Statement of
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before the
Subcommittees on Strategic Forces
Committee on Armed Services
United States Senate

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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 DefensesÕ 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 ø one that cuts across all of the Services. BMDO directs a joint "family of systems" approach for theater air and missile defense ø 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 ø 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 DepartmentÕs efforts in missile defense, BMDO has institutionalized three important processes. First, in order to assess architectural effectiveness and the performance of individual systems, BMDOÕs 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, BMDOÕs 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, BMDOÕs Joint Technology Board includes the Services to jointly plan and explore technology responses to evolving threat scenarios ø and to leverage one anotherÕs financial investments in this area.

Fiscal Year 2000 Program and Budget. In order to manage the joint missile defense program effectively, the Department of Defense proposes $3.3 billion in fiscal year 2000 for BMDO. This includes $2.9 billion for RDT&E, $355.9 million for procurement, and $1.3 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 $36.6 million for International Cooperative Programs. Together, these represent 2 percent of our overall budget. The chart that follows breaks out 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 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. Within Theater Air and Missile Defense, joint mission area acquisition entails a joint "family of systems" approach that utilizes a multi-tier, multi-platform architecture of ground-, sea- and air-based missile defense systems. The family of systems approach will allow us to provide defense in depth against a wide range of ballistic and cruise missiles carrying conventional and unconventional warheads ø including weapons of mass destruction. Our analyses continually demonstrate that the threat is varied, the mission demands are complex, and the assets we need to defend are diverse. This environment drives us to the solution that we need air-, sea-, and land-based TAMD systems in order to be successful. No single missile defense system can do it all. Multiple systems working together in unison greatly enhance the probability of destroying incoming missiles before they can hit U.S. or coalition forces, critical assets or population centers.

The heart of joint mission area acquisition is to acquire defense systems in the same manner in which we are increasingly called upon to defend our nationÕs interests ø jointly. The key is to make sure that "interoperability" is built into all missile defense systems while we develop, demonstrate, and procure them. The logic is that it is easier to build interoperability into the systems while we are acquiring them than to "insert" it into them after they are fielded.

The Importance of Interoperable TAMD Systems. Interoperability is achieved through two seemingly simple things. The TAMD systems must be able to share cueing and tracking data from space-based sensors and ground- and sea-based radars, and coordinate their defense or use of weapons. By sharing cueing and tracking data, all TAMD systems will have an extended view of the air and missile defense battlefield. Interoperability also enables missile defense systems to defend larger areas by allowing early launch of interceptor missiles against threat missiles that are "seen" earlier in flight.

Interoperability will let the joint commander coordinate the use of sea- and ground-based interceptors and the Airborne Laser to achieve two important things. First, "leakers" ø threat missiles that penetrate our defenses and hit their targets ø are

reduced. Interoperability allows the joint commander to coordinate his defense in depth by assigning a specific TAMD unit to attack a specific threat. If the first interceptor misses, interoperability enables the joint commander to assign another TAMD unit ø in an optimum position ø to re-engage the threat missile. This is a concept called "shoot-look-shoot." Without the ability to coordinate use of interceptors and Airborne Laser shots, multiple TAMD units will try to engage threat missiles simultaneously, thereby "wasting" interceptor missiles. Therefore, the second advantage of "shoot-look-shoot" fire coordination is reducing the number of interceptors used. In order to avoid wasting these relatively expensive interceptors, our TAMD systems must be able share sensor data and coordinate the defense. Only then can we optimize our defensive capabilities.

I have brought a chart to illustrate how interoperable systems can enhance our ability to defend critical areas in a conflict. This chart demonstrates the use of our family of systems in a hypothetical conflict in the Middle East. The map on the far left shows the defensive coverage of "stand alone" TMD systems that cannot communicate and share data with other systems. The center map defines the near-term goal of increased coverage and greater depth of fire. This example incorporates joint data sharing, cueing information and tracking data using. The picture on the right illustrates even greater defensive coverage, in which each ServiceÕs system not only shares tracking data and cueing information, but engages missiles using sensor and fire control information from other sensor assets in the theater. PAC-3, Navy Area, THAAD and Navy Theater Wide ultimately coordinate which interceptor will engage a specific target during its flight trajectory. The addition of ABL will further enhance these benefits.

The Importance of the Family of System Architecture. We need to build interoperability into our systems as we develop and acquire them, and to field the full family of systems architecture. Multi-layered defense requires upper and lower tier systems ø this allows us to engage incoming missiles in the ascent, midcourse and terminal phases of flight. This gives us greater opportunity to kill the incoming missile before it can hit its target ø whether that target is U.S. or coalition troops, key assets such as airfields or ports, or population centers in the region. Defense in depth provides near leak proof protection of critical assets.

Multiple platforms ø meaning ground-based systems such as PAC-3 and THAAD, sea-based systems such as Navy Area or Navy Theater Wide and air-based systems such as the ABL ø is also a critical aspect of the family of systems. These are not redundant systems. Instead, they complement one another and are needed to meet the full operational requirements in different theaters of operation.

