Missile Defense Agency

Fiscal Year 2008 (FY08)

Budget Estimates

Overview

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Overview

Outline

This budget overview summarizes our FY08 budget submission to Congress. It also may serve informed readers as a stand-alone, top-level description of the Ballistic Missile Defense System (BMDS). The overview describes our priorities, the budget structure, management and oversight processes, and program goals. It also includes Future Years Defense Program (FYDP) highlights.

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MISSILE DEFENSE AGENCY
FY08 BUDGET ESTIMATES OVERVIEW

I. INTRODUCTION

Over the last five years, the Missile Defense Agency has made major strides in developing and fielding a Ballistic Missile Defense System (BMDS) to defend the United States, its deployed forces, friends and allies against ballistic missiles of all ranges in all phases of flight. In 2004, the United States took the unprecedented step of fielding an initial defense capability against the rogue nation threat with advanced hit-to-kill technology. Since then, we have continued to develop and test an increasingly integrated system of interceptors, sensors, battle management, command and control, and communications in order to improve the depth, range and reliability of our defenses and provide options to address uncertainty and surprise in the future.

Our innovative acquisition strategy – fielding an operational capability while continuing to develop and improve it – was put to the test in the summer of 2006 when we placed the BMDS on alert in response to a credible ballistic missile threat from North Korea. Despite real-world operations, we made significant progress in learning how to continue simultaneous development and operation of the system. We also conducted a series of highly successful tests, culminating in the first intercept of a threat representative target with an operational ground-based interceptor using an operational radar sensor. In 2008 and beyond, we will increase the capability of the BMDS by adding more interceptors, deploying additional radars, and enhancing our command and control systems, while conducting a series of ground and flight tests that are increasingly realistic and challenging. Our Fiscal Year (FY) 2008 program of work and our proposed Future Years Defense Program (FYDP) will focus on several critical goals:

- Recruit, retain, and develop a high-performing and accountable missile defense workforce;
- Complete fielding and verification, and begin transition of the initial BMDS capability;
- Support the operation and sustainment of capabilities fielded to the warfighter;
- Develop an integrated future capability based on a comprehensive and collaborative systems engineering process;
- Execute an increasingly integrated and complex test program to build confidence in system performance;
- Maintain a strong research and development program focused on continual improvement of the BMDS; and
- Implement the international strategy for the BMDS to expand our allied collaboration.

The Evolving Security Environment -- The proliferation of increasingly sophisticated ballistic missile systems and associated technologies and expertise continues to pose a danger to our national security. In 2006, more than sixty foreign ballistic missiles were launched around the world.

Today, rogue states continue to view ballistic missiles as a means for gaining or maintaining their own freedom of action. Nuclear-capable North Korea, and Iran, which continues to show interest in developing nuclear capabilities, have not relented in their pursuit of

longer-range ballistic missiles for coercion, intimidation and deterrence, and are also actively proliferating to other nations. North Korea in particular abandoned its own self-imposed moratorium on ballistic missile tests by launching multiple short-range ballistic missiles (SRBMs) and medium-range ballistic missiles (MRBMs) in July, 2006. Although it failed, North Korea's attempted launch of a Taepo Dong-2 intercontinental ballistic missile (ICBM) represented a renewed threat to the U.S. homeland. Iran views ballistic missiles as an element of their asymmetric strategy against the United States and our allies, and is proliferating to both state and non-state actors. Iran likewise launched multiple SRBMs and MRBMs during two exercises. The latter exercise featured the near-simultaneous launch of several missiles and rockets, as well as a Shahab-3 MRBM. Our current and near-term missile defense fielding activities provide capability to respond to these dangers.

During the summer and fall of 2006 Hezbollah launched thousands of long-range rockets into northern Israel from Lebanon. Over forty Israeli civilians were killed in the attacks and as many as 500,000 were displaced. Thousands of buildings were damaged and up to 70 percent of businesses in northern Israel were closed during the conflict. Iran supplied many of these systems to Hezbollah as a means to destabilize the region. We expect future adversaries of the United States to use similar tactics as they try to counter our battlefield superiority.

