Statement of
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Director, Ballistic Missile Defense Organization
before the
Senate Appropriations Committee
Subcommittee on Defense

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Good morning. Mr. Chairman and Members of the Committee, it is my pleasure to appear before you today to present the Department of Defense's Fiscal Year 2000 missile defense program and budget.

The Ballistic Missile Defense Organization (BMDO) is chartered within the Department of Defense to manage, direct and execute the BMD program in order to achieve the following objectives:

- enable deployment of effective, rapidly relocatable Theater Missile Defenses to protect forward deployed and expeditionary U.S. armed forces as well as friends and allies;
- develop options for, and deploy when directed, an antiballistic missile system to defend the U.S.;
- demonstrate advanced technologies to enhance initial BMD systems; and
- continue basic applied research to develop follow-on technologies

BMDO is developing and demonstrating systems which integrate the missile defense weapons systems of each Military Service to provide a highly effective, total defensive capability for the joint warfighter. This is a concept we call joint mission area acquisition. BMDO is unique in this regard. We do not manage a particular weapon, or even a class of weapons. We function as the "integration systems architect" for an entire mission area - one that cuts across all of the Services. BMDO directs a joint "family of systems" approach for theater air and missile defense - a multi-tier, multi-platform architecture that utilizes ground-, sea- and air-based missile defense systems in order to provide defense in depth against a wide range of ballistic and cruise missiles carrying conventional and unconventional warheads. This also entails a system of systems approach for National Missile Defense - a mission for which there is not a single Service solution. The NMD system approach will utilize Air Force space- and ground-based early warning and tracking sensors; Army ground-based systems to engage and destroy the target; and a battle management/command, control and communications system to tie all the system elements together. Finally, we are conducting a joint technology program that coordinates the technology needs of systems under development and invests in the technologies that can address those needs. In addition, we are jointly planning and exploring technology responses to evolving threat scenarios.

In order to coordinate the Department's efforts in missile defense, BMDO has institutionalized three important processes. First, in order to assess architectural effectiveness and the performance of individual systems, BMDO's chief architect and engineer conducts architectural studies and analyses in coordination with the Joint Theater Air and Missile Defense Organization (JTAMDO), the Military Services and other key stakeholders. Second, recognizing that limited resources exist for missile

defense programs, this same team works together to allocate resources to missile defense programs and projects in a manner that prioritizes efforts within the overall joint mission area. JTAMDO leads the effort to validate theater air and missile defense (TAMD) operational requirements through the Joint Requirements Oversight Council (JROC), while BMDO leads the architecture development, integration and systems engineering. Lastly, looking toward the future, BMDO's joint technology program plays a key role in ensuring we continue to invest in future technologies which can help us address future threats. This joint technology approach coordinates the technology needs of systems currently under development and invests in those technologies that can address those needs. To institutionalize this, BMDO's Joint Technology Board includes the Services to jointly plan and explore technology responses to evolving threat scenarios - and to leverage one another's financial investments in this area.

The Department has made a series of substantial changes to our approach to missile defense and increased the resources available. In order to address the missile threat and fully execute the Department's plans for missile defense, we have structured a sound and affordable program for Fiscal Year 2000 and beyond. I would like to take a few moments to outline specifically the status of our programs and how we intend to proceed over the next few years to demonstrate and field these systems.

Fiscal Year 2000 Program and Budget. The total Fiscal Year 2000 budget request for the Ballistic Missile Defense Organization is $3.3 billion. This includes $2.9 billion for RDT&E, $355.9 million for procurement, and $1.4 million for military construction activities. Combining these three budget categories, Theater Air and Missile Defense programs account for $1.9 billion or roughly 60 percent of the budget. National Missile Defense represents $836.6 million or 25 percent of the budget. We are requesting $65.3 million for Applied Research and $173.7 million for Advanced Technologies, together; these represent about 7 percent of the budget. BMD Technical Operations accounts for $192.0 million and is about 6 percent of the budget. We will ask for $16.5 million for Threat and Countermeasures efforts and $36.7 million for International Cooperative Programs. Together, these represent 2 percent of our overall budget. The chart that follows provides a break out of the Fiscal Year 2000 budget request by program element for BMDO-managed programs.

TY$M Theater Air and Missile Defense	FY1999	FY2000
PAC-3 EMD*	320.842	29.141
PAC-3 Procurement*	245.494	300.898
Navy Area EMD	242.597	268.389
Navy Area Procurement	43.189	55.002
THAAD Dem/Val	433.922	527.871
THAAD EMD	0.000	83.755
THAAD Procurement	0.000	0.000
Navy Theater Wide Dem/Val**	364.284	329.768
TAMD BMC/3 Procurement	22.759	0.000
Joint TAMD Dem/Val	200.133	195.722
Joint TAMD Milcon	0.331	0.000
FoS E&I	95.721	141.821

MEADS Dem/Val (ADSAM in FY99 and MEADS PDV in FY00)	9.915	48.597
National Missile Defense		
NMD Dem/Val**	1533.532	836.555
NMD Procurement	0.000	0.000
NMD Milcon	9.669	0.000
Support Technologies		
Applied Research	97.436	65.328
Advanced Technology Dev.	272.82	173.704
BPI	6.426	0.000
BMD Technical Operations		
BMD Tech Ops	184.842	190.650
BMD Tech Ops Milcon	0.000	1.372
International Coop Pro	**58.903**	**36.650**
Threat & Countermeasures	**23.263**	**16.497**

* Funding shown is consistent with the February 1999 President's Budget request and does not include pending reprogrammings. The budget assumed $140 million from the FY 1999 emergency supplemental appropriation would be applied to PAC-3. DoD plans to work with the Congress to address concerns about using the supplemental for PAC-3.
** Funding shown on FY1999 includes funding from the FY1999 Supplemental that will be executed in FY2000

Theater Air and Missile Defense ø the Family of Systems Approach.

