Statement of
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before the
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Committee on Armed Services
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Mr. Chairman and Members of the Committee, it is my privilege to appear before you today to present the Department of Defense's Ballistic Missile Defense (BMD) program and budget for Fiscal Year 1999.

Over the last few years, working with Congress, the Department of Defense has structured a comprehensive missile defense program that is responsive to the existing and emerging threat to the United States, our deployed military forces, our allies and friends. In years past we have characterized the BMD program as having three fundamental priorities: Theater Missile Defense (TMD), National Missile Defense (NMD) and Advanced Technology. While those priorities remain consistent today, I think we have modified them slightly to respond to emerging realities. First, increasingly, I refer to the program as missile defense instead of ballistic missile defense. This is because during the past year BMDO has taken on the additional responsibility for developing and integrating a joint architecture for theater air and missile defense (TAMD). I will provide greater detail on this matter later in my testimony. The next substantial modification has been the increased emphasis on NMD, with the designation of NMD as a major defense acquisition program (MDAP). This increased emphasis demonstrates that the Department's policy priorities are clear and remain consistent. Finally, we are focusing our advanced technology program to ensure that our resources are dedicated to those efforts that have direct pay off for missile defense technology needs.

Last year's Quadrennial Defense Review (QDR) reaffirmed the importance and priorities of the missile defense program, including the integration of Cruise Missile Defense (CMD) activities into our capabilities. The specific recommendations of the QDR, which were designed to improve program stability and reduce risk, were provided to BMDO in the accompanying Fiscal Guidance. BMDO and our Service Executing Agents have successfully implemented the Department's direction. Our Fiscal Year 1999 budget reflects these adjusted priorities for the missile defense program. In order to successfully manage and execute these important priorities - and to successfully field missile defenses for the warfighter - I have directed my organization and our Service Executing Agents to evaluate and strengthen our management tools and processes. I will close out my statement with a review of the management improvements I have directed at BMDO.

Before I begin with the programmatic details, I would like to outline for the Committee the highly active year we anticipate in the world of missile defense. It will feature some highly visible flight tests and program decisions that will demonstrate the results of our past efforts and investments. Frankly, I would characterize this

year as one of "challenging opportunities." I say this because almost everything we are attempting is a substantial challenge as we are not responsible for a single weapons system or even a class of weapons - but rather an entire joint mission area.

One of our successes in this area is the shared responsibility of BMDO and the Joint Theater Air and Missile Defense Organization (JTAMDO) to provide the Joint Force Commanders with an improved capability to defend against air and missile threats. The JTAMDO is defining the required system interoperabilities and operational architectures and validating mission capabilities in coordination with the war-fighting CINCs and the military Services. BMDO assumes the role of System Integration Architect for theater air, cruise, and ballistic missile defenses working with JTAMDO and the Services translating the operational architecture into a systems architecture and carrying out systems engineering, integrated testing and program acquisition functions.

Another example of our joint view of missile defense is in the area of Attack Operations. As a result of SCUD missile attacks during the 1991 Gulf War, the Department decided that the preferred method of negating attack by threat missiles is to prevent launch by conducting attack operations. Such attack operations ultimately will help reduce our missile defense inventory requirements. BMDO and the Joint Staff have formed a collaborative team, which includes the Services and defense agencies, called the Joint Attack Operations Working Group (JAOWG) to improve our joint warfighting capability to conduct attack operations.

Equally important is the need to conduct and evaluate realistic joint training, field experiments, and demonstrations. These activities are low cost, high payoff opportunities to improve our joint attack capability.

While we consider our relationship with the Joint Staff, the CINCs, and the Services to be a success, the development and acquisition of systems in a joint manner remains a challenge. And when we add to that the technical challenges of missile defense, one immediately realizes how difficult a task this really is.

This year we will conduct a series of important flight tests for our TAMD and the NMD programs. We will continue several important technology development efforts as well. The NMD program began 1998 with a highly successful flight test of the exoatmospheric kill vehicle (EKV) sensor, which I will address in more detail later on. Another major element of our NMD program strategy is the award of a Lead System Integration contract. We plan to award the LSI contract this Spring. Two contractor teams, Boeing North American and the United Missile Defense Company (a joint venture between Lockheed Martin, Raytheon and TRW) are competing for this effort. The LSI contractor's main task will be to complete element development and integrate the elements into a system in time to provide the Department a viable deployment option in the year 2000.

Two systems in our TAMD program, the Patriot Advanced Capability - 3 (PAC-3) and Theater High Altitude Area Defense (THAAD), will undergo a series of intercept tests at White Sands Missile Range in New Mexico. THAAD is scheduled to fly two intercept attempts and PAC-3 will conduct five. As we have seen in the past, complex flight tests like the ones we plan to conduct this year are very challenging. Sometimes, we experience slight delays because of minor technical difficulties with either range instrumentation, the target or the interceptor vehicle. Moreover, the challenge of achieving a "hit-to-kill" intercept is significant when one considers that

the closing velocities of the target and interceptor are over 8,000 miles per hour, depending upon the missiles' ranges. However, we are confident that we have structured our programs to succeed on the test range and look forward to beginning this new year of challenging opportunities. I will talk about both the THAAD and PAC-3 flight tests in more detail later in my testimony. We will also make several important decisions and conduct some less-visible, albeit important, tests in our Advanced Technology program.

Fiscal Year 1999 Program and Budget. In order to address the missile threat and fully execute the plans for missile defense, the Department has structured a sound and affordable program for Fiscal Year 1999. The total Fiscal Year 1999 budget request for the Ballistic Missile Defense Organization is $3.605 billion. This includes $3.179 billion for RDT&E, $409 million for procurement, and $17 million for military construction activities. Combining these three budget categories, Theater Air and Missile Defense programs account for $2.121 billion or roughly 59 percent of the budget, while National Missile Defense represents $962.7 million or 27 percent. We are requesting $253.6 million for Advanced Technologies, which is about 7 percent of the overall budget. BMD Technical Operations accounts for $194.7 million and is about 5 percent of the budget. Finally, two of our new program elements, Threat & Countermeasures and International Cooperative programs represent a total of $72.8 million, or about 2 percent of the budget.