Ballistic missiles will remain the weapon of choice among our potential adversaries for the foreseeable future. The destructive power of ballistic missiles, particularly when armed with weapons of mass destruction, remains a serious threat to the United States, our deployed forces, friends and allies. We expect that in the future our adversaries will use ballistic missiles to threaten our national security objectives by holding our cities and other high value assets at risk. They will use them to try to deny our forces access to a theater of conflict, to coerce our forces to withdraw, and to intimidate other nations who might wish to support us. Asymmetric ballistic missile threats to the U.S. must be addressed as well, including the possibility of missiles launched from ships just off-shore. We now have an initial ballistic missile defense capability, but we must prepare to operate the ballistic missile defense system against new and unexpected threats. We must continue to move forward if we are to address the challenges and uncertainties of the future.

MDA Program Strategy -- In order to counter this growing strategic threat, we have established a program strategy with three components for the FY08 budget submission. We will ***maintain and sustain the initial capability***, ***close gaps and improve*** this capability to keep pace with the threat, and ***develop options for the future*** to address threat maturation, uncertainties and surprise.

Maintain and Sustain an Initial Capability. This aspect of our program strategy focuses on completing the fielding of Ground-Based Interceptors (GBI) in Alaska and California; the enhancement of early warning radars in Alaska, California and the United Kingdom (UK); the fielding of the Sea-based X-Band radar (SBX) in the Pacific; the fielding of a forward-based transportable radar in Japan; and the fielding of Aegis Ballistic Missile Defense interceptors and radars. The foundation of this capability is BMDS fire control and battle management, which includes three Command and Control, Battle Management and Communications Suites (C2BMC) at U.S. Strategic Command, U.S. Pacific Command and U.S. Northern Command. Sustainment of this capability is a top priority even as we work with the Services on transition and transfer plans.

Close Gaps and Improve this Capability. This initial capability is not sufficient to protect the United States from the extant and anticipated rogue nation threat. We therefore must close the gaps in the system and improve its capability to keep pace. Three key elements of this effort are additional Aegis BMD sea-based interceptors, the introduction of four transportable Terminal High Altitude Area Defense (THAAD) fire units consisting of radars and interceptors, and the introduction of a land- and sea-based volume kill capability (Multiple Kill Vehicle program) to address potential countermeasures. Additionally, to ensure full coverage of the United States against threats from the Middle East, we will upgrade an Early Warning Radar in Thule, Greenland. This radar, in conjunction with the radar at Fylingdales, UK provides the ability to track threats to the U.S. and Europe from the Middle East. Because we must protect these radars or risk losing the "eyes" of our system, we are planning to field ground-based interceptors and an associated ground-based midcourse radar site in Europe. This achieves four goals: protecting the foreign-based radars, improving protection of the United States by providing additional and earlier intercept opportunities; extending this protection to our allies and friends; and demonstrating international support of ballistic missile defense.

Develop Options for the Future. Our long-term program strategy is to develop a layered defense to meet growing threats, uncertainty and surprise. To do this, we must be prepared to intercept a ballistic missile in all phases of flight: boost, midcourse and terminal. A fully layered defense will be capable of near-real time global detection, tracking and fire control, and intercept capability. The systems we have fielded so far, or will soon field – Ground-based Midcourse Defense (GMD), Aegis, THAAD and Patriot – are designed to intercept missiles in their midcourse and terminal phases. However, if we can destroy ballistic missiles in their boost phase, we can reduce the number of targets faced by our midcourse and terminal defenses, and preempt a threat missile's ability to deploy multiple reentry vehicles, submunitions, or countermeasures. Boost phase defenses can destroy an enemy ballistic missile when it is most vulnerable and, when combined with midcourse and terminal phase defenses, add to the effectiveness of the BMDS.

We therefore, are developing a boost phase capability. The Airborne Laser (ABL) is the primary program for providing this capability, but we are maintaining the option of using the Kinetic Energy Interceptor (KEI) as a boost phase system in the event that critical knowledge point testing indicates ABL is not viable. The high acceleration booster being developed for KEI may also be used as the next generation midcourse interceptor.

Because terrestrial-based sensor systems have inherent limitations, in particular, their inability to acquire and track missiles around the curvature of the earth, we are developing the Space Tracking and Surveillance System (STSS). This system will provide a persistent identification and global tracking capability that would significantly increase the effectiveness of the BMDS.

II. PROGRAM HIGHLIGHTS

In this section, we discuss program accomplishments from FY06, anticipated highlights for the remainder of FY07, and proposed goals for the FY08 program of work.