The Family of Systems (FoS) concept is a flexible configuration of highly interoperable theater air and missile defense systems capable of joint operations, which allows the joint force commander to tailor the right mix of systems and capabilities according to the situation and threat. This FoS must be able to counter a wide range of threats providing a robust defense for U.S. forward-deployed forces, our friends and allies. This mission cannot be accomplished with just one or two systems; it requires multiple systems designed to counter an ever-growing and diverse missile threat during all phases of flight. The Department's recent missile defense program review again endorsed this TAMD family of systems approach as the most effective means to provide highly effective defenses to protect our interests.

Our analyses continue to conclude that one system cannot do it all. The mission of TAMD requires a layered defense allowing for multiple shot opportunities. The threat is so varied, and the mission demands so complex, that we do not currently have the technology to allow us to develop a single weapon system that can meet all of the mission requirements. In short, there is no single "silver bullet" in theater missile defense. Multiple systems working in unison greatly enhance the probability of destroying incoming missiles before they can hit U.S. or coalition forces, critical assets, or population centers.

For these reasons, BMDO is working to acquire and integrate land- and sea-based systems that will effectively counter current and rapidly emerging theater missile threats. This strategy includes pursuing four major defense acquisition programs

(MDAPs) within BMDO, with Service execution. These include the Patriot Advanced Capability-3 (PAC-3), Navy Area, Theater High Altitude Area Defense (THAAD) and Navy Theater Wide (NTW) systems. In addition, the U.S. Air Force is managing and executing the Airborne Laser (ABL). While this program is not funded or managed by my organization, the ABL remains a critical part of the FoS architecture. The ABL system will provide a critical boost-phase intercept capability in the theater of operations, thereby extending our layered defense approach to the earliest stages of missile flight.

In the context of the Department's program review, let me summarize the status of these theater air and missile defense major defense acquisition programs (MDAPs) and address our direction on the cooperative TAMD program known as Medium Extended Air Defense System (MEADS).

Lower-tier TAMD systems. Fielding both the PAC-3 and Navy Area systems remains our highest near-term TAMD program priorities. Our goal is to press on with those activities, which will allow us to achieve first unit equipped (FUE) dates of Fiscal Year 2001 for PAC-3 and 2003 for Navy Area. Unfortunately, these represent a slip from last year's projected FUE dates. I would like to explain why these programs are delayed and what, specifically, we plan to do in the next fiscal year on these programs and fact of life changes.

Patriot Advanced Capability 3 (PAC-3). In the case of PAC-3, the first intercept flight test has been delayed by about a year because of software and seeker integration setbacks. Moreover, a planned seeker characterization risk reduction flight test did not take place in December because of a failure of the test target. This was a target that we have reliably flown many times before. I am delighted to report that we conducted a successful seeker characterization flight test on March 15 at White Sands Missile Range. Objectives included the collection of data and analysis of the system/missile capability to detect, track, and close with the target, the PAC-3 missile seeker data in a flight environment, and the missile closed-loop homing guidance performance in flight. While not a specific objective of the SCF, the PAC-3 missile intercepted the HERA reentry vehicle target.

Despite this successful test, flight test delays have resulted in a one year slip to Developmental Test & Evaluation and a comparable slip to Milestone III - full rate production authority. In addition, the FY 1999 Defense Appropriation bill specifically directed that PAC-3 may not enter low-rate initial production until two successful intercept flight tests have taken place. In hindsight, I think that was a very prudent move. Based on these issues, the planned PAC-3 FUE is now targeted for FY 2001.

In addition to the delay in the program that I have already mentioned, the Committee should know that there is substantial cost growth in the PAC-3 program. This is not a good news story. It is a serious matter that concerns me greatly. In order to cover this cost growth, the Department has sent a reprogramming action to Congress to move $60 million of FY99 funds from the Procurement account to Engineering, Manufacturing and Development (EMD). We will also need to work with Congress to adjust the budget in Fiscal Year 2000 to ensure the program remains on track.

I appreciate that such transactions do not increase one's confidence that the program is well-executed. But, I want to make certain that we are in the best position to field PAC-3 as soon as possible. I regret that we are in the position of

either covering this cost-growth at this time or accepting further delays in fielding the system. These resources are absolutely necessary for us to keep PAC-3 on track.

In concert with our Army executing agent, I have commissioned a comprehensive review of the entire PAC-3 program. Additionally, we have asked the Defense Contracting Management Command (DCMC) and the Defense Contract Auditing Agency (DCAA) for assistance. We are examining all aspects of cost growth, technical and program management, and the fundamental assumptions behind the schedules that the contractor has proposed. I have also requested a team of senior-level acquisition leaders - to include retired general officers - for their assessment of the program. Based upon my initial findings, I have already reviewed some initiatives aimed at reducing the unit cost of these missiles. While I am very concerned about the cost aspects of the program, I cannot ignore the need for a realistic schedule, performance and timely deployment for the warfighter. I have met with the prime contractor at the CEO level and have expressed my concern about the program and desire for corporate commitment to a realistic program baseline, a realistic schedule and real cost-reduction efforts. This should include cost-sharing arrangements to reduce Government liability. I am committed to coming back to the Committee and reporting on our progress before you complete action on the Defense Appropriations Bill.

Ultimately, I want to reduce the unit costs of PAC-3 so we can procure more inventory for the warfighter with the same level of funding. This must always be our bottom line - more inventory and defensive protection within the budget allocated.

