The Ballistic Missile Defense Program
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Director, Ballistic Missile Defense Organization
Amended Fiscal Year 2002 Budget

Good morning, Mr. Chairman, Members of the Committee. It is a pleasure to appear before you today to present the Department of Defense's Fiscal Year (FY) 2002 Ballistic Missile Defense program and budget.

The fundamental objective of the BMD program is to develop the capability to defend the forces and territories of the United States, its Allies, and friends against all classes of ballistic missile threats. The Department will develop technologies and deploy systems promising an effective, reliable, and affordable missile defense system. The RDT&E program is designed to develop effective systems over time by developing layered defenses that employ complementary sensors and weapons to engage threat targets in the boost, midcourse, and terminal phases of flight and to deploy that capability incrementally.

At the direction of the Secretary of Defense, we have developed a research, development and test program that focuses on missile defense as a single integrated BMD system, no longer differentiating between theater and national missile defense. This revised structure involves three basic thrusts. First, the new BMD program will build on the technical progress we have made to date by providing the funding required to develop and test selective elements of the current program fully.

Second, the new program will pursue a broad range of activities in order to aggressively evaluate and develop technologies for the integration of land, sea, air, or space-based platforms to counter ballistic missiles in all phases of their flight. The new program will not cut corners. Rather, it is designed to pursue parallel development paths to improve the likelihood of achieving an effective, layered missile defense.

Third, the new testing program will incorporate a larger number of tests than in the past. They will employ more realistic scenarios and countermeasures. This will allow us to achieve greater confidence in our planning and development. Through this robust testing activity, we may discover opportunities to accelerate elements of the program based on their performance, and increase the overall credibility and capability of BMD systems. This approach is designed to enable contingency use of the demonstrated BMD capabilities, if directed.

The goal of the BMD System is a layered defense that provides multiple engagement opportunities along the entire flight path of a ballistic missile. Over the next three to five years we will pursue parallel technical paths to reduce schedule and cost risk in the individual RDT&E efforts. We will explore and demonstrate kinetic and directed energy kill mechanisms for potential sea-, ground-, air-, and space-based operations to engage threat missiles in the boost, midcourse, and terminal phases of flight. In parallel, sensor suites and battle management and command and control (BMC2) will be developed to form the backbone of the BMD System.

But before I proceed to describe the new program in detail, I would like to make clear what this program does <u>not</u> do. It does not define a specific architecture. It does not commit to a procurement program for a full, layered defense. There is no commitment to specific dates for production and deployment other than for the lower tier terminal defense elements. It is not a rush to deploy untested systems; it is not a step back to an unfocused research program; and it is not a minor change to our previous program. Rather this program is a bold move to develop an effective, integrated layered defense that can be deployed as soon as possible against ballistic missiles of all ranges.

The new program is a major change in our approach to developing ballistic missile defense. The previous National Missile Defense program, for example, was a high risk production and deployment program dependent for its success on an RDT&E effort that was underfunded but charged with developing a system that would operate at the outset with near perfection; and it was based on rigid military requirements. The new program is built around a fully funded, rigorous RDT&E effort designed to demonstrate increasing capability over time through a robust, realistic testing program.

The objective of the new program is a layered defense to protect the United States, Allies, friends, and deployed forces against ballistic missiles of all ranges. We will pursue this objective in the following way. First, we are recommending a broad, flexible approach to RDT&E that allows us to explore multiple development paths and to reinforce success based on the best technological approaches and the most advantageous basing modes in order to hedge against the inherent uncertainty of the ballistic missile defense challenge. Second, we are recommending an acquisition approach that is evolutionary, one that will allow us to field systems incrementally once they are proven through realistic testing. And third, rather than committing to a single architecture as we have done in the past, we will deploy over time different combinations of sensors and weapons consistent with our national strategic objectives.

We have designed the program so that, in an emergency and if directed, we might quickly deploy test assets to defend against a rapidly emerging threat. This has been done before with other military capabilities, both in the Gulf War and in Kosovo. But barring such an emergency, as the Deputy Secretary has stated, we do not intend to deploy test assets until they are ready because such emergency deployments are disruptive, and can set back normal development programs by years.

LAYERED DEFENSE—EFFECTIVE AGAINST COUNTERMEASURES

The technical and operational challenges of intercepting ballistic missiles are unprecedented. While these challenges are significant, our testing accomplishments to date tell us that they are not insurmountable. Given the threats we expect to face, there is a premium on fielding a highly reliable and effective system. Reliability will be realized, in part, through redundancy in our system.Effectiveness is partly a function of the number of opportunities the system provides to intercept an in-flight missile and how early and how often those opportunities occur in the missile's flight. Because we need redundancy, we determined that whatever BMD systems we deploy, they should allow multiple engagement opportunities in the boost, midcourse, and terminal phases of a ballistic missile's flight.

The boost phase is that part of flight when the ballistic missile's rocket motors are ignited and propel the entire missile system towards space. It lasts roughly 3 to 5 minutes for a long-range missile and as little as 1 to 2 minutes for a short-range missile. When the missile boosters are spent, the missile continues its ascent into what we call the midcourse part of flight (which lasts nominally 20 minutes for a long-range missile). In this stage of flight, a ballistic missile releases its payload warhead(s), submunitions, and/or penetration aids it carried into space. The missile enters what we call the terminal phase when the missile or the elements of its payload, for example, its warheads, reenter the atmosphere. This is a very short phase, lasting from a few minutes to less than a minute.