BMDS On Alert – In 2006, the BMDS was placed on alert for the first time in response to real-world events. North Korea's missile launch activity in July precipitated the alert status, which included the deployment of missile defense assets in the Sea of Japan and the activation of the Ground-Based Interceptors (GBIs) at Fort Greely, Alaska. The Ballistic Missile Defense System was ready and prepared to respond if necessary against the North Korean ballistic missile threat to the U.S. or our allies.

Fielding – We continue to have success in fielding our missile defense capability. In the past year, we deployed five additional GBIs in Alaska and California for a total of 15. We will have up to 24 deployed GBIs by the end of CY 2007 and 30 by the end of CY 2008. We also added a third Aegis engagement cruiser, continued to convert Long Range Surveillance and Track Aegis destroyers to engagement destroyers, and fielded additional Standard Missile-3 (SM-3) interceptors. By the end of CY 08, we expect to have 13 Aegis engagement destroyers and three engagement cruisers and 40 SM-3 interceptors. We completed the upgrade of early warning radar at Fylingdales in the United Kingdom, which should be fully integrated into the BMDS by the end of FY07.

We have also fielded improvements to our Command, Control, Battle Management, and Communications (C2BMC) system, which provides the backbone for the integration of disparate sensor and fire control information to provide solutions to the various deployed interceptors. For example, the C2BMC system allows sensor information from an Aegis cruiser or destroyer deployed in the western Pacific Ocean to support the launch of ground-based interceptors in Ft. Greely, Alaska, by sending its track information to fire control. With this capability, we can effectively mix and match sensor information with interceptor resources and begin to provide a near-global sensing and communications capability. The C2BMC system also provides critical situational awareness for decision makers, and allows us to make the most effective use of the various sensors and interceptors that comprise the global BMDS.

We successfully deployed the first AN/TPY-2 (formerly known as the forward-based X band radar, or FBX-T) and supporting C2BMC equipment to Shariki Air Base in Japan, achieving partial mission capability on October 30, 2006. (Both the FBX-T and THAAD radars have officially been assigned the military designation of Army Navy/Transportable Radar Surveillance, or AN/TPY-2). Using the interconnectivity provided by the C2BMC system, this radar provides important sensing information for the defense of our Japanese allies, deployed U.S. forces and the homeland. The current location of the AN/TPY-2 at Shariki is an interim site until construction can be completed for the permanent site. Three additional AN/TPY-2 radars will also be delivered to the warfighter to provide forward-based sensor coverage against possible launches from critical threat locations.

The Sea-Based X Band Radar (SBX) arrived in the Pacific Ocean in January 2006 after completing high power radiation tests in the Gulf of Mexico. An independent assessment of the seaworthiness, operating procedures, and structural, mechanical and electrical considerations was completed. The assessment concluded that the SBX is an inherently rugged and suitable platform for its intended mission. After additional crew training and testing to verify shipboard processes off the coast of Hawaii, the SBX will commence a cold weather shakedown off Adak, Alaska.

Finally, we fielded an additional C2BMC suite during 2006 at U.S. Pacific Command (USPACOM). Combined with the Combatant Commander (COCOM) C2BMC suites already installed at U.S. Strategic Command (USSTRATCOM) and U.S. Northern Command (USNORTHCOM), this gives the BMDS a "tri-node" battle management capability.

The following figure summarizes our fielded capability as projected in 2007.

	CY 2007 Initial Protection vs. North Korea Partial Coverage vs. Mid-East Protect Deployed Forces
Fixed Site Interceptors	• 21 Ground-Based Interceptors, Alaska • 3 Ground-Based Interceptors, California
Fixed Site Sensors	• Cobra Dane radar, Alaska • Beale radar, California • Fylingdales radar, UK
Mobile/Transportable Sensors	• 1 Sea-Based X-Band radar, Alaska • 2 Forward-Based X-Band radars • 7 Aegis Surveillance & Track Destroyers
Mobile Interceptors	• 3 Aegis Engagement Cruisers* • 7 Engagement Destroyers • 21 Standard Missile-3 • 546 Patriot PAC-3

*Engagement ships can perform Surveillance & Track Function

Figure 1

Sustainment – The sustainment of our fielded capabilities until they can be transferred to a Service remains one of our highest priorities. In some cases, we will continue to develop and improve fielded capabilities, and are planning to share responsibility for the costs of operating and supporting these assets with the supporting Service. As discussed in more detail in Section V, we are working closely with the Services and Combatant Commanders to ensure a smooth transition.