Navy Area.The Navy Area program builds upon the legacy of success found in the AEGIS program. This sea-based missile defense capability consists of modifications to the AEGIS combat systems and the SPY-1 radar to enable the ship to detect, track and engage theater ballistic missiles using a modified Standard missile. There are over 50 AEGIS destroyers and cruisers, which will eventually constitute a fleet of forward deployed, multi-mission platforms - including theater missile defense. The Navy Area program is currently in the engineering and manufacturing development phase. We have successfully developed and demonstrated this system - including a successful series of flight tests. However, the program's progress has been slowed by the Navy's AEGIS Weapon System (AWS) Baseline 6 Phase III software development - not missile defense development issues. This has resulted in an eighteen month slip to ten developmental/operational assessment tests that were scheduled to occur in Fiscal Years 1999 to 2000. This slip has caused a six month delay to initial EMD testing and a one year delay in the FUE status for Navy Area. BMDO and the Navy are currently working to address an emerging cost-growth issue for the EMD phase of the Navy Area program. We will attempt to work this issue inside the Department during the Summer budget cycle. We are requesting $268.389 million in EMD and $55.002 million in procurement funds for Navy Area in Fiscal Year 2000.

In light of the emerging missile threat, we are endeavoring to provide a capability to the fleet as early as possible. Our plan includes providing a User Operational Evaluation System (UOES) that we call "Linebacker" for fleet use. "Linebacker" will be a single mission ship capable of performing TBMD or Aegis multiple missions. Two AEGIS cruisers, the USS Port Royal and the USS Lake Erie, are at sea now providing critical feedback to influence the tactical design improvements and modifications to the AEGIS combat system. They will conduct a variety of at-sea tests, develop core doctrine and tactics, and serve as a focal point for getting our theater missile defense capability to sea. In a contingency, the warfighting CINCs can call upon this

Linebacker capability. I believe this is the most prudent approach to fielding our lower-tier naval TAMD capability as soon as possible.

Upper-tier TAMD Strategy. We have revised our upper-tier strategy because we have found ourselves in a very tight spot. The medium-range ballistic missile threat is emerging very rapidly. More countries are acquiring ballistic missiles with ranges up to 1,000 kilometers, and more importantly, with ranges between 1,000 and 1,300 kilometers. North Korea has developed the *No Dong-1* missile. Last July, Iran conducted a partially successful *flight test* of its *Shahab-3* missile. With a range of 1,300 kilometers, the *Shahab-3* significantly alters the military equation in the Middle East by giving Iran the capability to strike targets in Israel, Saudi Arabia and most of Turkey.

The emergence of these missile capabilities is important because our upper tier systems - THAAD and Navy Theater Wide - are designed to specifically take on these medium-range theater-class missiles. The dilemma we face, however, is that we continue to have problems demonstrating the THAAD interceptor. Each of our six intercept test failures was caused by a different problem with a different missile component. This leads us to believe there are problems with the quality of the interceptor's components, but not the overall interceptor design.

At the same time, Navy Theater Wide has experienced development problems of its own - even though it is not yet at the same level of testing as THAAD. In September 1997, the initial Control Test Vehicle flight test was unsuccessful due to a steering component failure. The follow-on flight test is scheduled for later this year and will use improved Standard Missile-3 components. The first Navy Theater Wide intercept attempt is currently scheduled to take place during the third quarter of Fiscal Year 2000.

Based on a review of program performance - test results, schedule, cost, program risk, and projected performance - we will propose by December 2000, that either THAAD or Navy Theater Wide be deployed first. The system that is not selected will continue to be developed and will be fielded as soon as practicable. Therefore, instead of a competition, I really see this more akin to a "leader-follower" approach.

The fundamental reason why we are compelled to follow this approach is that the threat is *rapidly* expanding and we have not made substantial progress in demonstrating these systems. I think in this area - because of the pressing threat - a little "sibling rivalry" can go a long way within our family of systems.

I realize there has been a lot of concern that we are directly competing the two Upper Tier systems. Some Members have pointed to language in the Fiscal Year 1999 National Defense Authorization Conference Report as direction that these two systems should be seen as "complementary" versus "in competition." While we have referred to our revised TAMD upper-tier approach as a "competitive strategy," we are not directly flying one system off against the other.

Theater High Altitude Area Defense. So, with the threat rapidly expanding and our upper-tier programs experiencing development setbacks, we have devised an approach that will challenge us to field an upper-tier system as early as possible in order to meet the threat. As part of this approach, we will continue to fly THAAD. The most recent flight test that was conducted on March 29, 1999 did not achieve an

intercept. While we are still analyzing the data, the miss distance estimate is between 10 and 30 meters. We were very close and we have evidence that the interceptor was actively firing its divert motors to steer into the oncoming target missile. Although it will take some time to analyze the cause for the failure of the missile to intercept the target, we still plan to conduct four more flight tests this year. The cost-sharing agreement we have worked out with the prime contractor requires that the program achieve three flight test intercepts by the end of this year. The three intercepts are required for the missile and system to demonstrate sufficient design maturity to proceed into the next phase of development. The cost-sharing agreement provides that the contractor shall be responsible for up to $75 million of negative cost incentives should these intercepts not occur.

It is important to note that the rest of the THAAD system has performed remarkably well during all flight tests. We have successfully demonstrated the THAAD ground-based radar, the launcher, and the battle management, command, control and communications system. Overall, the THAAD system has performed well, but the critical element - the interceptor - still needs to demonstrate its technical maturity. The Department has made the right decision by continuing to fly the THAAD interceptor. We must get the missile in the critical "end game" and learn from that vital test experience. I am confident that the THAAD team can shake out all the various "bugs in the system" and THAAD will successfully intercept its target later this year.

I would like to note that Lockheed Martin's senior leadership has demonstrated to me that it is fully committed to the success of the THAAD program and that it has devoted the resources necessary to ensure success. I believe the cost-sharing plan that we have agreed to is a clear indication of the contractor's commitment to the success of the program. I continue to meet frequently with their leadership and remain very impressed with the quality of the people they have working on this program. They clearly have put the "A plus" team on the program. In light of this and the considerable progress I have observed over the last year, I am confident that the program will successfully engage its target during the upcoming flight tests.

