarded to the Secretary of Defense (SECDEF) who is the releasing authority for the document.

STRATEGIC COMMAND (STRATCOM) USER INPUT

34. Senator BILL NELSON. General Cartwright, as the responsible combatant commander for integrated missile defense, do you have a process whereby you can provide user input to the MDA as to the warfighter needs of the different regional and functional commanders, including yourself? In other words, are you able to tell MDA what capabilities would be most useful to the warfighters, rather than simply receiving what the developers can produce? If so, how does that process work?

General CARTWRIGHT. Yes, the Warfighter Involvement Process (WIP) injects warfighter needs into the MDA. This process is being evolved to improve and streamline warfighter advocacy in the BMDS development process.

The WIP is used to collaboratively develop combatant commander (COCOM) capability needs for Integrated Missile Defense (IMD). The WIP currently has five subordinate Focus Groups to address specific needs in Command and Control Battle Management Communications (C2BMC), Active Defense, Sensors, Architecture and Engineering and Test and Evaluation. The intent of the Focus Groups is to analyze, validate, and baseline capability issues to assist in MDA's development effort. As an example, the C2BMC Focus Group just recently convened in March to review 99 desired capabilities (findings from the October/December 2004 planner experiment) that resulted in 29 Modification Requests submitted to MDA to enhance C2BMC capability.

My staff, in conjunction with the Joint Theater Air and Missile Defense Organization (JTAMDO) is working to expand the existing WIP to address the full spectrum of Doctrine, Organization, Training, Material, Leadership and Education, Personnel, and Facilities (DOTLMPF) issues in support of the IMD mission.

COST PRESSURES ON MDA AND BMD

35. Senator BILL NELSON. Secretary Wynne and General Obering, in its recent report on the status of the BMD program in 2004, the Government Accountability Office (GAO) concluded that MDA faced cost overruns of some $370 million for fiscal

year 2004, and that in the future "MDA will likely face increased funding risks," both from other DOD programs and from the increased funding required for procurement and sustainment as more missile defense components are fielded over time. What are you doing to keep the missile defense program from having such cost overruns and to remain as affordable as possible?

Mr. WYNNE. General Obering continuously monitors development and production contractual performance and makes internal adjustments as needed. I personally review the entire BMDS program once a quarter. To minimize technical risk, and in turn cost risk, MDA has adopted a knowledge-based acquisition process, where individual elements have to achieve a series of technical and programmatic milestones. Lieutenant General Obering has the latitude to terminate, delay, or accelerate individual efforts providing him options for various phases of defense. This allows him to strike the best balance between the defensive capabilities to be fielded and available funding.

General OBERING. Some facets of future layered Missile Defense remain technologically challenging. To minimize the technical risk, and in turn the cost risk, MDA has adopted a knowledge-based acquisition process where individual programs have to achieve a series of technical and programmatic milestones. Lieutenant General Obering assesses program progress and has the latitude to terminate, delay, or accelerate individual programs providing him options for various phases of defense. This allows him to strike the best balance between the defensive capabilities to be fielded and available funding.

GOVERNMENT ACCOUNTABILITY OFFICE REPORT RECOMMENDATION

36. Senator BILL NELSON. General Obering, GAO recently issued its annual report on the status of the BMD program in 2004, as required by law that was written by this Committee. GAO found that MDA has not consistently aligned its cost and fielding goals. For example, MDA has requested funds for Block 2004 activities that will actually be carried out in later blocks, a practice that GAO says obscures the relationship between requested funding and delivered capabilities. The DOD concurred with the GAO's recommendation that MDA should "clarify and modify, as needed, its block policy to ensure that a block's cost and fielding goals are consistently aligned." What are you doing, or planning to do, to implement GAO's recommendation, and when will your implementation of this recommendation be complete?

General OBERING. This year the MDA submitted to Congress the baseline documentation as required by law and recommended by the GAO. I believe the baseline document addresses the shortcomings of our Block reporting structure as highlighted by GAO and provides sufficient data against which our annual progress in missile defense development and fielding can be measured. Specifically, I believe the baseline document more appropriately aligns our cost and fielding goals.

ARROW MISSILE DEFENSE PROGRAM

37. Senator BILL NELSON. General Obering, how would you assess the success of the Arrow program to date, including the flight test results from Point Mugu?