Development – We have funded a robust development effort to add capabilities that will address future challenges and uncertainties. Highlights in this area include our boost phase efforts (Airborne Laser and Kinetic Energy Interceptor), our space tracking program (Space Tracking and Surveillance System), our volume kill capability effort (Multiple Kill Vehicle), and our collection of activities to address the growing sophistication of the threat.

We continue to develop promising boost-phase defense options. In 2006, we completed refurbishment of the Airborne Laser (ABL) high energy laser in preparation for installation onto the modified 747 aircraft. Structural modifications to the aircraft were also completed, along

with installation and testing of the two low power illuminators, the Tracking Illuminator and the Beacon Illuminator. The ABL is on track to conduct a lethal shoot down of a ballistic missile target in 2009. The Kinetic Energy Interceptor (KEI) program successfully completed a series of tests indicating that a land-based interceptor can obtain enough acceleration and velocity, along with the supporting fire control data, to intercept a ballistic missile in the boost phase of flight. Successful proof of concept motor static fire tests of the first and second stage boosters were completed, along with a successful demonstration of the fire control component capability to use national space sensor data to calculate an interceptor solution in an operationally useful timeline. The KEI program is on track to conduct a flight test of its booster in 2008.

Progress was also made on the integration and testing of the Block 2006 Space Tracking and Surveillance System (STSS) satellites. The Block 2006 STSS program consists of two Low Earth Orbit research and development satellites with infrared and visible sensors as test tools for MDA to track ballistic missiles from launch through midcourse travel and atmospheric reentry. The Block 2006 system will demonstrate the ability to detect missile launches and pass missile tracking data to BMDS interceptors with the accuracy and timeliness necessary to enable successful intercepts of missile targets. The data obtained from these satellites will assist MDA in making decisions regarding the fielding of satellites for an operational architecture. Both Block 2006 payloads are on track for launch in 2007.

The ability to address more sophisticated countermeasures in the midcourse phase of flight is a critical aspect of our plan to close gaps and improve the effectiveness of the BMDS against the evolving threat. We are pursuing two parallel and complementary approaches to counter complex countermeasures: more sophisticated sensors and algorithms to discriminate the threat reentry vehicles (RVs) from associated countermeasures; and a volume kill capability to intercept the objects identified by the discrimination systems as potential threat RVs.

The forward placement of the AN/TPY-2 radar provides information early in the flight of a potential ballistic missile launch and helps discriminate threat RVs from associated countermeasures. For volume kill capability, we have established a new Multiple Kill Vehicle (MKV) program office to research, develop and design the MKV.

Testing – Since our last budget submission, MDA has had a very successful test campaign. Testing continues to be the most critical aspect of our effort and is planned and conducted in close coordination with the Operational Test Authorities (OTAs), the Director, Operational Test and Evaluation (DOT&E), and Combatant Commanders.

The OTAs have established the OTA Liaison Group (OLG) within MDA. The OLG includes representatives from the Army Test & Evaluation Command, the Air Force Operational Test & Evaluation Center, the Navy Operational Test & Evaluation Force, and the Joint Interoperability Test Command. The OLG participates in all BMDS test planning and analysis functions in which the OTAs have a vested interest. It is the primary conduit for the OTAs to insert operational test objectives into the BMD System test planning process. Although located at MDA, OLG members report directly to their respective OTAs. This relationship maintains the representatives' independence, yet provides the environment for continuous two-way communication channels to facilitate interaction and cooperation. In addition, MDA's interaction and coordination with the missile defense user community (USSTRATCOM, USNORTHCOM, and JTAMDO) provides Warfighter input to test planning and execution.

The MDA strategy for test, verification, and assessment reflects a 'top down' approach based on criteria established by MDA System Engineering, including functionality and capability defined in the form of engagement sequence groups, system test objectives, and overall system design. The BMDS is evaluated based on demonstrated performance and associated statistical analysis using Modeling & Simulation (M&S) with ground and flight testing. The foundation of the BMDS test program is the Integrated Master Test Plan (IMTP). The purpose of the IMTP is to devise scenarios that test each system from end-to-end to the maximum extent possible and to increase our knowledge of, and confidence in, system performance, while maintaining safety, minimizing artificiality, and keeping pace with the advancing threat.