If the next flight test, however, should fail to fully meet its objectives and successfully engage and intercept the target, I hope the Congress will recognize that this remains a program in the demonstration/validation phase. This is the phase when we want to learn from our mistakes and failures. This is the phase when we can still fix the system and have it properly aligned for acquisition. I confess that no one is more frustrated with our progress to date than me, but we need to be patient and to work the "bugs out of the system." THAAD is a critical element of our family of systems. We need to successfully develop, demonstrate and field a ground-based upper-tier system.

Navy Theater Wide. The Department is following the Congress' recommendation that we allocate the full funding required to make Navy Theater Wide an acquisition program. In Fiscal Year 2000, we will request $329.768 million for Navy Theater Wide. Over Fiscal Years 1999 - 2001, we will increase Navy Theater Wide funding by about $500 million, including funds added by Congress. This increased level of funding will allow the Navy Theater Wide system to conduct ground and flight tests to demonstrate its capabilities. The Navy Theater Wide AEGIS-LEAP Intercept Program now in progress is a series of progressively more challenging flight tests culminating in a demonstration of the Navy's ability to hit a ballistic missile target above the atmosphere. A Control Test Vehicle flight test is planned for the fourth

quarter of this fiscal year to test the flight characteristics of the SM-3 missile. Following this, we plan to fly seven Flight Test Round shots - one per quarter - through the third quarter of Fiscal Year 2001. The last five flight tests will attempt to intercept their targets. The first intercept flight test will now take place in Fiscal Year 2000.

In acquisition programs, we have seen how competition has encouraged technological progress, reduced system costs and provided the Department with more than one program option to address a threat. My hope is that this competitive approach to the upper-tier strategy will also provide a positive incentive for both the THAAD and Navy Theater Wide teams to succeed.

Personally, I want both programs to successfully demonstrate their readiness to be fielded. Both THAAD and Navy Theater Wide will play vital roles in protecting our forward deployed forces, friends and allies against the existing and emerging theater-class missile threat. We need both THAAD and Navy Theater Wide in our TAMD family of systems architecture.

Medium Extended Air Defense System. As a result of resource constraints, especially in the years when we intend to field our core TAMD systems and develop and deploy NMD, the Department recognized that it could not afford to proceed with the Design and Development phase of the MEADS program as originally planned. We made this decision even though there remains a valid military requirement for maneuver force protection and a compelling case for armaments cooperation with our allies.

The Department proposes using about $150 million over the next three fiscal years to demonstrate critical technologies - such as a fire control radar and mobile launcher - we need to satisfy the MEADS requirement. This restructured MEADS program allows us to explore less costly program options by leveraging developments in existing missile defense development programs, such as PAC-3. This approach will hopefully enable us to continue cooperation with our allies in this important mission area. As we solidify our approach with our allies, we intend to capitalize on the concurrent Air Directed Surface-to-Air Missile proof-of-principle activity as well.

On Dr. Gansler's behalf, I met with our German and Italian partners in March to discuss the future of MEADS. I must report that they were concerned about the commitment of the United States to this program. However, they recognized the resource constraints we faced in missile defense and support our overall approach. They would, however, like for the Department and Congress to express our commitment to following the three year technology demonstration with an affordable restructured program to field a MEADS system. Quite frankly, they are concerned that the Congress will not support the program in Fiscal Year 2000. I know that both the Secretary and Deputy Secretary are looking to Dr. Gansler and me to work with the four defense committees to secure a stable future for our MEADS technology development program. I realize that especially in a tight budget environment $48.6 million is a very substantial amount of money. I hope to work with the Committee, and the other three defense committees, to lay out how we intend to proceed with this program, demonstrate that we have clear end-products for our investments, and also outline how our German and Italian partners will play in this cooperative venture.

Joint TAMD Programs.

Several research, development, test and evaluation efforts - which effectively support multiple theater air and missile defense system development program requirements - are managed and funded under the Joint TAMD program. Joint TAMD requirements and supporting tasks include development of target missiles, collection and analysis of target signature and discrimination measurements, and funding of CINC-level planning and participation in wargaming exercises that maximize the consideration of theater air and missile defense requirements and systems capabilities.

BMDO funds the development of the Extended Air Defense Testbed (EADTB), an object-based simulation and analytic tool which supports architecture analysis and system performance, and supports the theater air and missile defense community through distributed interactive simulation (DIS) connectivity. An important element of Joint TAMD is the TAMD Critical Measurements Program (TCMP), which provides tactical ballistic missile target signature and related discrimination data. Collected data from recent test flights will be used to characterize potential countermeasures and to develop and test algorithms designed to mitigate their effects. Programs that are expected to directly benefit from EADTB and TCMP include all theater air and missile defense MDAPs and the U.S. Air Force Space-based Infrared System (SBIRS). The Joint TAMD program element includes a requested $195.7 million in Fiscal Year 2000.

Family of Systems Engineering and Integration.

Each member of the family of systems will contribute what it sees to a common picture of what is occurring in the battlespace, and then based on that picture, the warfighter will launch the most effective and efficient missile defense response. All theater air and missile defense systems must be capable of joint or autonomous operations. For example, based on cueing from a space-based sensor and target detection and tracking by the THAAD ground-based radar, a Navy Theater Wide interceptor could be launched to counter a ballistic missile threat. This system will be demonstrated through a series of systems integration tests. We are currently planning such an integration test for Fiscal Year 2002. That test will fly targets that realistically simulate medium-range ballistic missiles against both the PAC-3 and Navy Area systems. Our intent is to calibrate how well our lower-tier systems can protect their defended areas against these longer-range targets. Our Fiscal Year 2000 budget request for FoS E&I is $141.821 million.