General OBERING. The Arrow Program has been one of our most successful Missile Defense programs. It has an outstanding test record and is proving to be well suited for its mission as Israel's National Missile Defense System. Tests in Israel and in the United States (Point Mugu, CA) have shown the system is very effective against short range ballistic missile threats such as the various SCUD-class missiles.

The first test at Point Mugu in July 2004 intercepted a short range liquid fueled missile and accomplished all test objectives. The second test at Point Mugu in August 2004 was an attempt to intercept a more complex short range target with a separating warhead. This test completed many of its objectives and confirmed that the system has inherent capability to accomplish the mission against a more challenging threat. However, an intercept was not achieved due to a component failure during the interceptor's second stage of flight. Subsequent investigation pointed to damage resulting from high vibration levels during the interceptor's transport from Israel to Point Mugu as the most likely cause of the component failure.

38. Senator BILL NELSON. General Obering, given the expanding threat of short-range and medium-range ballistic missiles in the Middle East, do you think there might be utility in a joint U.S.-Israeli effort to address this threat?

General OBERING. The Arrow system, supported by Patriot, has been developed and optimized to defend Israel against the medium-range and most short-range bal-

listic missiles. Our joint U.S.-Israeli Arrow System Improvement Program continues to assess and improve the capability of the Arrow Weapon System to meet the evolving threat in the region.

The proliferation of short range ballistic missiles and large-caliber rockets is of great concern to both Israel and the United States. At present, the Israeli Patriot system has the capability to intercept some of these threats, albeit at a relatively high cost. In the United States, the MDA and the military services are developing other systems that will add to this capability in the future.

We recognize that developing an effective yet low cost interceptor to defend against these short range threats will be a significant challenge. Recently, Israel began evaluating the feasibility of two concepts for low-cost interceptor systems proposed by Israeli industry.

QUESTIONS SUBMITTED BY SENATOR JACK REED

NEED FOR OPERATIONAL TESTING

39. Senator REED. Secretary Wynne and General Obering, at the hearing, General Cartwright and Mr. Duma both said that the currently fielded GMD system is not yet mature and needs realistic operational testing, consistent with the maturity of the system. Do you agree with their assessment?

Mr. WYNNE and General OBERING. We are in the early stages of providing an unprecedented defensive capability; and our confidence is based on performance of individual elements of the system and of testing conducted throughout the development program, supplemented by modeling and simulation. We now must drive discipline into our processes, improve the overall system reliability so that the system works every time, and verify this with realistic operational testing. In that sense, I agree the system is not yet mature.

FLIGHT TEST FAILURE

40. Senator REED. General Obering, you have characterized the failure in Integrated Flight Test (IFT)–13C of the GBI to launch as a minor "glitch" involving one line of software code. Can you explain why the problem was not found and corrected prior to IFT–13C in the engineering and integration phases of development and testing?

General OBERING. The problem was not found in testing prior to Integrated Flight Test –13C because one of the GMD system component simulators used in ground testing did not exactly reflect the flight hardware configuration. Accordingly, all aspects of the interceptor behavior were not captured during ground testing. Specifically for Integrated Flight Test –13C, the Inertial Measurement Unit Simulator used in pre-mission testing did not operate at the exact clock frequency used by the flight hardware. This minor clock difference meant that certain non-periodic timing behavior of the integrated booster vehicle electronics was not properly captured during ground testing. The root cause of the Integrated Flight Test–13C failure-to-launch was a software threshold set overly conservatively to 10 percent of the allowable limit. It was not caught in ground testing because of the minor differences in this non-periodic timing behavior between the Inertial Measurement Unit flight hardware and the simulator which represents it used in ground testing. The software correction made sets the threshold at the allowable limit.

41. Senator REED. General Obering, how will you ensure that there are no other similar software problems in a system that has millions of lines of software code, many of which are being revised and changed on a regular basis?

General OBERING. The processes used for development, testing, and verification of software code are among many areas under review by an independent Mission Readiness Task Force that I have formed and asked Rear Admiral Paige to lead. The Mission Readiness Task Force is reviewing all processes and procedures to ensure needed flight-testing corrective actions are taken and that the GMD Program is ready to return to flight-testing.

In addition, we are committed to maintaining configuration control of the operational BMD System at all times with the establishment of an Operational Configuration Control Board. Under the Operational Configuration Control Board, no changes are permitted to the operational hardware or software outside of this formal configuration control process.