The IMTP emphasizes operationally realistic testing and criteria. The plan is revised annually, in coordination with the OTAs and DOT&E, and continues to expand on our combined developmental and operational testing. This combined approach will focus on increasing operational realism as we move from subsystem to fully integrated system-level testing for each block. Each BMDS ground and flight test will include operational test objectives to provide data for an operational assessment. The IMTP also is the basis for detailed BMDS test planning and execution within a given Block and defines the characterization objectives by which the OTAs will assess each system test. In turn, DOT&E will use these assessments as the primary technical basis for its report to Congress.

M&S provides data to plan tests, support test rehearsals, provide performance prediction, perform post-flight assessments, and explore scenarios where flight testing is either impractical or impossible. It also provides insight into test design, anticipation of potential range and operational constraints, provides an avenue to rehearse test execution and expand the demonstrated performance envelope to additional threat representations, and provides us an efficient replication of actual flight tests.

Flight testing gives MDA the data it needs to further characterize the BMDS, anchor M&S tools, and demonstrate BMDS operational capability. Although each test examines a single scenario, and is often constrained by environmental and safety concerns, flight tests are conducted in realistic operational environments. Each BMDS flight test also builds on the knowledge gained from previous tests and adds challenging objectives to demonstrate enhanced capability.

System Ground Testing follows a test-fix-test approach and begins with a series of focused ground tests that address a specific function. Integrated Ground Tests (IGT) are used to determine the impact of specific threats on a wide variety of proposed engagement scenarios and provide data across a range of environmental conditions. Distributed Ground Tests (DGT) follow an Integrated Ground Test and combine the fielded hardware and software of specific BMDS Elements to exercise the BMDS, communications networks, and communications links.

FY06 Test Program – In FY06, we demonstrated the increased capability of the BMDS after restructuring our test program in 2005. MDA's FY06 record of achievement includes 13 test successes out of 14 flight tests, an Aegis Standard Missile-3 intercept of a separating warhead, and a THAAD missile intercept of a unitary target. Of significant importance was the September 1, 2006 intercept of a long-range target by an operational ground-based interceptor using data from the Upgraded Early Warning Radar (UEWR) in

Beale, California. This intercept successfully demonstrated the improved performance of the ground-based interceptor against a target along a likely threat trajectory. It also provided valuable radar characterization data for our UEWR radars. MDA has now conducted 23 hit-to-kill intercepts throughout the program since 2001.

In addition, MDA performed multiple ground tests to assess the execution and functionality of simultaneous Engagement Sequence Groups (ESG) using operational assets against multiple raid sizes. Most notably, from October 23 through November 9, 2006, MDA conducted Ground Test Distributed (GTD)-01, which involved three Combatant Commands, warfighters from each service, and 17 distributed sites, including two Aegis ships, satellites, and 3,500 miles of communications and network infrastructure in seven U.S. states and Japan.

FY07 Test Plan – The FY07 plan includes two GMD intercept flight tests as well as a target fly-by test of the SBX Radar with a simulated GBI launch. In addition, we will conduct four flight tests employing Aegis BMD to intercept a ballistic missile target with the tactical Aegis BMD configuration. We will also conduct four flight tests of the THAAD weapon system, as well as a THAAD Radar Data Collection (RDC) flight test.

We will participate in Air Force Glory Trip (GT) flight tests, a Patriot Test, and two Israeli Arrow System Tests (AST). To support this flight test program, we plan to conduct additional integrated and distributed ground tests. We will also participate in COCOM sponsored events to demonstrate interoperability, evaluate performance, and develop doctrine, tactics, techniques and procedures (TTP).

FY08 Test Plan – The BMDS FY08 test plan includes two GMD intercept flight tests. MDA will also conduct two flight tests employing Aegis BMD to demonstrate the ability to successfully engage a target under operational conditions, and a Japanese Cooperative Target test. MDA will conduct two intercept flight tests of the THAAD weapon system to test the system performance in various scenarios. Several flight tests that include PATRIOT will be conducted as well.

We will participate in Air Force Glory Trip (GT) flight tests and two Israeli Arrow System Tests (AST). To support this flight test program, we also plan to conduct three integrated and distributed ground tests. MDA will also participate in COCOM sponsored events to demonstrate interoperability, evaluate performance, and develop doctrine and TTPs.