(Charts [2] - BMDO Funding)

Program Element Realignment. As you will note, our program element structure has been modified in the Fiscal Year 1999 budget request. My organization proposed these changes to the Department, after consulting with Members and Committee staff, in order to update the program element structure to align with the current BMDO mission focus and program management responsibilities. The catalyst for this proposal is the fundamental shift in the Department's management approach for both the NMD program and TAMD "Family of Systems," and Congressional direction on our International Cooperative program.

Last year, the Deputy Secretary of Defense delegated to BMDO the total TAMD integration and architectural-level planning responsibility. These TAMD "Family of System" costs are now captured in the "Family of Systems" Engineering and Integration (FoS E&I) program element. These are the activities and functions primarily executed by BMDO's TAMD Systems Engineer and supported by the Chief Architect. These activities include providing optimal TAMD architectural solutions via cost-performance analyses evaluating the participation of each system, working in concert with all other systems, to address the entire theater-level threat. This program element will increase the stature and visibility of these architecture-level, MDAP-like program activities and costs, and align the program management responsibility for the TAMD efforts consistent with the current BMDO organization focus.

The BMD Technical Operations program element captures those BMDO centrally-managed activities that provide functional expertise, analytic tools and support (i.e. the Joint National Test Facility), and test resources (i.e. data collection assets and test ranges) for TMD, FoS E&I, NMD and Advanced Technology efforts. These activities were previously "housed" across three separate program elements, with algorithms to determine cost-shares between TMD, NMD and Technology. By consolidating these activities into one program element, it enhances resource

visibility and simplifies our management of these activities - especially from the perspective of paying internal Departmental "taxes" or allocating undistributed reductions in the authorization or appropriations processes.

The creation of the International Cooperative Programs program element is in response to both a Congressional initiative and new Secretary of Defense cooperative program policy guidance. This program element contains significant developmental programs which are jointly funded with international partners. However, it specifically excludes the MEADS program (which is housed in its own program element) and small-scale Innovative Science and Technology programs. Hence, it provides greater insight and focus for BMD international cooperative programs.

The Joint TMD, NMD, and Advanced Technology Development program elements have been modified to reflect the transfer of the infrastructure (Technical Operations) and International activities. The Boost-phase Intercept and TMD BMC3 program elements have been eliminated, as these costs have been accounted for in the new program elements. The remaining RDT&E and Procurement program elements for MEADS and the TAMD MDAPs are unchanged.

Theater Air & Missile Defense Programs - The Family of Systems.

The Family of Systems (FoS) concept is a flexible configuration of 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 situation and threat. This FoS must be able to counter a wide range of threats providing a near-leak proof shield to US forces, allies and friends around the world. 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.

One system cannot do it all, which 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 demanding and complex requirements. In short, there is no single "silver bullet." Multiple systems working in unison greatly enhance the probability of destroying incoming missiles before they can effect critical assets.

For these reasons, BMDO is pursuing the acquisition and integration of land and sea-based systems that will effectively counter current and future theater missile threats. This strategy includes leveraging prior investment in ongoing Service programs, and developing new systems and capabilities for the future.

(Charts [3] - Master Schedule/Master Plan/Theater Missile Defense)

Let me summarize the status of these programs:

PAC-3. The Patriot PAC-3 is the most mature of all our TAMD systems - it is currently in the Engineering and Manufacturing Development (EMD) phase of the acquisition process. PAC-3 is being fielded in the course of three phased upgrades called "configurations." Currently, we have fielded the first two configurations of PAC-3, providing the Army with improved operational performance. The third

configuration will provide the final element in the form of the hit-to-kill interceptor missile, along with additional communications, radar, and ground support system improvements. I expect the program to conduct the first intercept flight this year, to be followed by a decision to begin Low Rate Initial Production (LRIP) of the new missile. The first deliveries of the ground system hardware and software have already begun, and development and operational testing will start this year. All of these efforts support a First Unit Equipped (FUE) date of late Fiscal Year 1999.

The Fiscal Year 1999 budget request for PAC-3 is $137 million for RDT&E and $343 million for Procurement. The funding request supports the deployment of the Configuration 3 system starting in 2000.

As the Committee is aware, we had planned to fly an intercept test for the PAC-3 missile in February but the test date has slipped. The reason for this delay is that the Patriot Program Manager assessed that the missile development effort and integration of the hardware and software into our hardware-in-the-loop testing facility would take longer than planned. As a result, we now plan for the test to take place in the third quarter of Fiscal Year 1998 - later this Spring. The hardware-in-the-loop and acceptance testing are important pre-flight qualifications to ensure that all system hardware and software meet our standards and are ready to fly. The program will conduct a flight readiness review by the end of March which will determine when the missile will be ready to fly. Operational testing is currently planned to begin in Fiscal Year 1999.

Navy Area. Following last year's successful intercept flight test, the Navy Area program was approved for entry into EMD on February 22, 1997. The program will commence Development Test (DT) flight testing in Fiscal Year 1999, followed by an at-sea demonstration of the User Operational Evaluation System (UOES) in Fiscal Year 2000. LRIP will begin in Fiscal Year 2000, with an FUE date of Fiscal Year 2002. The BMDO Fiscal Year 1999 budget request for the Navy Area program is $245 million for RDT&E and $44 million in Procurement funds. As part of our "shared approach" for this program, the Navy has requested in their Procurement budget $111 million.