Theater Missile Defense Challenges. Mr. Chairman, missile defense is one of the most technically challenging projects the Department has ever undertaken. The urgency to develop and deploy a highly effective TAMD system grows directly out of our experience in the Gulf War. We recall that the largest single loss of U.S. servicemen was the result of the SCUD missile attack on our barracks in Dharan. And we see how the threat is growing in both numbers and capabilities. The Gulf War experience and emerging threat drove us to make TAMD a schedule-driven effort that has stressed the Department's most technically challenging projects.

Missile defense requires the integration of many new technologies into a system that must perform in a very dynamic threat and operating environment. For instance, TAMD systems must operate largely inside the atmosphere at very fast speeds against targets that are traveling several kilometers per second. TAMD systems, such

as THAAD and PAC-3, use hit-to-kill technologies and must literally "hit a bullet with a bullet." This is a technical and engineering challenge - but it can be done.

We have other substantial programmatic challenges as well. For instance, we must develop and test TAMD systems and demonstrate they are highly interoperable - to ensure that the whole architecture is greater than the sum of its parts. And finally, we must ensure these systems are affordable - because we want to maximize the inventory we can buy for the warfighter. Despite our recent program and cost setbacks, I believe we are up to these challenges.

We must continue to press on with these TAMD systems because the threat is there and it is growing. I pledge to keep the pressure on our Government and industry team to deliver highly effective and affordable defenses as soon as possible. For the sake of our servicemen and women, we cannot afford to fail.

National Missile Defense.

The Department has dedicated the funds necessary to develop and deploy NMD. We have worked to ensure that our NMD development program was properly funded. But until now, we had not budgeted funds to support a possible NMD deployment that could protect us against a limited missile attack. In Fiscal Year 2000, we are requesting $836.555 million for NMD. In addition, we propose to use for NMD roughly $600 million from last year's $1 billion emergency supplemental appropriation. Between Fiscal Years 1999 through 2005, we intend to allocate $10.504 billion (in then year dollars) for the NMD program.

The Secretary's January 20, 1999, announcement acknowledged and affirmed the rogue nation strategic missile threat is emerging. In addition, he announced the dedication of an additional $6.6 billion for NMD during Fiscal Years 1999 through 2005. He also noted that the Administration had begun a dialogue with Russia about the development related to our NMD program and ABM Treaty. Lastly, he recognized that the program was now structured to work toward a key requirement - developing and demonstrating the technological readiness of our system.

Our challenge during the next few years is to make sure all NMD elements work together as an integrated system and that it can do exactly what the mission tells us we need to do. Success on the critical tests and execution of the element schedules, which constitute the NMD program, will provide the answer to the question: are we technically ready to deploy a capability?

I would like to lay out for the Committee the time line of programmatic decisions we will seek between now and 2005. I will also review our plans to develop and test the NMD system elements and to demonstrate the effectiveness of the integrated NMD system.

NMD Decision Time Line. In order to be able to deploy a ground-based NMD system by 2005, we have developed a detailed plan of program activities to ensure success. The proposed changes to the NMD program I will address today will ensure that we fully develop, test and demonstrate the system elements in an integrated fashion before we begin to deploy. This will significantly reduce the program risk associated with our previous "3 plus 3" program approach.

We still plan to conduct a Deployment Readiness Review (DRR) in June 2000. This DRR will take place at the defense acquisition executive level - with full participation from all key Department of Defense stakeholders. The DRR will not constitute the actual decision to deploy the NMD system, rather it will assess whether or not the technical progress has been made which would allow the Administration to decide whether and when to deploy. At this time, the Adminstration will also assess the current state of the threat, the affordability of the system, and the potential impact on treaty and strategic arms reduction negotiations. When a decision is made to deploy, we will seek commitment to several key elements of the program. First, we would seek approval of the recommended NMD site - either in North Dakota or Alaska. Similarly, we would seek approval to award the construction contract for the selected NMD site. And finally, we would seek a decision on whether to pursue deployment sooner than the proposed deployment of 2005, if it is both warranted and technologically possible.

In Fiscal Year 2001, we would conduct a Defense Acquisition Board review to assess the status of the program. Based on program performance, we would seek approval to initiate upgrades to the current early warning radars; begin building the X-band ground-based radar and start integrating the battle management, command, control and communications into the Cheyenne Mountain complex.

In Fiscal Year 2003, we would conduct a second Defense Acquisition Board review to seek approval to build and deploy the weapon system - the ground based interceptor. At this point, we would seek authorization to procure 61 GBI missiles - this would include deployment interceptors, spares and test rounds. Based on this schedule, if the program proceeds as we anticipate, we would deploy in late 2005.

In order to meet this schedule, we plan to conduct a series of 19 more flight tests between now and 2005 to demonstrate the technical maturity of the system. As the Committee is aware, in June 1997 and January 1998, we conducted two very successful seeker "fly by" tests that allowed us to demonstrate key elements of the kill vehicle - namely the "eyes" that will allow the weapon to move into the end game, discriminate the warhead from decoys and intercept the target. In the remaining 19 flight tests we will attempt to intercept the target. In addition, we will conduct major ground testing of hardware and demonstrate the integration of system elements. Let me briefly outline our test program.

NMD Flight Testing. The proof of the NMD system's maturity literally will be "put to the test" over the next 18 months in a demanding series of system tests. In summer 1999, the performance of the exoatmospheric kill vehicle will be demonstrated for the first time as we attempt to intercept a target. We have a lot to learn in this first intercept test. Later in the fall, we plan to conduct a second intercept flight test. Both flight tests will use the developmental version of the kill vehicle produced by Raytheon. We will fly these interceptors against threat-representative target warheads launched from Vandenberg AFB, California. We will launch the kill vehicle on a booster from the Kwajalein Missile Range in the Pacific Ocean. The actual intercept will take place outside the atmosphere over the Pacific Ocean. We intend to demonstrate the continuing development of our non-nuclear kill vehicle, its sensor, software and discrimination capabilities.