There are opportunities and challenges to engage a threat missile in each of these phases. The layered defense, or defense-in-depth, approach will increase the chances that the missile and its payload will be destroyed.

Intercepting a missile in the boost phase, for example, results in the defense of any target that the missile might be aimed at and can destroy a missile regardless of its design range. A midcourse intercept capability provides wide coverage of a region or regions, while a terminal defense protects a localized area. Intercepting a missile near its launch point is always preferable to intercepting that same missile closer to its target. When we add shot opportunities in the midcourse and terminal phases of flight to boost phase opportunities, we increase significantly the probability that we will be successful.

Another advantage of the layered approach is that it complicates an adversary's plans. Countermeasures, for example, will always be a challenge for the defense. But because countermeasures have to be tailored to the specific phase of a missile's flight, layered defenses pose major challenges to an aggressor.

RDT&E ACTIVITIES

The FY 2002 Program speeds development of established technologies, enables robust testing and evaluation of systems that are more mature, and explores new missile defense concepts and technologies. I will address some of these activities in a moment. We plan to pursue multiple, parallel development paths to reduce the risk inherent in BMD engineering, with initiatives in each of the Boost, Midcourse, and Terminal Defense

Segments of the BMD system. As part of our risk reduction activity, we will explore different technologies and paths. We will also pursue technologies that may be useful across multiple Segments and employ multiple technologies to avoid single point failures in each Segment.

We do not want to be in a situation, for example, to discover a fundamental design problem in our only Exoatmospheric Kill Vehicle (EKV), or in our only sea-based booster under development. That would amount to a single point failure that could cost us years in developing effective missile defenses, not to mention leaving America and our allies unnecessarily exposed. We must be agile in our engineering approaches to keep the BMD program on track and affordable.

This robust RDT&E program aims to demonstrate what does and does not work. Those activities showing the greatest promise will receive greater resource emphasis. Our progress will inform an annual high-level decision-making process that will steer the BMD program in the most promising direction, taking into account optimal approaches and the most reliable information on costs, allowing informed research, production, and deployment decisions.

This RDT&E approach also will minimize possible disruptive effects that the introduction of new technologies, development challenges, or changes in the threat otherwise could have on the BMD program and allow us to keep pressing forward along the most promising paths. We will pursue enough paths so that the scaling back of one effort will not undermine progress in other areas and the technological advances we make even in failed efforts will be put to good use. This represents the best approach for pursuing promising capabilities that will allow us to get out in front and pace a dynamic ballistic missile threat.

The business of missile defense requires coping with a number of technological, developmental, acquisition, and threat uncertainties. For this reason, I cannot tell you today exactly what the system will look like 15, 10 or even 5 years from now. This system will take shape over time. We do not intend to lock ourselves into a highly stylized architecture based on either known technologies or hoped for advances in technology that will take a decade or more to complete. We intend to go beyond the conventional build-to-requirements acquisition process.

We have adopted a capability-based approach, which recognizes that changes will occur along two separate axes. On the one axis, the threat will evolve and change over time based on the emergence of new technologies, continued proliferation of missiles worldwide, and operational and technical adjustments by adversaries (including the introduction of countermeasures) to defeat our BMD system. On the other axis lie changes we will experience. These include improving technologies, incremental system enhancements, evolving views of system affordability, and out-year decisions expanding coverage, potentially including the territory and populations of our Allies and friends.

The BMD system will feature a uniform battle management and command and control network and leverage, where possible, other Department communication channels to integrate elements of the BMD system. Because the system must act within minutes or even seconds to counter ballistic missiles, the information we receive on threats must be accurately received, interpreted, and acted upon rapidly. The information network must be seamless and allow information to be passed quickly and reliably among all the elements of the system.

Mobility in our sensor and interceptor platforms and the capability to do boost phase and/or midcourse phase intercept must be central features in our architecture if we are to provide effective territorial protection at home and abroad. Placing sensors forward, or closer to the target missile launch point, either on land, at sea, in the air, or in space, will expand the battle space, improve discrimination of the target complex, and increase engagement opportunities. We will develop complementary elements in different combinations in order to afford the system a high degree of synergism and effectiveness.

Specific system choices and timelines will take shape over the next few years through our capability-based, block approach. We will increase our capability over time through an evolutionary process as our technologies mature and are proven through testing. The block approach allows us to put our best, most capable technologies "in play" sooner than would otherwise be possible. We have organized the program with the aim of developing militarily useful capabilities in biannual blocks, starting as early as the 2004-2006 timeframe. These block capabilities could be deployed on an interim basis to meet an emergent threat, as an upgrade to an already deployed system, or to discourage a potential adversary from improving its ballistic missile capabilities.

Consequently, the CINCs and military Services will be involved throughout the development process so that with each block we move steadily forward towards systems with ever increasing military utility that complement other operational capabilities and that minimize life cycle cost.

TESTING

We have restructured the BMD program to facilitate success through rigorous, robust, and realistic testing. To ensure rigor our BMD testing philosophy recognizes that we must have an integrated, phased test program that comprehensively covers all aspects of testing; and our budget submission reflects our investment in the requisite test infrastructure to support this. To enable more robust testing we will invest in additional test articles and targets. The test bed we propose constructing will enhance our ability to test the full range of missile defense capabilities in realistic configurations and scenarios. Let me describe our approach to testing and discuss broadly what we are undertaking in FY 2002.