Theater High Altitude Area Defense (THAAD). The THAAD program is currently in the Program Definition and Risk Reduction (PD&RR) phase of development and is the most mature of our upper-tier TAMD systems. In 1997, as a result of our failure to achieve an intercept in flight tests and the need to reduce technical and programmatic risk, the QDR endorsed a plan to restructure the program and to achieve a FUE in 2006.

After flight test seven, BMDO and the Army commissioned an Independent Review Team (IRT) to review the program's processes and the design of the THAAD missile. I believe the IRT has had a direct, positive impact on the way the THAAD program conducts its business. As a result, we have increased the rigor in our ground testing program as we prepare for the next flight test. That is where we detected the most recent technical problems. Therefore, I applaud the THAAD team for discovering these faulty components during their many ground-tests and quality assurance checks - well before we tried to fly the interceptor. The next flight test is scheduled for later this Spring.

The Department's Fiscal Year 1999 budget request for $822 million fully supports deployment of the THAAD system in 2006. This level of funding is required for

completion of the PD&RR flight test program, continuing risk reduction for EMD, and for acquiring missiles for a UOES capability. In fact, the budget request is tied very closely to three concurrent contractual requirements. About $414 million is for the extension and completion of the PD&RR flight test program and completion of the Pre-EMD risk mitigation effort. This risk reduction effort is principally focused on the design of the EMD radar and battle management software, both of which are on the critical path to achieving the FUE in Fiscal Year 2006. Another $302.9 million will be used to initiate EMD and its associated start-up costs, such as materiel orders, Government Furnished Equipment procurement and "turning on" five major subcontractors. A substantial portion of the EMD start-up costs are associated with the THAAD radar development and not the interceptor missile. Finally, about $105 million will be used to execute the UOES missile buy for 40 missiles. This will provide the warfighter with an interim capability in Fiscal Year 2001 until the objective system is fielded. The THAAD program is currently on schedule to fly its next intercept attempt in May. A successful intercept will allow exercise of the UOES contract option.

Navy Theater Wide (NTW). The Navy Theater Wide program is currently in the Program Definition & Risk Reduction phase of development and is preparing for an initial Defense Acquisition Board (DAB) Review in mid-April. This review is equivalent to a Milestone I review. The Navy has proposed an evolutionary acquisition approach consisting of an initial Block I system followed by a more-capable Block II system. The Milestone I-level DAB will be asked to review and approve the proposed evolutionary acquisition strategy. The Fiscal Year 1999 budget request for Navy Theater Wide is $190 million.

Family of Systems Engineering and Integration (FoS E&I). Each member of the Family of Systems contributes what is sees to a common picture of what is occurring in the battlespace, and then based on that picture, the warfighter launches the most effective and efficient response. All TAMD systems must be capable of joint or autonomous operations. For example, based on cueing from a space-based sensors and target detection and tracking by a THAAD radar, a Navy Area interceptor could be launched to counter a threat. This concept is demonstrated through a series of "systems integration tests," such as the one we conducted last year, where we operate Army, Navy and Air Force TAMD sensors, such as the THAAD or AEGIS radars, to track and "communicate" the threat with a Patriot firing unit.

Our Family of Systems concept will provide the warfighting CINC a "plug and fight" architecture, allowing him to selectively deploy the weapon system or systems tailored to the requirements of his theater. This Family of Systems responsibility means that all the TAMD weapons systems must be completely interoperable and capable of sharing and exchanging information that provides a common view of the battlespace. Through a rigorous systems engineering process, BMDO ensures that BMC4I, sensors, and weapons systems retain their singular capability, yet can function as one complete defense no matter what elements it is comprised of to meet the CINC's needs. The "plug and fight" approach enables the CINCs to tailor their forces to the threat and theater geography.

Our budget request for Family of Systems engineering and integration is currently $96 million in RDT&E and roughly $20 million in Procurement funds. The responsibility for TAMD integration of ballistic missile defense, cruise missile defense, attack operations and the BMC4I "back bone" capability into a single integrated air picture will continue to drive the requirement for additional resources.

Airborne Laser (ABL) program. I would like to take a moment and talk about an important TAMD system that is a part of our Family of Systems architecture, but managed and budgeted by the U.S. Air Force. The Airborne laser is the Department's primary boost-phase intercept program for theater missile defense. BMDO and the Air Force work very closely to ensure that the ABL system is effectively integrated into our TAMD Family of Systems. When this system is developed and deployed it will provide our warfighters with a powerful TAMD capability and will strengthen our overall TAMD architecture. By providing a critical boost-phase intercept capability, before a missile can deploy a separating warhead or countermeasures, ABL will thin out the attack for ground- and sea-based TAMD systems.

Medium Extended Air Defense System (MEADS). The MEADS program is a cooperative development program with our German and Italian allies. The program is currently in the Project Definition and Validation phase, which is scheduled to be completed in the first quarter of Fiscal Year 1999. The Memorandum of Understanding (MoU) negotiations for the Design and Development (D&D) phase are currently underway with our international partners. The QDR recommended continuation of the MEADS program and increased the Fiscal Year 1999 funding level to provide a bridge to the next RDT&E phase, D&D. In light of the QDR guidance, the importance of this international program and continuing Congressional interest in out-year funding, I raised MEADS as an issue during the Department's POM deliberations this past Fall. Nonetheless, other defense program priorities at the time superseded addressing the issue. During the POM process this Spring, the Department will identify the resource requirements for all BMD programs and future funding of MEADS will be reviewed in this process.

Joint Theater Missile Defense. This activity funds projects which support our TAMD programs. This includes target missiles, collection and analysis of target signatures, technical support and TMD-unique test resources. In addition, funding in this program element supports CINC-level planning and participation in wargaming exercises. This ensures that TAMD program development reflects military needs and the combined warfare capabilities of allies and friends. These efforts support all the TAMD major defense acquisition programs in a centralized manner. I believe such centralization reduces costs and enhances the integrity in our test program.