There is no way to completely guarantee no software errors. However, the GMD program has implemented rigorous processes for software assurance, peer reviews,

end-to-end ground testing using high fidelity hardware-in-the-loop system test facilities and actual fielded hardware, and Independent Verification and Validation assessments to mitigate potential software problems. In addition, fault tolerant software design features are built-in to the system wherever possible.

GMD software development organizations are required to meet the Software Engineering Institute's Software Capability Maturity Model level three—or higher—which fosters defined, repeatable software development processes. The Software Capability Maturity Model is the most up to date industry standard recommended for software development organizations. The Model describes an evolutionary improvement path to a mature, disciplined software development approach. The prime contractor and the government provide joint teams to periodically verify compliance, following the Software Engineering Institute's compliance evaluation process. By following these processes, the software development organizations form teams that eliminate faults and hold individual developers accountable for their work. Peer reviews conducted during the requirements, design, coding, and test procedure generation phases of the software development process have proven to be an effective means to identify and correct software problems. Other errors may be found and corrected during the component unit, integration, and system test phases. System level faults can also be found by the software development organizations when external interfaces can be realistically simulated. It is the strength of these processes that determine the quality of the software that is delivered to the prime contractor's integration and system test labs.

The integration of software for various components is done in hardware-in-the-loop system test laboratories, where it is further tested against all requirements using the standards above. Test procedures are well documented and the testing does not proceed to the next step until all criteria are met. The software is kept under configuration control and if any changes are required in order to satisfy a requirement, the software must undergo regression testing to confirm all previous results. This rigorous testing and retesting is done throughout the integration process in the laboratory. Once the system is fully integrated in the laboratory, it is thoroughly tested against the established requirements. These system-level tests are called Integrated Ground Tests and are used to understand system behavior against a wide range of threats and environments.

Once the software is certified by these laboratory processes, it is loaded into the components in the field for a distributed ground or flight test. There are well-defined rigorous standards and instrumentation for testing conducted during this stage to insure the software continues to perform in the same manner as it did in the laboratory.

Finally, concurrent with these Prime Contractor procedures, the government conducts Independent Verification and Validation to ensure the software meets system requirements. Independent Verification and Validation teams evaluate requirements and code development, and perform independent testing of component (interceptor, radar, fire control) software builds. This process is repeated at the integrated GMD system level where all the components are brought together.

DISTINGUISHING BALLISTIC MISSILES FROM SPACE LAUNCH VEHICLES

42. Senator REED. General Obering, there are currently a number of programs underway to produce a boost-phase or ascent-phase missile defense capability. If these development efforts succeed in producing such a capability, the systems would have to operate on extremely short time-lines to succeed. Given the short operational time-lines, how will our system distinguish between a space launch vehicle with a satellite payload and a threatening ballistic missile with a warhead, so we do not shoot down a space launch vehicle?

General OBERING. The battle management process for our boost phase intercept systems can potentially take advantage of multiple elements of information including the missile launch location, current public and intelligence information, and the missile launch trajectory to avoid engaging satellite launch vehicles. First, satellite launches are normally conducted from well-known launch sites. Second, we would expect notification of planned satellite launches in accordance with public international practice, or from U.S. intelligence sources. Finally, analysis of the trajectory of an ascending space launch vehicle, using data from the sensors supporting the boost phase intercept systems, can determine whether there are potential targets along the projected flight path. In some cases, the launch vehicle's heading (launch azimuth) may be well away from any plausible targets, and could be excluded from engagement. However, if the vehicle were either unannounced or significantly deviated from its planned flight path, time of launch, or location, and is

determined to be a capable of reaching the U.S. our operators may consider it a hostile act.

FLIGHT TESTS FROM FORT GREELY

43. Senator REED. General Obering, your predecessor General Kadish told this committee last year that he was completing necessary studies to support using Fort Greely as a missile test launch site in the future. What is the status of that effort to use Fort Greely as a test launch site?

General OBERING. The MDA conducted a preliminary study looking at the technical feasibility of test launching GBIs from Fort Greely last April. Specifically, the MDA performed a quick look feasibility analysis of possible flight trajectories from Fort Greely considering several factors, including operationally realistic engagements, target launch sites, and safety.

The MDA then conducted an initial range safety assessment often preliminary "most feasible" GBI trajectories. This preliminary study identified three potential flight corridors that if subjected to a more refined and rigorous flight safety analysis could pass range safety standards for public safety. Results of this additional study could be used as inputs to MDA's subsequent environmental studies.