Our BMD developmental testing entails conceptual prototype development, assesses the attainment of technical performance parameters, generates data on risk, supports risk mitigation, and provides empirical data to validate models and simulations. Testing of systems, subsystems, and components, especially early in the developmental cycle, helps us to achieve two fundamental objectives: 1) determine performance capabilities, and 2) identify potential design problems to support timely changes. Later testing will demonstrate the broad range of effectiveness and suitability of missile defenses in increasingly realistic environments.

Our test philosophy is to add, step-by-step over time, complexity such as countermeasures and operations in increasingly stressful environments. This approach allows us to make timely assessments of the most critical design risk areas. It is a walk-before-you-run, learn-as-you-go development approach. These testing activities provide critical information that reduces developmental risk and improves our confidence that a capability under development is progressing as intended.

Given the number of technical challenges shared among the many elements of the BMD system, we will conduct a number of program-wide tests, experiments, and measurement projects each year to achieve our program-wide objectives. System interoperability and critical measurements flight tests and ground experiments will be conducted to support development of BMD system operating concepts, reduce development risks, and assess BMD system integration and interoperability. Program-wide collection and measurement needs will be met by phenomenology measurements, countermeasure characterizations, and analysis of lethality, kill assessment, and discrimination. International cooperative test and evaluation activities could become an important part of our program.

Each test range currently in use is equipped with precision instrumentation sensors (radar and optical), telemetry capabilities, and flight and range safety systems. Additionally, BMDO deploys mobile airborne sensors. Core supporting ranges include both short- and long-range test facilities with multiple launch sites, primarily in New Mexico and over the Pacific Ocean. These collection capabilities are a critical part of our program. In FY 2002, we will be engaged in a number of activities to develop and upgrade the test range infrastructure we require.

The new program will feature range improvements for boost segment and system level testing, and will allow us to increase the tempo of our testing operations. Existing ground facilities will be upgraded for testing of Boost Segment elements, advanced sensors, counter-countermeasures, and nuclear weapons effects. Airborne instrumentation platforms will be upgraded, and modeling and simulation software having system-level and program-wide application will be developed.

Ground test facility development and enhancement will help us to improve sensor testing, strengthen our end-to-end test capability, and undertake tests using scenarios we cannot duplicate in our flight-testing, such as nuclear weapons effects testing. Facilities for program-wide interoperability ground tests must be upgraded to be capable of both analyzing yesterday's flight test data and predicting tomorrow's expected system performance.

With our more robust test program we will increase the number of tests and add tests of different technologies and basing modes. To meet the challenges of missile defense development we must upgrade our capabilities to test with flexibility over greater distances. Test scenarios must accommodate multiple intercepts occurring nearly simultaneously at realistic intercept geometries. Upgrades will be required in our launch facilities, flight hardware, and range tracking and collection assets.

In FY 2002 we will develop an inventory of targets and initiate procurement of additional test hardware to support a more aggressive test program. We must have quicker reaction in our targets program in order to accommodate changes in threat knowledge and to incorporate countermeasures. The BMD program will fund development of new threat-credible ballistic missile targets and countermeasures for all defense segment development activities, risk reduction flights, and comprehensive target system support, to include direct target costs and launch operations.

Challenges we face in this area include development of new targets for boost segment testing, proper incorporation of countermeasures, and overcoming a dwindling supply of target hardware, particularly hardware incorporating countermeasures. The objective is to ensure an adequate supply of target boosters, reentry vehicles, and countermeasures to prevent major delays in development schedules resulting from a shortage of these major target components. We need to be able to test more and more often, and this requires that we have the test articles on hand and ready for use. Larger quantities of hardware also will help us overcome lengthy delays caused by, for example, a pre-launch problem with a target booster.

As I mentioned earlier, we will increase testing of alternative technologies, especially in the medium and high-risk areas of development. We must be hardware rich if we are to have a robust testing program and if we are to avoid single point failures in any of our development efforts.

Among the challenges that faced the previous NMD program was overcoming flight test restrictions on trajectories, impact areas, and debris in space in order to test overall system performance limits. The range we have been using between Vandenberg Air Force Base in California and Kwajalein Missile Range, while useful for developmental testing, lacks realism for tests of BMD interceptors and sensors.

The amended budget request contributes significantly to the development of a BMD Test Bed, which will be used initially to prove out the midcourse capabilities. That test bed will expand test boundaries and develop and enhance test infrastructure and will provide for more operationally realistic testing. Over time the test bed will expand to include weapons and sensor capabilities to improve all missile defense capabilities as they are made available.

The integrated test bed will be oriented in the Pacific region and extend many hundreds of miles from the Marshall Islands in the South Pacific to Alaska. It will allow more realistic flight-testing of capabilities in the Boost, Midcourse, and Terminal Defense Segments.

The new test bed would make use of early warning radars at Beale Air Force Base and Cobra Dane at Shemya Island, and use the Kodiak Launch Facility in Alaska to launch targets and interceptors. The test bed would continue our practice of integrating early warning cueing information from Defense Support Program satellites and leveraging a battle management system operated out of Colorado Springs, Colorado. The test bed also will include up to five ground-based silos at Fort Greely, Alaska. We anticipate a prototype ground support capability, to include launch facilities, sensors, and networked communications, will be developed in FY 2002 and built in FY 2003. We will initiate construction of an interceptor integration facility in FY 2002 to support a wide range of interceptor needs for testing.

This test bed will allow us to test more than one missile defense segment at a time and exploit multiple shot opportunities so that we can demonstrate the viability of the layered defense concept. The test bed will provide a realistic environment to test different missile defense capabilities under varying and stressing conditions. It will also help us prove out construction, transportation, and logistics concepts we will need to clarify as we execute deployment decisions.