National Missile Defense (NMD) Program. The primary mission of the NMD system is to defend the United States against a limited ballistic missile threat by a rogue nation, should such a threat emerge. In addition, the NMD system would have some capability against a small accidental or unauthorized launch of a ballistic missile from more nuclear capable states. To ensure that the Department would have the required capability to defend the Nation against an emerging threat, it has adopted an ambitious strategy known as "3 plus 3" for National Missile Defense: by 2000 the United States will be in a position to make a deployment decision if warranted by the threat, which would result in the deployment of an initial NMD system by 2003. To meet this challenging schedule, and to mitigate risks, we have taken numerous steps to leverage previous NMD technology development. We are constantly evaluating our performance in mitigating risk to achieve the strategy and meet the program objectives. If, in 2000, the threat assessment does not warrant a decision to deploy, improvements in the NMD system component technologies will continue, while the ability to deploy a system within three years of a decision is maintained. In order to give the program the appropriate level of acquisition emphasis and oversight, NMD was designated an Acquisition Category (ACAT) 1D

program and the Joint Program Office (JPO) under BMDO was formed to manage the program.

NMD "Tool Box." The NMD system is being developed with a flexible architecture to allow for a variety of deployment options in order to respond to unknown and emerging threats and provide an evolutionary path to a more robust system. The elements of this system include battle management/command, control and communication; the Ground-Based Interceptor; and X-band and upgraded early warning radars. The architecture also uses space-based sensors such as the Defense Support Program (DSP) and Space-based Infrared System (SBIRS). Since the architecture is very flexible, we refer to the collection of potential NMD system elements as the "NMD Tool Box." Literally, as we approach the 2000 deployment decision and assess the threat to the United States, we will be in a position to determine which NMD system element "tools" we will need to address the threat. If the threat does not warrant deployment at that time, we will continue to develop and refine both the individual system element "tools" and strengthen the overall NMD architecture.

During the past year, the NMD program has conducted two very successful flight tests that demonstrated sensor performance for the two competing contractor exoatmospheric kill vehicle (EKV) designs. EKVs are a major subcomponent of the GBI - indeed it is the "front end" of the interceptor that "sees" the target and destroys it by colliding with it at an incredibly high velocity. The first successful sensor flight test took place on June 23, 1997, using an EKV sensor built by Boeing North American. The second flight test, flying a Raytheon-designed EKV, took place on January 16, 1998. The purpose of each test was to analyze the ability of an EKV sensor to identify and track objects in space, including a representative threat target and decoys to provide risk reduction for future intercept flight tests, and to conduct an integrated system test of other NMD elements and surrogate systems. Data gathered during the tests indicate that both EKV sensors performed extremely well. The EKV sensor payload includes an optical seeker, a data processing system and a telemetry unit. The seeker and data processor are literally the "eyes" and "brain" of the EKV, enabling it to intercept an attacking intercontinental ballistic missile (ICBM). Neither of these flight tests attempted an intercept.

In addition to these two important flight tests, the NMD team participated in three NMD risk reduction flight tests, in May, June and November 1997, to evaluate the BMC3 software and NMD system communications and cueing of ground-based sensors. Finally, the NMD program completed construction of the ground-based radar prototype facility at the Kwajalein Missile Range. The GBR will be used in upcoming flight tests and will play a vital role in next year's integrated system test.

The next flight test for the NMD program will also be the first intercept test under the "3 plus 3" program. During this test, we will fly one of our competing EKV designs against an ICBM target. The interceptor and kill vehicle will be launched from the Kwajalein Atoll in the central Pacific Ocean and will attempt to intercept and destroy a "dummy" warhead deployed from a Minuteman ICBM launched out of Vandenberg AFB, California. A second intercept attempt, using the other competing EKV design, will follow and provide the data necessary to downselect to one EKV design. These represent important milestones on the path to the integrated system test in 1999 that will demonstrate overall system capabilities against threat-representative targets.

In the very near future, BMDO and the JPO will announce the award of the Lead Systems Integration (LSI) contract. Two industry teams are competing for this contract: the Boeing Company and the United Missile Defense Company, a joint venture between Lockheed Martin, Raytheon and TRW. The LSI contractor's main task will be to complete element development and integrate the elements into a system in time to provide the Department a viable deployment option in the year 2000. We have received two excellent proposals and will continue to evaluate them in the coming weeks.

Ballistic Missile Defense Testing. Flight testing represents a particular challenge for advanced programs like ballistic missile defense hit-to-kill interceptors, especially when the test events are limited in number and compressed in time. As an integrated part of any military acquisition program, test and evaluation activities will be most successful if we can conduct them according to some important principles:

- Event driven rather than schedule driven test events to have the opportunity to apply test outcomes deliberately within the systems engineering process.
- Stable funding at levels to permit adequate testing.
- A disciplined engineering approach extending throughout the system development activity, to include its test and evaluation.
- Modeling and simulation including full program life-cycle modeling and simulation. Ground testing using hardware-in-the -loop and software-in-the-loop test capabilities gives vital preflight information, especially when conducted in realistic environments.
- Flight testing at a level that allows verification of system performance and also to acquire the extensive data needed for successive phases of engineering and development - and the latter signifies substantial amounts of instrumentation.
- Finally, because success can never be assured, spare resources - targets, interceptors and range instrumentation support - are needed to conduct a testing program consistent with these principles.

Despite the valuable information that flight testing produces, even in the absence of a successful intercept, we all recognize that the investment we make in a flight test, the publicity attendant to it, and the limited time and resources for accomplishing the performance verification of our interceptors, place a high premium of achieving successful flight test outcomes.