We are building a Geographical Information System tool to facilitate our analysis of mapping data characterizing the Alaska region. This Geographical Information System analysis tool will assist MDA test planners in developing potential flight test alternatives that could be subjected to further safety and environmental analysis if MDA considers continuing planning towards a decision for test launches from Fort Greely.

44. Senator REED. General Obering, does MDA still plan to fire test missiles from Fort Greely? If so, what is the earliest point such tests would be launched from Fort Greely?

General OBERING. While we have conducted a feasibility analysis and are building a Geographic Information System tool to support our planning process, we would not make definitive plans to test launch GBIs from Fort Greely until after the necessary environmental- and safety-related studies are completed, which will take between 13 and 24 months depending on the complexity of the analyses. In addition, we would need to develop the mandatory data collection architecture and range safety procedures to safely support GBI's launches from Fort Greely, which could take an additional 12 months, for a total of 2 to 3 years. The earliest such tests could be conducted would be 2 to 3 years after the initiation of the National Environmental Policy Act process.

BMD MISSION GOAL AND AFFORDABILITY

45. Senator REED. Secretary Wynne, the stated goal of the BMDS is to defeat ballistic missiles of all ranges in all phases of flight in defense of our homeland, our deployed forces overseas, our allies, and our friends. We are spending nearly $10 billion per year to develop missile defense systems, and have barely begun to field relatively immature systems. What is the order of magnitude you believe it would cost to deploy and operate a missile defense system over the next 30 years that can defeat all short-, medium-, intermediate-, and long-range ballistic missiles in their boost, midcourse, and terminal phases of flight virtually around the globe on a 24-hour, 365-day basis—if it is technically possible?

Mr. WYNNE. Today the U.S. has an initial capability to destroy missiles heading toward the U.S. where previously we had none. The BMDS now in-place cost roughly $12 billion, which is a small fraction of the cost one weapon of mass destruction could inflict on the Nation. The spiral development program we have in place will deliver additional capabilities in increments. The configuration of these increments, and thus the 30-year cost, will be affected by future circumstances, including changes in the threat.

46. Senator REED. Secretary Wynne, do you have any concerns about the affordability of such a system, especially given the need to provide adequate resources for our worldwide effort to defeat international terrorism?

Mr. WYNNE. Affordability must be judged in light of the stakes involved. The GAO Audit 02–700R estimated damage costs for the terrorist attacks of September 11, 2001, alone, at $83 billion. A single WMD-tipped ballistic missile would cause far greater damage and costs to the Nation. September 11 showed us that our adversaries are willing to attack by any means available. If we abandon a missile defense

capability for this Nation, we may be seen as inviting terrorists to pursue this form of attack.

47. Senator REED. Secretary Wynne, is it possible that, if the ballistic missile threat does not become severe, we could decide upon a less robust and less costly missile defense system?

Mr. WYNNE. There are currently more than 20 countries with ballistic missile technology; and, even after implementing the next few blocks of BMD System capability, we will just be catching up with the current threat. If, however, the presence of our system dissuades further proliferation of ballistic missiles, it may be appropriate to scale back future growth.

AIRBORNE LASER (ABL) PROGRAM VERSUS KINETIC ENERGY INTERCEPTOR (KEI) FUNDING

48. Senator REED. General Obering, your prepared testimony indicates it will be at least 3 years before we even know whether the Airborne Laser program (ABL) or the KEI program can provide a useful boost-phase missile defense capability. In the meantime, the budget request indicates that we plan to spend over $9 billion on these two systems over the next 6 years. If either program shows that it cannot affordably provide a significant military capability, or won't work, will you terminate the program, or take whatever steps are appropriate to prevent unnecessary spending on a failing program?

General OBERING. Yes. The authority to make terminations and other program tradeoffs within the single BMD program has been delegated to me by the Deputy Secretary of Defense in the MDA charter. In the event I terminated a part of the BMDS program, I would redirect funds and usable technology from the cancelled program to other, more promising efforts elsewhere in the BMDS. I would, of course, consult with the Under Secretary (AT&L) and, in the process, I would comply with reprogramming requirements and otherwise keep the defense committees informed.

49. Senator REED. General Obering, are you examining ways of learning the technical feasibility and utility of either technology in a less costly manner?