If directed, the BMD test bed also could provide a basis for a contingency defensive capability if the security environment warrants.

BMD PROGRAM MANAGEMENT

We must deviate from the standard acquisition process and recognize the unprecedented technical challenges we are facing. We do not have major defense acquisition programs in the FY 2002 budget. We do not have program activities with traditional fixed milestones and clearly marked phases showing the road to production.

The new approach to BMD development features more streamlined, flexible management through comprehensive and iterative reviews. We will establish yearly decision points to determine the status of the available technologies and concept evaluations in order to be in a position to accelerate, modify, truncate, or terminate our efforts in a particular area. This comprehensive annual review process will also help us make decisions to shape the evolving systems and allocate resources to optimally support them. This decision process will allow for: 1) more complete understanding of current technologies and the evolving capabilities; 2) evaluation of innovative concepts; 3) development of competing technologies to reduce cost, schedule, and performance risks; and 4) better estimation of complete costs for making informed decisions concerning system capability, production, and deployment. We believe that full annual evaluations of our program activities and demonstrated technical achievements will build confidence for decision makers.

This program is designed to seek opportunities to provide the most effective and efficient missile defense by exploiting advances in technology as they emerge and by making timely decisions to direct individual development activities. We will make adjustments as we learn what we can and cannot do technically and as we make the tough calls on selecting among the promising technologies to create the best mix of missile defense capabilities across the threat missile flight envelope.

As missile defense capabilities mature, we envision transferring the individual elements to the Military Department for production and procurement as part of a standard acquisition program. This approach will ensure that the Military Department can operate these capabilities effectively and reliably.

PROGRAM ELEMENTS AND ACTIVITIES

To manage and account for program resources, BMDO plans a configuration of nine Program Elements (PE): BMD System; Terminal, Midcourse, and Boost Defense Segments; Sensors; Technology; Pentagon Reservation Maintenance Reserve Fund; Small Business Innovation Research; and Headquarters Management. This PE structure supports the revised BMD program goals by aligning activities and funding with the program's internal technical focus. It also provides the flexibility to mitigate, through internal adjustment, unforeseen consequences and risks in budget and schedule. The following table illustrates the PE structure.

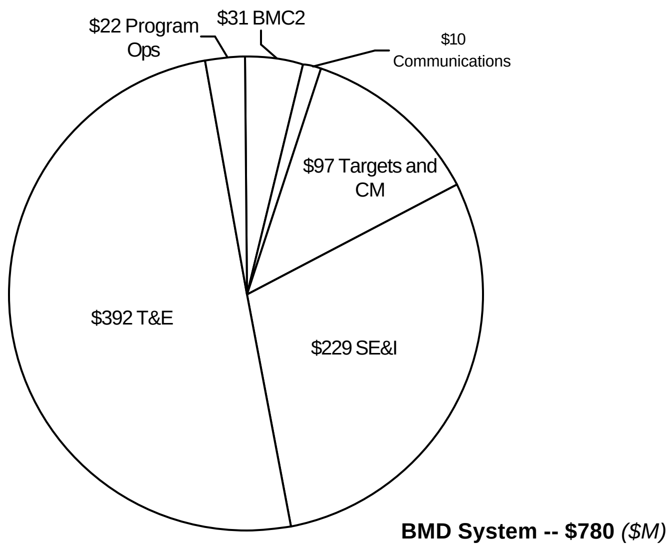
(TY $ In Millions)

Program Element Title	FY 02
BMD System	779.584
Terminal Defense Segment	988.180
Midcourse Defense Segment	3,940.534
Boost Defense Segment	685.363
Sensors	495.600
Technology	112.890
Pentagon Reservation Maintenance Reserve Fund	6.571
HQ Management	27.758
Small Business Innovative Research*	0.000
Total RDT&E	**7,036.480**
BMD System MILCON	7.549
Terminal Defense Segment MILCON	0.750
Total MILCON	**8.299**
Total Program	**7,044.779**

* Funds for this PE are allocated immediately following the annual appropriation; the amount is based on internal redistribution of RDT&E funding (2.65% of extramural RDT&E). Total program appropriation does not change.

Program Element Descriptions

BMD System



The BMD System Program Element allocates the resources required for the overarching conduct and integration of the multi-layered BMD System. The BMD System PE comprises five primary projects: Battle Management, Command and Control (BMC2); Communications; Targets and Countermeasures; System Engineering and Integration (SE&I); and Test and Evaluation (T&E). System-level activities involve integrating the Boost, Midcourse, Terminal, and Sensors segments into a single and congruous missile defense system; this PE also includes management efforts to preserve and promote architectural consistency, interoperability, and integration of PAC-3, MEADS, and Navy Area systems within the overarching BMD mission. Our amended request of $780 million for these activities represents an increase of $253 million over FY 2001 enacted funding, and $251 million over the initial FY 2002 budget submission.

Our evolutionary acquisition process will increase the BMD System capabilities over time in two year increments. Each BMD System block will comprise multiple weapon and sensor elements. The BMC2 and Communications project funding is for developing and integrating the command and control and communications for the BMD System. The BMC2 project includes the development and allocation of BMC2 specifications to ensure the weapons and sensor system products are fully interoperable with each other and with external systems, providing optimum flexibility to the war fighter. To this end, a ballistic missile defense integration center will be established at BMDO's Joint National Test Facility.

The Communications project consolidates and refines BMD system-wide communication systems to allow components to exchange data and to permit command and control orders to be transmitted to the weapons and sensor systems.