In conjunction with the OSD testing organizations, I recently initiated an independent Task Force on Reducing Risk in BMD Flight Test Programs out of shared recognition of the challenge that flight testing represents. The report of that task force highlights a number of important aspects of our overall BMD test and evaluation program.

The task force noted that there have been deviations from that philosophy in the past and our programs have been making adjustments over recent months to use our test and evaluation infrastructure more effectively. The task force found that PATRIOT's test and engineering approach was deliberate and is following a supportable schedule with adequate resources; and the PATRIOT program manager is staying the course.

National Missile Defense has applied its additional funding, as intended, to increase the number of flight tests as well as supporting ground tests. The program

manager has provided resources for both his targets program and engineering program to provide spare targets and system hardware.

The task force's insights have generated a set of recommendations that I have shared with our PEOs and PMs, and I will be evaluating with them alternatives for how we might implement the recommendations for the benefit of all of our programs. The task force's tasking was to identify any additional ways in which we could bring best technology and practices to bear effectively on our T&E programs for hit-to-kill interceptors. Its recommendations point to engineering disciplines and management practices at the PM level and at my level. There may be value in taking its recommendations as the basis for a follow-on review team to report more specifically on the technical attributes that our test managers and infrastructure managers must plan for in their future test activities.

Our existing and planned T&E and M&S facilities are complete and well-suited to meet the needs or our programs as they develop hardware from flight testing. The task force has reported persuasively that we need to keep greater discipline in using those capabilities as intended. BMDO recognizes its important role, not only in bringing best technology and practices to bear, but in helping our programs apply them in consistent ways to help solve the engineering challenges of building hit-to-kill interceptors.

(Chart [1] BMD Test Philosophy)

Threat and Countermeasures Program. Fiscal Year 1999 marks the first time that our Threat and Countermeasures program is treated as a separate program element of our requested budget. I directed that we do this in response to recommendations by Congress that this important area of our program gain greater oversight visibility. In addition, it is a prudent step because it simplifies our internal budgeting practices and allows us to make program and budget decisions in a more coherent fashion. The Fiscal Year 1999 request for this program element is $22 million, or roughly .6 percent of our budget.

BMDO's Threat and Countermeasure program provides a wide spectrum of 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 countermeasure information central to the planning and execution of those programs. In addition, it supports our Advanced Technology program by providing information on future threats and the timelines associated with their emergence. Our effort draws 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 closely to the performance parameters of BMDO's defense systems, exploring possible vulnerabilities as they might 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 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.

Advanced Technology Programs. For many years the primary focus of the Nation's missile defense program was the research and development of fundamental technologies. Under the Strategic Defense Initiative (SDI) program, the focus was largely directed toward the development and demonstration of technologies useful in building a missile defense system capable of defending the United States against missile attack. Therefore, the budget dedicated to technology development was significant. The dividends from those investments are substantial, for as the program focus shifted to the development and fielding of actual defenses for the theater and Nation, we were ready to "cash in" on those technologies we had developed.

However, with the increased emphasis on fielding TAMD systems and developing an NMD system for deployment, one critical effect has been the limited resources available for continued technology development. Today, our technology budget accounts for only 7 percent of the overall BMDO budget request. Continued technology investment is absolutely necessary because it represents not only our seed corn for future missile defense systems, but it also helps us address near-term technology needs that our MDAPs may experience. The chart on the following page illustrates the declining investment in technology programs.

Today's technology program, therefore is a leaner one. However, reduced resources present us both a challenge and opportunity. Reduced resources drive us to the challenge of ensuring all our technology efforts are directly relevant to the mission of missile defense - to make every dollar spent on technology truly matter. With this in mind, I have instituted two major efforts that demonstrate we are rising to the challenge and seek greater cooperation with the Services in this critical area.

(Chart - BMDO Historical Funding)

Joint Technology Board. The first effort is the Joint Technology Board (JTB) which will examine areas where BMDO and the Services can better coordinate technology efforts, share resources and leverage off one another to develop an integrated technology program. The JTB includes members of my staff and representatives from the Service technology communities. The JTB advises me on the advanced technology program, ensures the Services have better insight into the BMD technology program, and provides an avenue for BMDO to work with the Services to understand both their technology requirements and investments. The JTB works within our existing BMDO "board structure." Hence, by being fully integrated into our core processes, the JTB represents a critical management response to the challenge of leaner technology resources. Indeed, we have come to the point in time where we must think smarter and not simply rely on increased resources to meet the missile defense challenge. This initiative ties directly into the second one, the establishment of a Missile Defense Technology Master Plan.

Missile Defense Technology Master Plan. In a few moments, I will address some of the initiatives I have instituted at BMDO to strengthen our management and execution of the program. One of those is the development of an organizational strategic plan, which includes the "mission essential task" to plan and execute a coherent missile defense advanced technology program that reduces program risk, improves system performance and affordability, and keeps pace with the threat. The Technology Master Plan is the guiding document that will help us implement this mission essential task. The plan represents a fundamental shift in the way we do business in the BMDO advanced technology program. It represents a development and maturation program consistent with the requirement of maintaining and

enhancing U.S. technical superiority in missile defense technologies. The Technology Master Plan will address the issue of transitioning technology investments into the MDAPs using a more structured and routine planning process. Specifically, the process will:

- Create a greater understanding of the evolving threat and mission essential/enabling capabilities;
- Identify and define which technologies should be pursued to keep pace with the threat, reduce MDAP costs, and mitigate MDAP risk;
- Identify the timelines along which technology development should be undertaken;
- Align existing technology programs and development of new programs to meet the needs and foster innovative technologies for potential BMD applications; and
- Determine the level and timing of required financial resources.