General OBERING. We have proven the feasibility of the enabling technologies for the ABL/KEI at the subcomponent, assembly, and item levels. ABL recently had successful "first light" and "first flight" tests; the KEI design requires no new inventions or technology breakthroughs. What we have not done yet is integrate the key ABL/KEI capabilities and tested them at the full-scale performance levels needed to assess boost phase intercept military utility. This full scale design, development, integration, and testing is necessary to support a decision to move forward with the acquisition of either the ABL/KEI. This is why we established the fiscal year 2008 knowledge points for both the ABL/KEI programs. Our plan is to closely monitor incremental progress made in each program between now and fiscal year 2008. If we run into execution issues prior to fiscal year 2008 we will make the appropriate decisions and budget adjustments. If ABL and KEI are successful through 2008, we may proceed with both because of the complementary capabilities they offer the BMD System. We believe this is the most efficient acquisition approach for the country in this critical capability area.

50. Senator REED. General Obering, is it your intention to proceed with only one of these programs, depending on which one shows the greatest promise—assuming either or both would work? Or would you plan on fielding both systems? If the latter, what would be the estimated total cost to build and operate both systems?

General OBERING. ABL is our primary boost phase program, and KEI is a backup in the boost/ascent phase. The KEI booster also will have significant capability as a midcourse interceptor, particularly for some of the advanced payloads we are developing, for example the Multiple Kill Vehicle payload. The Department will make a decision on whether to pursue one, both, or neither of these programs in the fiscal year 2008 time frame, after each program has passed through major capability demonstrations—or knowledge points.

If we pursue both programs, we could field one land-based KEI fire unit (10 interceptors) in the 2012–2014 timeframe and the two ABL test bed aircraft in the 2014–2016 timeframe. In the fiscal year 2006 President's budget, MDA has included about $4.3 billion for ABL and $4.9 billion for KEI in fiscal year 2006–2011. These costs are associated with the development programs and do not include funds to field or operate these systems. Pending successful capability demonstrations, as both of these systems continue to mature MDA intends to work with the Department and

the Services to determine appropriate fielding opportunities and refine the costs beyond the FYDP that would be required to build and operate these systems.

SPACE TEST BED

51. Senator REED. General Obering, the budget request documents indicate that you plan to begin a space test bed project in fiscal year 2008 that is intended to produce space-based interceptors on 50–100 satellites, and include "multiple space-based intercept tests in Block 2012–2014 and a constellation production decision in Block 2014." Placing interceptors in space would be a controversial and expensive step. Congress eliminated the funding last year for space-based interceptor work. We are already fielding the Patriot PAC–3 system and the GMD system. We are starting to produce standard missiles for the Navy's Aegis BMD system, and pursuing the ABL and KEI systems, as well as THAAD—all at a cost of more than $50 billion over the next 6 years. We are facing a very limited long-range ballistic missile threat. I understand that the budget request indicates some $670 million in the FYDP just to start the space test bed. What would a space-based interceptor (SBI) system cost to build and operate, including the full constellation of satellites and related equipment?

General OBERING. We intend to use the space test bed to explore the advantages, and the costs, of engaging ballistic missile threats from space. We cannot reliably estimate costs until we learn more. As mentioned in our budget documentation, a constellation of 50–100 satellites would provide a thin boost/ascent capability against ICBMs (and a midcourse capability against medium to intercontinental range ballistic missiles), regardless of the origin of the threat and the size of the threat country. We have not made a decision to produce such a constellation. The space test bed effort will examine concepts for, and the size and cost of, a space-based interceptor constellation.

QUESTIONS SUBMITTED BY SENATOR HILLARY RODHAM CLINTON

MISSILE DEFENSE POLICY

52. Senator CLINTON. Mr. Duma, in mid-February, I had an exchange with Secretary Rumsfeld on the administration's Missile Defense Policy. I pointed out that the last time there was a successful intercept test of the National Missile Defense System was October 2002 and that was using immature, surrogate components in a highly choreographed and unrealistic test.

Now, President Bush decided, in December 2002, to begin fielding the system by the end of 2004, before any operational tests were planned or conducted. Since the President's decision, there have only been failed intercept flight tests of the system. The new interceptor has not even left the silo during the tests. Would you agree that realistic operational tests could give us confidence in whether the system works effectively, and that if the system does not work effectively, we should not be spending billions of dollars on it?