The Targets and Countermeasures project funding provides threat-credible ballistic missile targets, countermeasures, and target system support. This project will provide new target and countermeasure development, risk reduction flights, and target characterization.

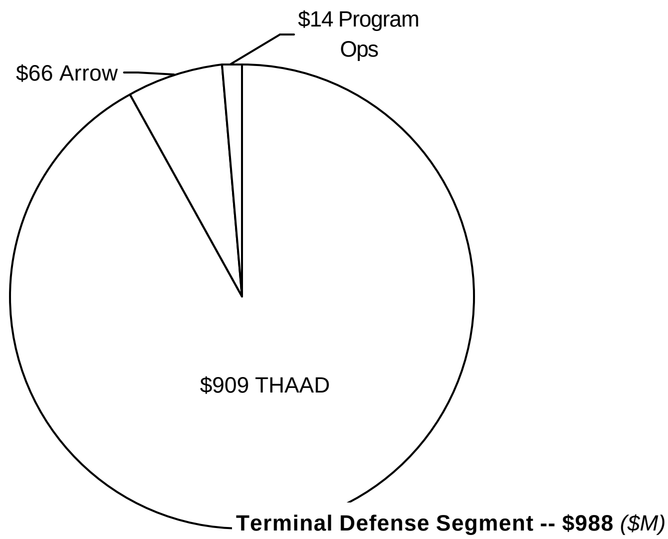
As the central engineering component within BMDO, the Systems Engineering and Integration (SE&I) project provides the overall system engineering development and integration of the BMD system. The SE&I mission is to define and manage the layered BMD system, providing the collaborative, layered, and detailed systems engineering and integration required across the entire spectrum of BMD warfighter capabilities.

Lastly, the Test & Evaluation project provides consolidated system-wide Test & Evaluation capabilities and resources required to allow for cohesive facilitation, management, and execution of test activities. Test & Evaluation efforts include the development, operation, maintenance, and modernization of the BMD program-wide Test & Evaluation infrastructure. The T&E program also addresses crosscutting issues related to BMD system lethality, discrimination, and other T&E derived mission critical functions. Finally, the T&E Program conducts system integration tests for the entire

BMD system and will validate performance of each block. Test & Evaluation activities are grouped in terms of Program Wide Test & Evaluation; Test Support of facilities, ranges, sensors, and test instrumentation; modeling and simulation; and facilities, siting, and environmental efforts.

Terminal Defense Segment

The Terminal Defense Segment (TDS) allocates resources to support development and selective upgrades of defensive capabilities that engage and negate ballistic missiles in the terminal phase of their trajectory. The primary projects under this PE are the Theater High Altitude Area Defense (THAAD) system and the Israeli Arrow Deployability Program (ADP). Related activities include the Israeli Test Bed (ITB), Arrow System Improvement Program (ASIP), and studies via the Israeli Systems Architecture and Integration (ISA&I) effort that assess the Arrow performance relative to both existing and emerging threats. Our amended request of $988 million represents an increase of $212 million over FY 2001 enacted funding, and an increase of $224 million over the initial FY 2002 budget submission. Note: The PAC-3, MEADS, and Navy Area programs are funded within their respective Service accounts.



The mission of the THAAD System is to defend against short- and medium-range ballistic missiles at significant distances from the intended target and at high altitudes. THAAD will protect U.S. and allied armed forces, broadly dispersed assets, and population centers against missile attacks. This evolutionary program is structured to demonstrate capability in Block 2004, with planned improvements based on upgraded seekers, ground support equipment, and discrimination software. Current efforts are addressing component and system performance, producibility, and supportability. A robust ground-testing program will precede flight testing, currently planned for FY 2004. The budget adds resources to accelerate acquisition of a THAAD radar and to buy more test missiles in order to capitalize on early flight test successes should our disciplined development program prove effective. The Arrow Weapon System (AWS) (developed jointly by the U.S. and Israel) provides Israel a capability to defend against short- and medium-range ballistic missiles and helps ensure U.S. freedom of action in future contingencies. Arrow also provides protection against ballistic missile attacks for U.S. forces deployed in the region. The successful Arrow intercept test on September 14, 2000, resulted in Israel declaring the system operational in October 2000. The Arrow Deployability Program (ADP) also supports Israel's acquisition of a third Arrow battery and Arrow's interoperability with U.S. TMD systems. Interoperability will be achieved via a common communication architecture utilizing the Link-16. An interoperability test was completed in January 2001 using the Theater Missile Defense System Exerciser (TMDSE) that validated that the Arrow Weapon System is interoperable and can exchange surveillance and missile track cueing data with U.S. PATRIOT and Aegis missile defense systems. The Arrow System Improvement Program (ASIP) will include both technical cooperation to improve the performance of the AWS and a cooperative test and evaluation program to validate the improved AWS performance. We added $20 million in our amended budget specifically for additional flight testing and development of additional production capacity for the Arrow missile.

Equally important to the integrated BMD System are the lower tier programs that are being transferred to the Military Departments. We have had significant success with the PAC-3, and interceptor missiles will be delivered to training battalions this year. PAC-3 system will provide critical operational capability to defend our forward-deployed forces, allies, and friends. The system is designed to counter enemy defense suppression tactics that may include tactical ballistic missiles, anti-radiation missiles, and aircraft employing advanced countermeasures and low radar cross-section. The PAC-3 technology has a proven record of hit-to-kill success. We are now 7-for-8 in body-to-body intercepts against ballistic missile targets. PAC-3 missile technology also accomplished 4-for-4 body-to-body intercepts against cruise missiles and air-breathing threats. Recent successes included multiple simultaneous engagements of both short-range ballistic missiles and cruise missiles using PAC-2 and PAC-3 interceptors.