The approach I have directed follows a path from understanding the BMD architectures to identification of missile defense drivers to meet military needs. From there we identify technology needs, along with solutions which satisfy those needs and produces an investment strategy. The Technology Master Plan is designed to have a major influence on the development and execution of the BMDO advanced technology program, as well as the BMDO budget process. Therefore, the process is closely coupled and synchronized with the overall BMDO and Office of the Secretary of Defense financial planning, programming and budgeting process - the PPBS.

The Technology Master Plan process begins each year in January with an annual review of both the evolving threat and the performance of the MDAP systems under development. Working with the user representatives, MDAP Program Managers, and others in the missile defense community, my Chief Engineer will identify needs for technology focus to counter evolving threats by existing or new systems/architectures, reduce MDAP costs and mitigate MDAP risks. These technology needs are then prioritized and approved by my System Architecture and Engineering Board. The technology needs are then used as input by my Deputy for Technical Operations, who in turn formulates and designs the advanced technology program.

To achieve these objectives, we will use an approach similar to Integrated Product Teams (IPT) - however, they will be called Technology Planning Teams (TPT). We have set up TPTs for specific technology areas, such as Interceptor and Surveillance Technology, and will soon set up a TPT for BM/C4I and others. Membership of the TPTs is both diverse and inclusive to provide a comprehensive, corporate approach. They will include Service representatives of the Program Executive Officers (PEOs), the MDAP program offices, the threat community, technology program managers and executing agents, BMDO, and the Defense Advanced Research Projects Agency (DARPA). The Joint Theater Air and Missile Defense Organization (JTAMDO) and organizations within OSD are also invited to participate.

Throughout the technology planning process, periodic reviews are provided by senior leadership from BMDO and the Services. The Joint Technology Board, System Architecture and Engineering Board (SAEB) and Planning and Resources Board (PRB) will review the results of the TPTs during the course of the planning year. This rigorous review cycle ensures that the Technology Master Plan addresses the

challenges of emerging threats; provides a means to address technical issues as they arise in the acquisition process and executes technology programs to provide for block upgrades or pre-programmed product improvements for BMD systems. Finally, the missile defense technology investment strategy that results from the Technology Master Plan has the single, important goal of providing maximum effectiveness for each defense dollar spent. My bottom line is that the Technology Planning Process ensures a strong, effective and stable technology program which is responsive to the needs of BMDO, the Services and our Nation.

Advanced Technology Programs. While we just started the Technology Master Planning process during this past year, we obviously have a legacy of technology developments which have laid the foundation for today's missile defense systems. The focus of our technology program has been, and will now be in a stronger sense, focused on developing those components and systems that may be required in the future. Currently, the largest efforts we have underway are two specific programs: the Space-based Laser (SBL), a high-payoff next-generation concept for a missile defense weapons, and the Atmospheric Interceptor Technology (AIT) program, a technology integration program to exploit advances in kill vehicle technology to counter more complex threats. Together, these two programs represent roughly 33 percent of the advanced technology program budget in Fiscal Year 1999.

Space-based Laser. The SBL program is a high-payoff, next generation concept for a missile defense system. The SBL system, if developed and deployed, could provide highly effective boost-phase intercept of both longer-range theater-class and strategic ballistic missiles. Working with ground-based defenses, the SBL's boost-phase intercepts would "thin out" missile attacks and reduce the burden on ground- or sea-based mid-course or terminal phase defenses.

Last year BMDO and the Air Force signed a Memorandum of Understanding, designating the Air Force as the new executing agent for the program. While the SBL remains an important BMDO technology program and will continue to be funded in the BMDO budget, the Air Force will be responsible for executing the program. As the Director of BMDO, and the Acquisition Executive for BMD programs, I will retain the role of program oversight and will be responsible for centrally planning and budgeting for SBL. In addition, I will be responsible for making overall system architecture trades for SBL as we integrate it both as a technology development program and as a potential weapon system in the future.

In response to Congressional interest in accelerating the development of the SBL technologies through a readiness demonstration program, both BMDO and the Air Force sought to increase program resources through the Department's POM process. Other Defense program funding needs superseded this BMD funding issue. Together, BMDO and the Air Force internally realigned approximately $65 million for SBL in Fiscal Year 1999, with a combined budget request of about $94 million. BMDO provided added approximately $30 million to its previously planned budget and the Air Force added $35 million. Funding at this level allows the program to progress at the level of maturing SBL technology and components, but precludes the integration of those components and launching an SBL readiness demonstrator in the foreseeable future. BMDO and the Air Force are currently reviewing the feasibility of alternatives to such a launch by the year 2005. The Air Force recently concluded that a more realistic approach may be to plan a space-based experiment for 2008. The Air Force has awarded two Concept Definition Study contracts with industry hardware teams to examine all the development options and lay out schedules which

bracket a number of potential launch dates for a space-based experiment. Once these studies are reviewed, the Air Force and BMDO will make a concept decision. This approach allows us to reduce development risk and test a configuration that would be more readily scaleable to an operational system.

In parallel to the Air Force concept definition studies, BMDO is working to identify a suitable location for a facility to develop, integrate and test the SBL system. The current test facility in San Juan Capistrano, California has been deemed inadequate to fully integrate and ground-test a readiness demonstrator and prepare it for space-launch. Site selection is expected to be completed by late Fall 1998. Four potential sites have been visited by a site selection team. They are Cape Canaveral Air Force Station and Kennedy Space Center, Florida; Stennis Space Center, Mississippi; and the Redstone Arsenal in Huntsville, Alabama. I will keep the Committee fully informed as this process proceeds.