Mr. DUMA. I agree that realistic operational testing is essential to characterizing the capabilities of the BMD System. Until we have challenged the system in a realistic testing environment, I do not believe we can confidently assess its effectiveness, suitability, survivability, and lethality. Characterizing performance is a critical step to support prioritizing the Department's resources. The appropriate investment strategy for Ballistic Missile Defense is for Congress and the administration to decide.

53. Senator CLINTON. Secretary Wynne, in your testimony, you state that "we have indeed fielded an inherent capability that can be used for limited defense of the United States against long-range threats from North Korea." Given that the last time we had a successful test was October 2002 and that was using immature, surrogate components in a highly choreographed and unrealistic test, how can you describe the U.S. as having "an inherent capability?"

Mr. WYNNE. Our confidence in the capabilities we are placing in service is based on an assessment of the performance of individual elements of the system and of the overall system during testing conducted throughout the development program, supplemented by modeling and simulation. We are in the early stages of providing an unprecedented defensive capability. Our recent GBI failures have not shaken our confidence in the fundamental system. This is a complex system with a number of components that have to work together, and MDA is implementing a thorough quality control program that is focused on the small details that will improve the overall

system reliability. I am confident future testing will demonstrate the full capabilities and quality of the BMDS.

54. Senator CLINTON. Secretary Wynne, General Cartwright, Mr. Duma, and General Obering, during an exchange with Secretary Rumsfeld at an Armed Services Committee hearing in February, I said to him: "I know that the decision was made by the President to deploy, to begin fielding the system, by the end of 2004. So it's basically the position of the administration that we're deploying regardless of whether we have any successful tests, for whatever reason—whether it was computer errors in getting the silo open or other more serious errors—we're still committed to deploying a system that has not proven it can work. As I understand the theory behind that, that just by deploying a system, it serves a deterrent value. It strikes me a little odd that we would deploy a system that hasn't succeeded and expect that to serve a deterrent value."

Secretary Rumsfeld replied, "I agree with that point, that there's no deterrent if something is known to not work."

Do you agree with Secretary Rumsfeld that a missile defense system that hasn't succeeded will not have a deterrent value?

Mr. WYNNE. I agree with the Secretary's statement that "there's no deterrent if something is known to not work." However, we believe the BMDS does work and provides a limited missile defensive capability. The BMDS testing to date shows the system is fundamentally sound and has an inherent operational capability. The two recent test failures have been frustrating as they have prevented testing all of the system's capabilities. Lieutenant General Obering has recently implemented an extensive quality control program. I approved this program, and I have asked him to emphasize it. I am confident the overall system will work; now I want to see it work consistently.

General CARTWRIGHT. In the case of the BMD System, we have a system that has demonstrated a rudimentary capability through extensive testing. While some recent testing has not been successful, the MDA and the warfighter community have gained valuable knowledge in the evolution of this new mission and we will use the results to further refine capabilities. Recent failures have been fixed. Scheduled testing in 2005 will provide redundancy and depth to command and control sensors and weapons.

Mr. DUMA and General OBERING. I agree that a system which is known not to work has no deterrent value.

55. Senator CLINTON. General Obering, in your prepared testimony, you state that "with the initial fielding last year of the GMD and Aegis surveillance and track capabilities of this integrated system, we are establishing a limited defensive capability against a long range North Korean missile threat. Is the system in place able to target missiles in each phase of launch?

General OBERING. Yes, the system in place is able to track and destroy long range missiles in each phase of flight. The Defense Support Satellite (DSP) system provides the initial warning to the BMD System that a missile has been launched, and will track the missile up through its burnout phase. The Aegis BMD ships, by utilizing their on-board radars, track the missile while it is still burning through burnout and then through the initial ballistic trajectory, i.e. unpowered flight. Finally, based upon the information received from these two sensors and the Cobra Dane radar at Shemya, Alaska; the BMD System interceptor is launched to intercept the threat missile in the midcourse phase of flight. For shorter range missiles, the Patriot PAC–3 is our battle tested defense for missiles in the terminal phase. With the development, testing and fielding of each subsequent block of the system, we will create a layered BMD System and increase our ability to respond to all phases of the ballistic missile threat.

56. Senator CLINTON. General Obering and Mr. Duma, MDA documents acknowledge that during the midcourse phase, there is a greater opportunity to deploy countermeasures against a defensive system. These countermeasures include readily available technology such as separating reentry vehicles, radar absorbing material, booster fragmentation, low power jammers, chaff, and even simple balloon decoys. Has there been any testing of the ability of the missile defense system to respond to these countermeasures? What has been the result?