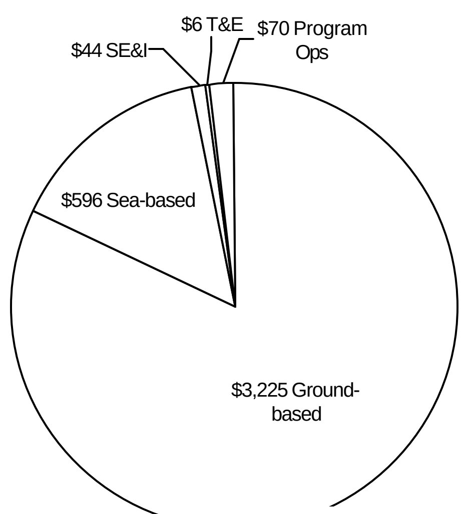
Although the Navy Area Program has experienced technical, cost and schedule challenges we are now at a point where we can execute a rigorous set of flight tests and likely achieve a capability in the middle of this decade. A Fly-By test is anticipated for early 2002, to be followed by a series of intercept flight-tests. At-sea testing is expected to begin in late 2002/ early 2003. Navy Area has been positioned to undertake initial at-sea tests using, Aegis "LINEBACKER" ships.

With the German Parliament funding recently made available to continue the trilateral MEADS activity, that program is about to embark on a three-year Risk Reduction Effort. MEADS will use the PAC-3, which has already begun production, as its interceptor. Once deployed, MEADS will improve tactical mobility and strategic deployability over comparable missile systems and provide robust, 360-degree protection for maneuvering forces and other critical forward-deployed assets against short- and medium-range missiles.

These systems have been in development for many years and PATRIOT and Navy Area are approaching procurement and deployment decisions. For this reason, and in compliance with our program philosophy to have BMDO do RDT&E and the Military Departments do procurement, and to support the Military Departments' air defense mission, the Department is transferring to the respective Services the responsibility for execution and management of PAC-3, Navy Area, and MEADS

Midcourse Defense Segment

The Midcourse Defense Segment (MDS) develops increasingly robust capabilities for countering ballistic missiles in the midcourse stage of flight. The MDS will develop and test multiple technologies to provide credible capabilities against this threat to operate in this segment of flight. The MDS program of work is



Midcourse Defense Segment -- $3,941 *($M)* divided into multiple elements including Ground-based Midcourse Systems, and Sea-Based Midcourse Systems, the successors to the National Missile Defense and Navy Theater Wide programs, segment Systems Engineering and Integration, and segment Test and Evaluation. Our amended request of $3,941 million represents an increase of $1,455 million over FY01 enacted funds, and an increase of $1,237 million over the FY02 initial budget submission.

Under the previous BMD program, we had under development only one system that could provide a midcourse intercept capability for defeating ICBMs. We made significant progress in the National Missile Defense (NMD) program and brought system development to the point where an Independent Review Team led by retired Air Force General Larry Welch concluded that, despite some challenges, the technical capability was in hand to develop and field the limited system to meet the projected threat. We were pursuing a highly concurrent development and production program focused on a 2005 deployment. While the NMD testing program experienced delays in development and testing, our analysis last year showed that ground and flight tests to date have demonstrated about 93% of the system's critical engagement functions and have shown the ability to integrate the system elements.

The revised Ground-based Midcourse System has three objectives: 1) to develop and demonstrate an integrated system capable of countering known and expected threats; 2) to provide an integrated test bed that provides realistic tests and reliable data for further system development; and 3) to create a development path allowing for an early capability based on success in testing. During its initial phase, the program will develop an integrated system, further demonstrate a "hit-to-kill" capability, and prepare for the

RDT&E test bed capability and subsequent blocks. Each block will develop capability against increasing threat complexity.

Within the MDS, the bulk of the resources are designed to build and sustain an operationally realistic test architecture that represents the envisioned operational capability. We plan to have an RDT&E ground based test bed available in the 2004 – 2006 time frame. As designed, this test bed will expand to enhance overall test infrastructure and system maturation, although its initial development will occur within the midcourse segment. Over time the test bed will expand to include weapons and sensor capabilities from throughout the BMD System when they become available.

The test bed will consist of up to five ground-based silos with an upgraded COBRA DANE radar; associated command and control and launch facilities; other sensors; and networked communications to support robust testing with credible targets, scenarios, and countermeasures. This project includes four flight tests in FY 2002. Moreover, upon availability, the test bed could incorporate air launched targets, thereby providing geographically realistic scenarios and improving overall testing realism. Throughout, enhancements will be made to both the Ft. Greely and Kodiak Island test facilities, improving both target and interceptor launch capabilities.

This approach might be a near term option to employ the test facilities - radars, C2, and interceptor missiles at Fort Greely and Kodiak - in an operational mode. Its use in this mode could provide an interim capability to meet an emergent threat. This interim capability could subsequently be upgraded through technical improvements, replaced by deployment of production-quality radars, C2, and interceptors as described below or supplemented with a sea-based midcourse system, described below.