Atmospheric Interceptor Technology. The other major technology endeavor is AIT. It is a technology integration effort which will exploit advances in hypervelocity hit-to-kill vehicle technology to counter more complex and evolving threats. I do not view the AIT program as the development of a new system per se, but rather a technology testbed. In this approach, we use the AIT program to develop component technologies which could be applied to current acquisition programs as part of a pre-programmed product improvement program. The AIT program is designed to provide:

- new capabilities with reduced costs and risks compared to current interceptor weapons systems, and enhancements to other interceptors under development;
- reduction of technical risks and costs in support of current acquisition programs through direct technology insertions; and
- technical solutions to provide theater missile defense interceptor capabilities for contingencies and against advanced threats not currently addressed by the TMD system programs.

I have specifically directed that AIT be planned and conducted with BMDO, Navy, Army and Air Force cooperation to make maximum use of existing Service infrastructures and to ensure that AIT is responsive to the needs of our current TMD acquisition programs. As part of this process, the Army and Navy in particular have provided information about their requirements in order to ensure AIT meets the needs of its primary end users.

BMD Management Initiatives. During the past year, my staff and I have embarked on a critical process of developing and strengthening our management tools. Specifically, we have begun our strategic planning process, refined and strengthened our corporate board processes, commenced a second round of our internal management reviews, initiated cost control and Cost as an Independent Variable (CAIV) measures and begun work on our performance-based contract. These measures will help us focus our efforts, ensure our resources are appropriately allocated to developing and fielding missile defense systems, and organize our efforts toward achieving those important results.

Strategic Planning. As I mentioned at the beginning of my testimony, BMDO does not manage a particular weapon system, nor even a class of weapons. We manage the development and acquisition of an entire mission area - one which cuts

across all the Services. No one else in the Department does this to the scale that BMDO does. Therefore, in line with our chartered responsibilities, **BMDO's vision** is to be ***the Department's premier joint mission area acquisition agency, ensuring the deployment of interoperable missile defenses to the warfighter.*** Our strategic plan is our roadmap to achieve new levels of missile defense effectiveness, interoperability, and affordability for the 21st century. Our plan embodies the relevant elements in Joint Vision 2010, the Office of the Secretary of Defense planning and acquisition guidance, the Quadrennial Defense Review, and the National Defense Panel. The Strategic Plan focuses our efforts toward the successful development, deployment, and follow-on initiatives for both NMD and TAMD.

Within the Department of Defense, BMDO is responsible for managing, directing, and executing the acquisition of ***joint missile defense*** systems. This is our mission and reason why a centrally-organized BMD agency exists. In order to achieve this mission, we have identified a series of mission essential tasks, with each task incorporating key performance goals that deliver greater service, foster partnerships, and drive our own internal reinvention. To this end, BMDO strives to develop the systems which will defend our Nation, our deployed forces, friends and allies. In so doing, we seek to become the premier agency for achieving the National Performance Review Reinvention Impact Center's acquisition goals by the year 2000.

The Mission Essential Tasks that we are dedicated to executing are:

- Serve as the Nation's source of technical expertise for all matters relating to ballistic missile defense;
- Establish and implement joint systems engineering processes that provide the technical foundation for BMD planning and execution;
- Develop and enable the deployment of a cost effective, affordable, and interoperable Theater Air and Missile Defense (TAMD) to meet the missile threat to deployed U.S. forces, friends, and allies;
- Develop options to deploy a National Missile Defense (NMD) for the United States, should a deployment decision be required;
- Plan and execute a coherent missile defense advanced technology program to reduce program risk, improve systems performance and affordability, and keep pace with the threat;
- Lead the international dialogue and cooperation for missile defense activities;
- Articulate and advocate the joint mission area of missile defense;
- Support our people by developing and implementing human resource strategies that enable and enhance the achievement of our vision and mission; and
- Plan and execute a program budgeting system process and other key business processes that enable and support the accomplishment of our mission essential tasks.

These tasks are goals upon which our performance will be measured. They also simultaneously serve as a planning tool and our basis for benchmarking. Each one of these mission essential tasks include a full implementation plan, with measurable activities and outcomes. My intention in embarking on this process is to: first, to comply with the Department's Defense Reform Initiatives; and, just as importantly, add rigor into every one of our efforts to ensure that we are appropriately focused toward achieving results.

Even before we began our strategic planning process in earnest, my senior staff and I redesigned our corporate board processes. The two most central are our Systems Architecture and Engineering Board - which reviews critical systems-level and architecture-level issues and makes fundamental system or architectural decisions - and our Planning and Resources Board - BMDO's senior executive corporate body - which reviews and directs all missile defense plans, programs, budget actions and policies. During the past year, we have made major strides in streamlining these processes, ensuring the inclusion of Service program stakeholders, and focusing our efforts toward more timely decisions. In addition, my Deputy, Rear Admiral Richard West, has been spearheading our Management Review Team effort to review our organization, staffing and use of support service contractors. The purpose is to assess how we are organized and staffed to perform our mission - with the purpose of buttressing those areas that need additional focus and resources while reducing those areas that no longer require the support they traditionally have enjoyed. I expect that this process will conclude later this Summer, with organizational adjustments occurring in the new fiscal year.

Cost as an Independent Variable (CAIV). In order to control missile defense program cost growth, I am in the process of instituting very specific processes and procedures for all our acquisition programs to follow. Cost as an Independent Variable (CAIV) features aggressive, realistic cost goals that the Program Manager and the contractor team work together to meet or exceed. Given the costs of developing and fielding missile defense systems, and the overall constrained Defense budget, we must effectively utilize these tools to contain or reduce program life-cycle costs.