In Fiscal Year 2000, we plan to conduct two full integrated system tests - one in each of the second and third quarters. This will allow us to conduct four intercept opportunities prior to the Deployment Readiness Review.

Starting in Fiscal Year 2001, we plan to fly three intercept flight tests each Fiscal Year through 2005. This will allow us to gradually demonstrate the increasing sophistication of our kill vehicle and ultimately the integrated ground-based interceptor weapon system. Flight test 7, scheduled to take place in Fiscal Year 2001 after the DRR, will be the first flight test to incorporate both the exoatmospheric kill vehicle and the proposed operational booster. Flight test 13, scheduled for 2003, will fly the production-quality ground-based interceptor - including both the kill vehicle and booster.

The revised program follows a very specific path to reaching the initial operational capability by Fiscal Year 2005. This path includes two key milestones that, in effect, postpone the need to freeze the interceptor design until the latest possible time dictated by lead time to the 2005 deployment date. The interceptor remains the ***least mature element*** of the NMD architecture. Therefore, by waiting to lock in the interceptor design until after we have tested the production-quality "round," we add confidence to the system we will ultimately deploy.

We have done nothing in the NMD program that would result in a delay as a result of the Secretary's announcement. Between now and the DRR in June 2000, nothing has been slowed down. In fact, we have actually added modeling and simulation efforts in the next two years that will help us develop and demonstrate the system further, as well as reduce flight test risks.

To prove out the system's readiness for deployment, we have chosen 2005 as the deployment date for NMD to avoid rushing to failure. I have testified on several occasions that I felt the NMD program was being executed along a **very high risk** schedule. Our recommended approach will reduce schedule risk by taking the time to develop, demonstrate and, ultimately, deploy the system in a more prudent manner. However, the program schedule, albeit less risky, still has significant concurrency. In the meantime, if the testing goes flawlessly, we may be able to deploy a system on an accelerated basis. However, such acceleration would be a **very high-risk** approach that we would only pursue if our assessment of the technological maturity and threat indicate it is warranted.

Given the reality of the threat, the NMD program cannot afford to fail. The funds provided by the Congress in last year's Emergency Supplemental Appropriation, combined with the programmatic adjustments proposed in our current budget, enable us to deliver the defensive protection as soon as practicable against the emerging rogue nation limited threat.

NMD Concept of Operations. I would like to take a moment to explain how we envision the individual NMD system elements will operate when combined as a fully operational and integrated system. A hostile launch from a rogue state begins the engagement process. Space-based sensors make the initial detection and report a threat launch. DSP, and ultimately SBIRS high, will alert the entire system of a potential ballistic missile attack; cue the radars to erect "search fences" to detect the incoming missile and start the battle management centers to evaluate engagement options. When the threat missile crosses into the range of ground-based early warning radars, these radars confirm flight and tracking information on the target missile. Upon data confirmation, the battle management, command and control center directs the launch of a ground-based interceptor. A ground-based X-band radar will provide high resolution target tracking data to the interceptor in flight through an In-Flight Interceptor Communications System - IFICS. This data will be

used by the interceptor to maneuver close enough to the target missile for the on-board kill vehicle sensor to discriminate the warheads from potential decoys. Sensors on the kill vehicle provide final, precise course corrections to enable the kill vehicle to destroy the target with a direct hit - or "kinetic kill."

We have already made progress in demonstrating some elements of the system. For instance, some hardware and software upgrades to early warning radars have been incorporated into an existing radar and are being tested. A prototype X-band tracking radar has been built at the Kwajalein Missile Range and has successfully tracked test launch vehicles out of Vandenberg AFB, California, including the most recent Air Force operational test on February 10, 1999. Both the upgraded early warning radar and prototype X-band radar will support the intercept flight tests this year.

The ground-based interceptor (GBI) weapon is the least mature element of the system and entails the highest technological development risks. The GBI consists of the exoatmospheric kill vehicle (EKV) launched by commercial-off-the-shelf boosters. As I noted earlier, we have already flown two successful EKV sensor flight tests. Our next 19 flight tests will build upon these two sensor tests and demonstrate our kill vehicle's capabilities.

The battle management, command, control and communications system links the NMD system elements to the warfighter. The BMC3 development is a continuous effort. Our capability will be increased on an incremental basis as we progress toward system deployment.

While we have been developing and testing the system elements, we also have been proceeding vigorously on deployment planning activities. We have conducted fact-finding and siting studies in two potential site locations - North Dakota and Alaska. We have initiated site designs for the X-band radar and weapon sites. We will start the design of the BMC3 facilities later this year. On November 17, 1998 we published in the Federal Register a Notice of Intent, announcing the beginning of the NMD Program's Deployment Environmental Impact Analysis process. We held public scoping meetings in North Dakota and Alaska in which over 650 people attended. We are in the process of preparing a draft Environmental Impact Statement. We plan to return to North Dakota and Alaska this fall to conduct public hearings on the draft Environmental Impact Statement. As required by law, the results of the EIS will represent one of many inputs into the deployment decision process.

I believe that we have structured a prudent NMD program and we are moving out smartly to execute it. We have made important technical progress to date. While we have important challenges still ahead of us, I believe we can meet those challenges and field an NMD system in a timely manner.

International Cooperative Programs

Our International Cooperative program element contains two project areas. First, our cooperative programs with Israel. Secondly, our cooperative efforts with Russia. I would like to outline briefly our efforts in both areas.