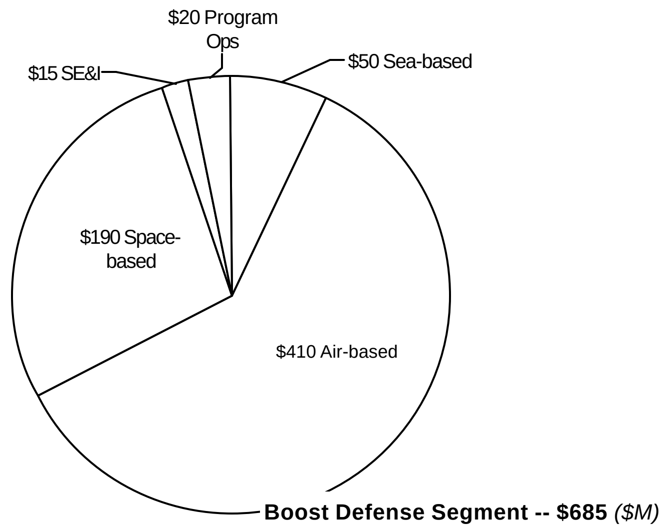
The Sea-based Midcourse System is intended to intercept hostile missiles in the ascent phase of midcourse flight, which when accompanied by ground-based system, provides a complete midcourse layer. By engaging missiles in early ascent, sea-based systems also offer the opportunity to reduce the overall BMD System's susceptibility to countermeasures. The Sea-based Midcourse System will build upon technologies in the existing Aegis Weapon System and the Standard Missile infrastructures and will be used against short and medium range threats. Funding in FY 2002 offers the ability to continue testing and enables a potential contingency sea-based midcourse capability that can grant limited defense to U.S. and allied deployed forces as an element of the BMD system Block 2004. To support this effort five flight tests of the sea-based midcourse system are planned in FY 2002. Funding also begins concept development and risk reduction work for advanced capability blocks to include more robust capability against intermediate and long-range threats to complement Ground-based Midcourse capabilities later this decade.

The United States and Japan signed a Memorandum of Understanding in August 1999 to conduct a two-year cooperative project to conduct systems engineering and to design four advanced missile components for possible integration into an improved version of the SM-3 interceptor. This project leverages the established and demonstrated industrial and engineering strengths of Japan and allows a significant degree of cost-sharing.

Other Segment activities include Systems Engineering and Integration (SE&I), Test & Evaluation (T&E), and Program Operations. SE&I funding will allow for further

Risk Reduction activities and Counter-countermeasure development and will begin a complementary kill vehicle development which could be common to both ground- and sea-based interceptors. T&E funding starts a new target booster development that will allow for testing against more realistic targets.

Boost Defense Segment



The mission of the Boost Defense Segment (BDS) is to define and develop boost phase intercept (BPI) missile defense capabilities. Our amended request of $685 million for the Boost Defense Program represents an increase of $313 million over the FY01 enacted funding, and an increase of $384 million over the initial FY 02 budget submission.

The capabilities defined and developed in the BDS will progressively reduce the "safe havens" available to a hostile state. A "safe haven," is formed by geographic and time constraints associated with BPI. It is the region of a state from which it can launch a missile safely out of range of a potential boost phase intercept. To engage ballistic missiles in this phase, quick reaction times, high confidence decision-making, and multiple engagement capabilities are needed. The development of higher power lasers and faster interceptor capabilities are required to reduce the size of safe havens, whereas development of viable space-based systems could potentially eliminate them entirely. Thus, resources have been allocated to develop both kinetic and directed energy capabilities in an effort to provide options for multiple engagement opportunities and basing modes to address a variety of timing and geographic constraints.

Successful BDS operational concepts could be fully integrated with midcourse and terminal elements in the overall BMD System. In accordance with the overall BMD acquisition strategy, BDS will employ multiple paths and acquisition methodologies to deliver initial capability blocks as soon as practical, and upgrade the initial capabilities over time. From information gained following this approach, BMDO will evaluate the most promising projects to provide a basis for an architecture decision between 2003 and 2005.

There are four principal objectives for the BDS. First, it will seek to demonstrate and make available the Airborne Laser (ABL) for a contingency capability in Block 2004 with a path to an initial capability in Block 2008. Second, it will define and evolve space-based and sea-based kinetic energy Boost Phase Intercept (BPI) concepts in the next two to four years, supporting a product line development decision in 2003-2005. This effort will include concept definition, risk reduction activities, and proof-of-concept demonstrations. For example, the sea-based boost program is considering a high-speed, high-acceleration booster coupled with a boost kill vehicle. This same booster will be evaluated (with a different kill vehicle) for sea-based midcourse roles. Third, the BDS will execute a proof-of-concept Space-Based Interceptor Experiment (SBX). Fourth, the BDS will also continue Space-Based Laser (SBL) risk reduction on a path to a proof-of-concept SBL Integrated Flight Experiment (SBL-IFX) in 2012. At appropriate times, BMDO will insert mature system concepts and technologies into product line development and deployment. Planned tests within the Boost Segment include a ground test of the ABL project and a ground test of the sea-based boost concept in 2002.

Kinetic Energy Concepts

Little has been done in this area in recent years. We intend to address operational concept development and technical risk reduction to produce experiments and systems to deliver demonstrations in the 2003-2006 timeframe. Kinetic boost phase intercept is a challenge because the threat missile must be detected and confirmed within a few seconds of launch. It then becomes a race between an accelerating ballistic missile and the interceptor in which the threat missile has had a head start. Another technical challenge is designing a kill vehicle that can detect and track the target following missile-staging events and then impact the missile in the presence of a brilliant plume.