While the NMD Program CAIV process is under the purview of a single program manager who is managing a single acquisition program, the CAIV process for theater missile defense programs is complex because we are involved in a ***joint mission area,*** as opposed to a single acquisition program. While an individual TAMD system Program Manager has the primary responsibility to formulate CAIV metrics tailored to his specific program and will use those metrics to manage progress toward cost objectives, BMDO must be concerned with the overall architectural impacts. For example, the design of an interceptor in one TMD system may impact the design or performance of a fire control sensor and the battle management/command, control and communications. Therefore, these "cross system" interfaces must be carefully coordinated to achieve the full system requirements. Hence, BMDO has the responsibility for overseeing the implementation of TAMD CAIV, whereas the individual Program Manager bears the primary responsibility for the development and management of TAMD CAIV objectives for his program. Implementation of this important process involves the necessary procedures to state requirements in terms of needed military capability at the architecture level without offering specific system designs. Architecture cost objectives may be established through analysis of architecture-level development and performance issues which drive element costs. Therefore, CAIV at the TAMD architecture-level will allow the process to "trade-off" requirements, design parameters, and features versus cost of individual elements, while producing a missile defense system that fully provides the needed military capability. I consider our cost control measures to be an extremely important element of our overarching effort to develop and field highly effective and *affordable* missile defense systems.

Performance-based Contract. Finally, we are beginning to develop our performance-based contract. As the Committee is aware, the Deputy Secretary of

Defense will chair the Department's Defense Management Council. All defense agencies and OSD staff offices will be required by the end of the fiscal year to prepare, negotiate and sign a performance contract with the Defense Management Council. This contract will be directly linked to the BMDO strategic plan. If the strategic plan is our roadmap, then the contract will be the guideposts that measure our progress.

I view these management initiatives as absolutely critical efforts that will ensure we remain focused on our goals and deliver for the public, the Congress and our warfighters the very best systems and technologies we can in an affordable manner. My staff and I are committed to accomplishing these important mission essential tasks - in spirit, in results, and in the stewardship of our vital defense resources.

Closing. Mr. Chairman, in closing I appreciate the opportunity to appear before the Committee and share my perspective on the BMD program and budget. This is indeed an ambitious year in the world of missile defense. We will attempt more flight tests and intercept tests this year than any previous year. As we have already seen, some of those tests have experienced delays. However, I encourage the Committee to not equate delay with failure. These are very complex weapons systems. They operate at extreme conditions of speed, atmospheric pressures, and short times of flight. The closing velocities of the target and the interceptor are absolutely incredible. And we are attempting to create a TAMD "family of systems" that are interoperable with other Service systems. Indeed, we are attempting things that are not frequently accomplished elsewhere in the Department. While I will admit that I do not want to see any further delays in the PAC-3, Navy Area, THAAD or Navy Theater Wide programs, I am encouraged that these most recent test delays are the result of strong quality control checks and procedures. Frankly, I would rather see a flight test delayed because an astute engineer or technician questions the reliability of a component during a pre-flight review, than see a flight take place and fail because of faulty quality control processes. The importance and expense of these flight tests are too high to risk failure in the name of haste. We must obviously balance the need to demonstrate and field these systems as quickly as possible with the responsibility to ensure they are fully effective. I am confident that both PAC-3 and THAAD will experience a successful series of flight tests beginning in the very near future.

Mr. Chairman, I am delighted to report that the NMD program is progressing on schedule. Brigadier General Cosumano and his team are literally working six and seven days per week to conduct the planned test program and to execute all the critical acquisition process requirements for this program. I think they should be commended for their drive and perseverance to ensure the Nation is in a position to make a deployment decision in 2000, if required by the threat. In spite of the fact that the NMD program has an extremely aggressive schedule and is technically challenging, I am confident that once the third critical element of the NMD strategy - the LSI contractor - is in place, General Cosumano and his team will continue to make unprecedented progress in the 3 plus 3 program.

Mr. Chairman, I encourage the Committee to support our efforts to bring strength and coherence to our advanced technology program. Our Technology Master Plan represents a critical roadmap to the future for this portion of the missile defense program. While we started the technology planning process out of sequence, we recognized its importance and have been working the monumental task of a yearlong process in roughly six months. Again, the dedication of the BMDO and Service

Executing Agent staffs has been remarkable. The level of teamwork and jointness across BMDO and the Services in this critical area has been tremendous. I ask that the Committee have patience as we continue to build the correct technology roadmap and identify critical technology needs. Ultimately, I ask that the Congress help us instill both coherence and relevance into the investment plan for our missile defense future. With the Technology Planning Process we are trying to rigorously assess where we must invest. I feel this is an issue that requires strong leadership on the part of both the Administration and Congress - to ensure we provide adequate funds for our future. If we fail to invest today in a coherent and relevant manner, those component technologies and follow-on systems will not be there when we need them five, ten or fifteen years hence. We must maintain our technological superiority in the face of evolving and emerging threats across the spectrum - especially as weapons of mass destruction and missile technologies proliferate.

Finally, Mr. Chairman, after another year as Director, I must tell you how impressed I am with the combined Government-industry team that is working to develop and field highly effective missile defenses. This is true in every part of our program: TAMD, NMD, Technology and our Management team. Missile Defense is a very challenging field. In many ways, this team is charting new ground for the Department. This is frequently overlooked. BMDO is not responsible for a single weapon system or even a class of weapons. We are responsible for a new concept: ***joint mission area acquisition.*** As we have all seen, this requires incredible levels of support from the Services and the OSD staff to embrace the notion of jointness. In many ways, this requires a cultural change for the Services and Department - to look beyond a single Service solution - because in future conflicts our military will be called upon to fight jointly. Therefore, as we must develop and acquire our missile defense systems in the same joint manner. While our critics may focus on the differing interests of one Service over another, the most important message I want to convey to the Committee is that today, we are working together better than ever before to build into all our missile defense systems the capability to communicate and fight ***together.*** That is our mission and I am confident that we will succeed.

Thank you Mr. Chairman, I look forward to working closely with you and the Members of the Committee on this important program. Mr. Chairman, that concludes my statement. I look forward to answering the Committee's questions.