Cooperative Programs with Israel. The U.S.-Israeli cooperative Arrow Program continues to make progress toward the deployment of a contingency capable Arrow

Weapon System (AWS) later this year. On September 14, 1998, Israel conducted a successful fly-out test against a simulated ballistic missile target. For the first time, the Arrow II interceptor was controlled throughout the flight by the other system elements of the Arrow Weapon System; for example: the surveillance/fire control radar (Green Pine), fire control center (Citron Tree) and launcher control center (Hazel Nut Tree). The integrated AWS flight test was a combined Phase II/III test that served to complete the Phase II Arrow Continuation Experiments (ACES) program and to begin the integrated flight tests under the Phase III Arrow Deployability Program (ADP). The next ADP flight test is scheduled for this summer and will be an intercept test against a ballistic missile target. If successful, the Israeli Air Force will declare the Arrow Weapon System to be initially operational, as a limited contingency capability.

Several proof-of-concept tests have been conducted toward achieving Arrow interoperability with U.S. theater missile defense systems. The Arrow Link-16 Upgrade Converter is in final development and will be delivered to Israel later this spring. This device is a two-way translator that will convert U.S. Link 16 TADIL-J formulated messages to the Arrow-formatted protocols, and vice-a-verse. Once the Foreign Military Sales case is concluded for Israel to purchase a JTIDS 2H terminal, with delivery anticipated in late 1999 or early 2000, Israel will have the full capability for Arrow to "interoperate" with U.S. TAMD systems.

We are continuing our efforts that use both the Israeli Test Bed (ITB) and the Israeli Systems Architecture and Integration (ISA&I) analysis capabilities to assist with the deployment of the Arrow Weapon System. In addition, we are working with Israel in the ITB and ISA&I to refine procedures for combined operations between USEUCOM and the Israeli Air Force, and to examine future missile defense architectures that consider evolving regional threats. Recent contingency operations with Israel have benefited greatly from the work conducted bilaterally in the ITB and ISA&I.

We continue to reap benefits from our cooperative missile defense programs with Israel. In one specific case, the Arrow seeker technology flown by Israel is the same seeker planned to be flown aboard THAAD. Similarly, the lethality mechanism used in Arrow will greatly assist us as we develop the Navy Area system that also employs a fragmentation warhead. Additionally, the experience gained with the cooperative Arrow flight tests will provide many benefits as we begin a very robust flight test program for our TAMD systems this year.

Cooperative Programs with Russia. The Russian-American Observatory Sensor (RAMOS) program has been our cooperative effort with Russia on space-based surveillance technology. The program was conceived as a way to jointly develop and test these technologies. The projected budget to complete this program over the next few years is about $250 million. After very careful scrutiny we decided that the technical merits of the program did not warrant that level of funding - especially in light of the limited resources available for technology programs that directly benefit the missile defense mission.

While I appreciate the importance of cooperative programs with Russia, I cannot recommend continuation of the RAMOS project as it existed. However, in the spirit of cooperation with Russia, we are considering two other cooperative programs with Russia that promise similar benefits but at a substantially reduced cost. Both will ensure that the Russian scientific and technical community is engaged in a funded endeavor with America research interests. For instance, we will continue to work with

several Russian research institutes (through the Utah State University Space Dynamics Lab) to cooperatively research space surveillance technologies of mutual interest. As the Committee recognizes, it is in our collective interest to work cooperatively with Russia's technical and scientific community on a wide-range of mutual interests. Together, we can build a bridge of technical and political understanding, while lessening the opportunity for rogue states to gain access to Russian space and missile expertise.

I will personally ensure that we keep the Committee and interested Members fully informed as we proceed with our plans.

Threat and Countermeasures Programs.

BMDO's Threat and Countermeasures program provides intelligence and threat support to all aspects of the missile defense program. The efforts covered under this program element directly support our TAMD and NMD acquisition programs by providing potential threat and countermeasures information central to the planning and execution of those programs. In addition, it also supports our Advanced Technology Development program by providing information on future threats and the time lines associated with their emergence. Our efforts draw heavily on the Intelligence Community for analysis, reports and, in some cases, collection of technical data in the field. It also sponsors threat work tied directly to the performance parameters of BMD defense systems, exploring possible vulnerabilities as they may be perceived by potential adversaries. This countermeasures-oriented work is conducted in a systems-engineering context by means of a newly developed threat risk assessment methodology that is supported by selected hardware-oriented experiments. For example, we work very closely with the U.S. Air Force Phillips Laboratory's Countermeasures Hands-on Project (CHOP) to assist us with such hardware-oriented efforts. Lastly, the BMDO Threat and Countermeasures program produces a series of carefully constructed and documented missile attack scenarios - including simulated flight trajectory information - for use in many forms of missile warfare engagement modeling and simulations. These include wargames conducted at the Joint National Test Facility in Colorado Springs, Colorado. We propose $16.5 million for these activities in Fiscal Year 2000.

Ballistic Missile Defense Technical Operations.

The BMD Technical Operation program element contains the centrally-managed activities that provide functional expertise (i.e., systems engineering), analytical tools and support (i.e., the Joint National Test Facility) and test resources (i.e., data collection assets and test ranges) for theater missile defense, FoS engineering and integration, national missile defense and advanced technology efforts. Technical Operations truly provides a common, critical base of economical support for the entire BMD program.

This program element specifically provides funding for the activities of the Chief Architect/Engineer office that is responsible for the joint system mission area architecture, integration, interoperability, and engineering. The Chief Architect/Engineer provides the technical foundation for program acquisition decisions at the architecture level and leads the BMDO process for development, integration, and upgrade of mission area requirements with the military users and systems engineers for NMD and TAMD. Within BMDO, the Chief Architect/Engineer leads the implementation of Department of Defense architecture and engineering

initiatives, such as Open Systems, Value Engineering, and Cost as an Independent Variable (CAIV) from an engineering perspective.

Advanced Technology Programs

Advanced Technology programs underlie the success of our current MDAPs and remain a critical component of the overall BMD program. Our Advanced Technology program's objective is to enhance the effectiveness of our current MDAPs and reduce their costs while simultaneously investing in future technologies that that could serve as our nation's "insurance policy" to protect against future missile threats.