Another reason why we want to field such a family of systems is because we recognize that in different conflict scenarios we may not be able to have the full family of systems in theater. For instance, we may not have ground-based systems such as PAC-3 or THAAD on the ground when hostilities start. We may need to rely on sea-based missile defenses to protect our forces while we fight our way into the theater. In addition, some of the attacking missiles will be of such short-range that only our lower-tier systems will be able to engage them. In other cases, while the ABL and Navy Theater Wide systems can protect large areas within a region, if the attacking missileÕs launch point is far enough inland, these systems may not be in position to engage them effectively. Hence, we will need to rely on ground-based defenses like THAAD or PAC-3 to shoot them down.

The bottom line is that theater air and missile defense represents a diverse and complex mission area and we do not have a single "silver bullet" option. We are best served and protected by an interoperable family of systems that can provide a comprehensive defense. My organization, working with JTAMDO, the Military Services and other key stakeholders, ensures that joint mission area acquisition happens in a productive manner. Properly staffed with skilled technologists, engineers, acquisition professionals and supporting staff, we oversee the full process for the acquisition of the TAMD family of systems architecture, as well as the Joint NMD program and a Joint Technology base program.

The TAMD Major Defense Acquisition Programs (MDAPS). 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 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 family of systems 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 DepartmentÕs program review, let me summarize the status of these theater air and missile defense 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 yearÕs 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 anticipate we will conduct this flight test tomorrow, March 12, 1999.

These flight test delays have resulted in a one-year slip to Developmental Test & Evaluation and a comparable slip to Milestone III ø 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 proposes using part of last yearÕs

$1 billion emergency supplemental for the PAC-3 program. Specifically, we propose using $60 million in fiscal year 1999 and $80 million in fiscal year 2000 to ensure the program remains on track.

I appreciate that such transactions are unusual and do not increase oneÕs 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 ø to include retired general officers ø 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 Authorization and Appropriations Bills.

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 ø 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 ø 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 ø including a successful series of flight tests. However, the programÕs progress has been slowed by the NavyÕs AEGIS Weapon System (AWS) Baseline 6 Phase III software development ø 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. 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. Dr. Gansler has provided a detailed overview of how the Department arrived at the revised upper-tier TAMD strategy. I realize there has been a lot of concern that the Department appears to be posturing these two systems for direct competition. 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.

At the heart of our revised upper-tier strategy is the fact that 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 ø THAAD and Navy Theater Wide ø 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 five-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 interceptorÕs components, but not the overall interceptor design.

At the same time, Navy Theater Wide has experienced development problems of its own ø 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 ø test results, schedule, cost, program risk, and projected performance ø we will propose in 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 expanding rapidly and we have not made substantial progress in

demonstrating these systems. I think in this area ø because of the pressing threat ø a little "sibling rivalry" can go a long way within our family of systems.

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. Our next flight test is in a few weeks. Following this, we 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 ø the interceptor ø 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 into the critical "end game" and learn from that vital test experience. I am absolutely confident that if the THAAD team can shake out all the various "bugs in the system," THAAD will successfully intercept its target later this spring.

I would like to note that Lockheed MartinÕs 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 contractorÕs 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 next flight test.

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 CongressÕ 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 NavyÕs 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 ø one per quarter ø 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 ø such as a fire control radar and mobile launcher ø we need to satisfy the MEADS requirement. This restructured MEADS program allows us to explore less costly program options by leveraging efforts in missile defense programs currently under development, 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.

Earlier this month, on Dr. GanslerÕs behalf, I met with our German and Italian partners 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 $48.5 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 ø which effectively support multiple theater air and missile defense system development program requirements ø 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 family of systems 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 DepartmentÕs 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 ø but it can be done.

We have other substantial programmatic challenges as well. As I noted earlier, we must develop and test TAMD systems and demonstrate they are highly interoperable. Finally, we must ensure these systems are affordable ø 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.

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 early warning and missile defense 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 ø 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 RussiaÕs 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 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.
BMDOÕs Threat and Countermeasures program provides centralized intelligence and threat support to all aspects of the joint missile defense program. The efforts covered under this program element directly support both 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 potential adversaries may perceive them. 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 LaboratoryÕs 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 ø including simulated flight trajectory information ø 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 the entire missile defense program. 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 programÕs 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 nationÕs "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, but it 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 joint technology needs identified by our system architect in coordination with the MDAPs based upon current system performance, emerging threats, and cost drivers. Working closely with the Services, we have tailored our joint technology programs and leveraged Service technology programs to meet many but not all of our highest priority needs. This process has helped us to maximize the benefits from every technology dollar we invest. We now harmonize the ServicesÕ efforts with our own in the areas of interceptors, surveillance, and ballistic missile C4I technology. This provides us with 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. As a result we ensure these joint technology efforts benefit our missile defense 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 endoatmospheric interceptors. The AIT program ø along with other BMDO technology programs ø is developing cost saving components for both PAC-3 and THAAD. Our Exoatmospheric Interceptor Technology program is developing an advanced active and passive seeker system to enable future block upgrades for our TAMD upper tier and NMD interceptors to counter a potential emerging threat.

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.

My 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. I am concerned about our ability to keep pace with the emerging threat through our Advanced Technology program. We continue to examine ways to increase technology funding in the future.

Closure

Mr. Chairman, acquisition of joint missile defenses is not a simple mission. As I noted at the outset, 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 BMDOÕs continuous effort to ensure that the joint missile defense mission area is understood, adequately resourced and ø working with JTAMDO and the Military Services ø 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.

Mr. Chairman, I would be delighted to answer the CommitteeÕs questions.