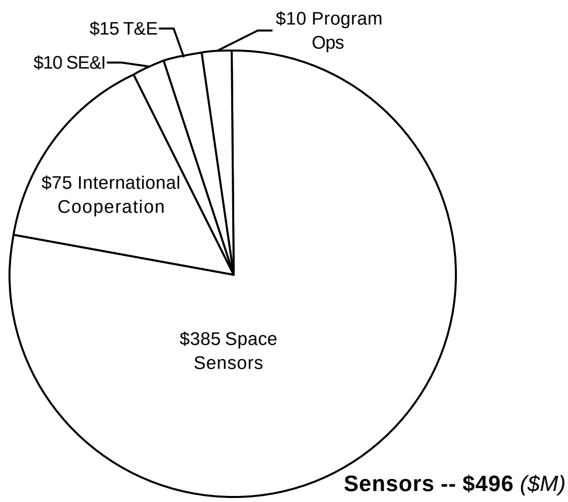
The money requested in FY 2002 will allow us to begin risk reduction activities to resolve critical technological risks associated with candidate boost systems and the development of a concept of operations through war-gaming and other planning activities. We are considering a sea-based boost activity to develop a high-speed, high-acceleration booster coupled with a boost kill vehicle. This activity will simultaneously support a proof-of-concept space-based experiment (SBX) using a space-based kinetic energy kill vehicle.

Directed-Energy Capabilities

The two primary programs in this area are the Airborne Laser (ABL) and Space Based Laser, now transferred to BMDO. The Air Force ABL program has been focused on short and medium range threats. We are taking deliberate steps to prepare ABL for a strategic defense role as well. With onboard sensors, each ABL aircraft will conduct long-range, wide-area surveillance of regions from which threat missiles might launch. The FY 2002 budget request will allow us to conduct an initial flight test of ABL and plan for a lethal demonstration in 2003.

The budget request will enable BMDO to continue SBL risk reduction work. Near-term SBL activity will focus on ground-based efforts to develop and demonstrate the component and subsystem technologies required for an operational space-based laser system and the design and development of an Integrated Flight Experiment vehicle that is scheduled to be tested in space in 2012. The SBL Project builds on many years of previous development and is based on prudent reduction of technical risk as early as possible in the design process.

Sensors

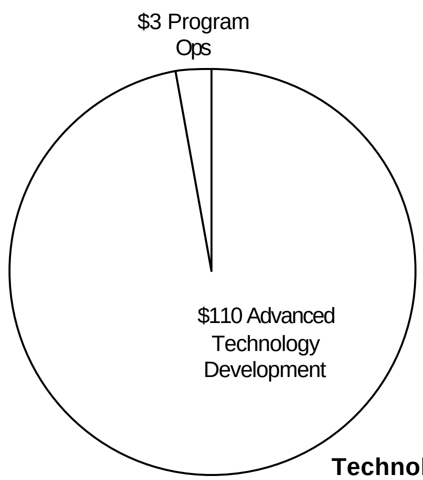


Sensors developed in this segment will have multi-mission capabilities intended to enhance detection of and provide critical tracking information for ballistic missiles in all phases of flight. This PE funds the Block 2010 SBIRS-Low sensor satellite constellation, and the Russian-American Observation Satellites (RAMOS) program, as well as emergent technologies and test and evaluation activities. In addition, resources are provided to further concept development and risk reduction efforts. Our amended budget request of $496 million represents an increase of $221 million over the FY01 enacted funding, and an increase of $113 million over the initial FY02 budget submission.

SBIRS-Low (transferred from the Air Force) will incorporate new technologies to enhance detection; improve reporting of Intercontinental Ballistic Missile (ICBM), Sea-Launched Ballistic Missile (SLBM) and tactical ballistic missiles; and provide critical mid-course tracking and discrimination data for BMD. SBIRS-Low, in conjunction with SBIRS-High (developed by the Air Force), form the SBIRS system, which will consist of satellites in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated centralized ground station serving all SBIRS space elements and Defense Support Program (DSP) satellites.

The Russian-American Observation Satellites (RAMOS) program is an innovative U.S.–Russian space-based remote sensor research and development program addressing ballistic missile defense and national security directives. This program engages Russian developers of early warning satellite in the joint definition and execution of aircraft and space experiments.

Technology



Technology -- $113 *($M)*

The Technology Segment will develop components, subsystems and new concepts needed to keep pace with the evolving ballistic missile threat. The primary focus of the Technology Segment is the development of sensors and weapons for future platforms that can complement today's missile defense capabilities. Investments will maintain a balance between providing improvements in current acquisition programs and demonstrating the enabling technology for new concepts. Our amended request of $113 million represents a decrease of $74 million relative to the FY01 enacted funding (and congressional adds), and a $41 million increase over the initial FY02 budget submission.

The Technology Program is divided into four thrust areas: 1) terminal missile defense, 2) midcourse counter-countermeasures, 3) boost phase intercepts, and 4) global defense. Specific projects include the development of a doppler radar to be used in a missile seeker, the demonstration of active and interactive midcourse discrimination techniques, the design and development of miniature kill vehicles for boost and midcourse application, and the development and/or testing of space relay mirrors for laser tracking systems. In addition to thrust area projects, investments are made in technology at the component level to improve the state-of-the-art in radars, infrared sensors, lasers, optics, propulsion, wide band gap materials, and photonic devices.

In closing, the Ballistic Missile Defense System Strategy balances significant engineering, management, schedule and cost challenges. It also provides for a robust RDT&E program with rigorous testing. Your support will be critical to our success.

Thank you, Mr. Chairman. I would be happy to answer any questions you and the Members of the Committee might have.