In recent years, we have found that it has become increasingly difficult to maintain our technology programs in the face of competing demands presented by the MDAPs. Therefore, it is not as robustly funded as in previous years. Although our annual Advanced Technology request has remained constant, investment has declined from the last several years appropriated levels. However, the program continues to focus on providing some of the critical capabilities needed across the current missile defense architecture.

Our Advanced Technology program has become more focused through a new, more formal technology planning process which we implemented last year. This process builds upon the technology needs identified by our system architect in coordination with the MDAPs based upon current system performance, emerging threats, and cost drivers. Working with the Services, we have tailored our technology programs and leveraged Service technology programs to meet many but not all of our highest priority needs. This process has helped us maximize benefit from every technology dollar through harmonizing the Services efforts in the areas of interceptors, surveillance, and ballistic missile C4I technology to provide advanced technology performance enhancing and cost reducing components and software, as well as critically needed phenomenology data, for as many MDAPs as possible with limited funding. This ensured these efforts benefit the Services' MDAPs as much as possible.

I would like to provide you with some specific examples. Our Atmospheric Interceptor Technology program is currently developing an advanced interceptor seeker and a solid propellant divert and attitude control system to enable block upgrade capabilities for our current generation of endo-atmospheric interceptors. Concurrently, the AIT program, along with other BMDO technology programs, is developing cost saving components for both PAC-3 and THAAD. Our Exo-atmospheric Interceptor Technology program is developing an advanced active and passive seeker system to enable future block upgrades for our Upper Tier and National Missile Defense interceptors to counter a potential growth in the threats those systems must address.

Finally, in our Fiscal Year 2000 program, we will begin to more robustly fund a program to develop advanced radar technologies to support cost reduction and performance enhancements for all of our ground- and sea-based radar systems. Unfortunately, because of our fiscal constraints, we were able to provide funding for this advanced radar technology program only through reducing our funding for other important technology programs.

Our concern about the Advanced Technology program remains. In the past, we were able to fund more robust technology programs, such as LEAP which is now the basis

for both the Navy Theater Wide and NMD interceptors. At the current funding levels, we are unable to fund programs such as this for next generation weapon systems. We are concerned about our ability to keep pace with the emerging threat through our Advanced Technology program. We continue to examine ways we can increase technology funding in the future.

Space-based Laser Program. The key focus of our Advanced Technology directed energy program remains the chemical Space-Based Laser (SBL). SBL is a high-payoff, next generation concept for a missile defense system. The SBL concept we envision would provide the Nation with a highly effective, continuous boost-phase intercept capability for both theater and national missile defense missions. In addition, SBL could perform non-missile defense missions, such as aerospace superiority and information dominance. . Working with ground-, sea- and air-based missile defenses, the SBL's boost-phase intercepts could "thin out" missile attacks and reduce the burden on mid-course and terminal phase defenses. The SBL will be instrumental in protecting airfields and ports in the early stages of the conflict. Additionally, because of its global presence, SBL will be available to protect U.S. Allies and coalitions that may be threatened by inter-theater ballistic missiles.

The SBL program is managed by BMDO and executed by the U.S. Air Force on our behalf. Both BMDO and the Air Force are requesting funds in the Fiscal Year 2000 budget for the SBL program. We are working jointly on this very important program, pooling resources and ensuring the program is following a clear direction. The BMDO budget contains $75 million and the Air Force budget has $63.8 million, for a combined request of $138.8 million. This level of funding on an annual basis will allow us to work on the program at a moderate pace while focusing our efforts on reducing the program's technical and engineering challenges.

In the near term, the SBL program will focus on ground-based efforts to develop and demonstrate the component and subsystem technologies required for an operational space-based laser system. These efforts will lead to the design and development of an Integrated Flight Experiment (IFX) vehicle to be tested in space. I believe this approach is a prudent, moderate-risk development program.

We recently sponsored the third Independent Review Team (IRT-3) as part of the ongoing assessment of technology readiness, role, and content for a meaningful Integrated Flight Experiment program for SBL.

Closure

Mr. Chairman, acquisition of joint missile defenses is not a simple mission. I think we all appreciate the technical challenges and experience the frustration of not moving as fast as we would like. We are now vigorously addressing the cost of these systems as well. An equal challenge is BMDO's continuous effort to ensure that the joint missile defense mission area is understood, adequately resourced and - working with JTAMDO and the Military Services - that the systems we are developing are fielded in a manner consistent with the needs of the joint warfighter. This means that we must develop missile defense systems that are effective, interoperable and affordable. My organization and I are addressing these issues across all our programs and we are working with our Executing Agents and industry partners to ensure we succeed.

I would like to express my gratitude for your continued support of missile defense. You and the Members of this Committee have steadfastly supported this program and have made very difficult funding decisions in order to ensure our programs succeed. Over the last few years, the additional funds provided by Congress have helped us in many areas to keep these programs moving forward, ensure additional test hardware could be procured, and in some cases accelerated our progress. Last year's IMPACT legislation, which was ultimately provided to the Department as a supplemental appropriation, helped us to gain momentum to do some vitally important activities which otherwise we would not have been able to afford.

Finally, last year the Congress authorized and appropriated an additional $1 billion for missile defense efforts. The Department looks forward to putting those additional resources to good use. Part of the billion dollars will be used to directly support our NMD program. Another portion will be used to posture the Navy Theater Wide program for acceleration.

Mr. Chairman, on behalf of the missile defense community, I want to thank you and the Committee for your leadership and support. Successfully developing and fielding missile defenses has been a joint goal of ours. Since we work hard everyday to make substantial progress in fielding these systems, we are often too focused to remember to acknowledge the partnership we form and to thank you for your leadership, support and continued confidence in this important mission area. Thank you.

I would be delighted to answer the Committee's questions.