General OBERING. [Deleted.]

General OBERING. Yes, by using data from our early sensor flight tests and data from other U.S. flight tests, we have conducted several ground hardware in the loop tests and high fidelity simulations which "flew" both simple and moderately complex countermeasures using the actual processors and discrimination algorithms from

the kill vehicles, battle management, and radars. the GMD system, using a prototype EKV, has also been successfully tested against threat-representative separating reentry vehicles accompanied by various debris and some countermeasure objects. We also have conducted non-intercept flight tests known as risk reduction flights, which have successfully tested the radar discrimination algorithms against a range of countermeasures.

A more detailed explanation involves classified information, which we have provided under separate cover.

Mr. DUMA. [Deleted.]

57. Senator CLINTON. General Obering and Mr. Duma, ostensibly, the decision to deploy a missile defense system by 2004 and 2005 is to defend the U.S. against a possible missile attack by North Korea. Will the system in place this year be able to defend against North Korean missiles if they are equipped with countermeasures?

General OBERING. The BMD System currently available for emergency operations provides a defensive capability against ballistic missile attacks from North Korea. The EKV provides the discrimination capability for the GMD Element to defend the United States and it demonstrated an initial capability to discriminate between a threat warhead and simple countermeasures. The SBX will begin to contribute in late 2005 to the GMD element by providing additional capability for discriminating the threat warhead from simple countermeasures. These additional SBX capabilities will be used to help direct the EKV to the threat warhead. In short, if the countermeasures are simple, then the current system in place will be able to discriminate between the threat warhead and other objects in the threat cluster. Of course, additional and more robust discrimination capabilities will be integrated in future Block upgrades of the BMD System.

Mr. DUMA. Intelligence estimates suggest the North Korean threat has very limited countermeasure capability at this time. MDA has achieved intercepts during developmental testing, against some limited countermeasures. The two most recent flight test attempts were intended to demonstrate capability against other simple countermeasure, but difficulties with the missile pre-flight check and the ground support equipment prevented the interceptor from launching. MDA is building the test bed infrastructure to support testing under more realistic operational conditions, including countermeasures.

58. Senator CLINTON. General Obering and Mr. Duma, do we know if the North Koreans are researching countermeasures technology for their missile program?

General OBERING. The answer is classified, and we have provided it under separate cover.

General OBERING. [Deleted.]

Mr. DUMA. [Deleted.]

59. Senator CLINTON. General Cartwright and General Obering, the boost phase missile defense approach is the one that seems the least affected by possible countermeasures. Given that the location of North Korea and Iran—the most likely threats of a ballistic missile threat—are such that a boost phase intercept system is technically feasible, how are boost phase interceptors incorporated into your missile defense plan?

General CARTWRIGHT. Currently, there are no operational active defense boost phase systems to support global missile defense. Systems in development by the MDA and the Navy have an emergency capability to counter short range ballistic missiles and medium range ballistic missiles in late boost and early mid-course. This system is incorporated into current plans only as a BMDS Emergency Activation Capability. Other boost phase active defense capabilities, such as ABL, are projected for later spiral blocks but are not currently considered in the existing missile defense plans. New boost phase intercept capabilities will be incorporated into BMDS Emergency Activation Plans and other operational plans as these new system capabilities become available for employment by the warfighter.

General OBERING. We plan to have boost phase interceptors ready for introduction into the BMD System in Block 12 or Block 14. We are currently restructuring the KEIs program to account for reduction of our BMD System Interceptors Program Element by $5 billion over fiscal years 2006 through 2009 (as compared to President's Budget 2005). The results of the restructure, to be completed by the end of calendar year 2005, will tell us in which of these two blocks boost phase interceptors will be available.

Boost-phase interceptors will initially deploy on land-mobile tractor trailers, enabling a boost defense layer against landlocked states like Iran. We will design our interceptors for easy adaptation to deploy on ships. Sea-mobile interceptors can de-

fend against states like North Korea where it may not be possible to use land-mobile interceptors. The MDA, working with the Navy, will decide in the next year on the appropriate platform and schedule for deploying sea-mobile boost phase interceptors.

In the near term, our KEIs program is focusing on the essential development and test efforts required to demonstrate critical boost defense capability and support a fiscal year 2008 knowledge-based decision point on continuing the program.

[Whereupon, at 4:47 p.m., the subcommittee adjourned.]