Concurrent Test and Development – In the summer of 2006, for the first time, we transferred control of the BMDS to the warfighter in response to a series of ballistic missiles launches from North Korea. Unfortunately, this necessary action impacted the availability of the BMDS for continued spiral development, and testing and fielding because we currently do have not a capability to concurrently maintain the BMDS in full operational mode while simultaneously developing, testing or training on the system. In the event of a crisis, most non-operational processes stop, and the system is transferred to the warfighter, where it remains until the decision is made to stand down from “operational” mode and continue with testing and development.

To address this problem, we are developing a Concurrent Test, Training and Operations (CTTO) capability. CTTO also allows the warfighter to conduct training on the actual system without impeding the operational readiness of the system.

CTTO efforts will focus on optimizing and distributing the BMDS architectural resources in the design and development process. Resulting technical approaches will be developed for each concurrent BMDS requirement to meet agreed test and training objectives generated in conjunction with the Operational Test Agency (OTA) and warfighters. Demonstration of the CTTO capability will be conducted in our hardware-in-the-loop laboratories. This will allow us to successfully demonstrate safe simulation of the BMDS system in all phases of the kill chain using all available sensor/shooter combinations.

Acquisition Framework – During MDA's reengineering effort of our acquisition policies, processes, and outcomes, we determined additional refinements would be beneficial to enhance integration at the BMDS level. When MDA was established in 2002, we were given considerable flexibility in how we would develop and deliver a useful military capability to the warfighter. Further, it was agreed that the BMDS program would be subject to streamlined executive oversight and reporting. MDA was able to provide rapid fielding of an initial missile defense capability against long-range ballistic missiles based upon this flexibility and streamlined direct oversight. The requirement to simultaneously develop and operate the system motivated the Agency to take a new look at the current acquisition policies and decision processes that form the basis of the development program. The intent was to establish a stable and more disciplined framework within which warfighter needs, based on experience with the fielded system, could be better balanced with the needs of the ongoing development program.

As a result, MDA is establishing an improved Acquisition Management Framework—a more logical, sequential flow that embraces the current conceptual and strategic framework; that is more robust across the elements; that is detailed and tactical; from a planning to execution perspective; and from the BMDS level to the element/component level. Most steps in this comprehensive Framework were already in place but we are making adjustments. For example, to enhance planning between the higher-level BMDS architecture and the lower-level annual program planning by specific elements, the Framework will include an Acquisition Program Plan. This new plan will capture the Director-approved program in terms of system performance, schedule, funding, risk, and acquisition strategy over the 6-year period of the Future Years Defense Program.

Integrating the BMDS – In previous budget submissions we described the concept of the Engagement Sequence Group (ESG) as a tool to achieve full integration among BMDS assets. An ESG identifies the combination of weapons and sensor information, pulled together by the C2BMC system, required to intercept an enemy missile. In other words, the ESG describes the complete kill chain from the time the threat missile is first detected through intercept of the missile, and thereby defines how the BMDS components are integrated. The C2BMC system is the backbone of this effort and provides a global communications network to efficiently manage and distribute essential data; a planning capability to optimally locate sensors and weapons systems to counter identified threats; situational awareness; the capability to integrate sensor information to detect, identify, track, and discriminate threat reentry vehicles from countermeasures or debris; and, finally, global integrated fire control to pair the right sensors and

weapons systems against multiple threats for the highest probability of kill and improved weapons inventory management.

The C2BMC network is a service-oriented architecture (SOA), which allows for the building of software applications using services that are available in a network. With an SOA, new services can be introduced while maintaining legacy services without the need to rebuild the network from the bottom up. By the end of 2010, our plan calls for any element to be able to modify its software at any time and remain a fully functional element of the BMDS.

The planning capability provides the planning and analysis tools needed for the warfighter to rapidly develop and evaluate courses of action (COA). We will develop algorithms to expand the selection of alternatives available to the commander when planning an engagement. Situational awareness provides the real time information needed by decision makers to identify, process and comprehend the critical elements of information about what is happening in the battlespace. The loss of situational awareness increases the chance for human error.

A global and integrated BMDS relies on a network-centric capability that shares information from various land, air or space-based sensors, provides this information to an integrated fire control system to calculate solutions for the interceptors, and then distributes this information to appropriate interceptors for an effective kill. The Global Integrated Fire Control (GIFC), one of the major products of C2BMC, is the global, distributed, real-time integrated fire control system that provides this capability. The GIFC is designed to be flexible, supporting any command structure desired by the warfighter and providing system-level tracks for interceptor engagements, automated or manual management of BMDS sensors, automated or manual weapon-target pairing and kill assessment.

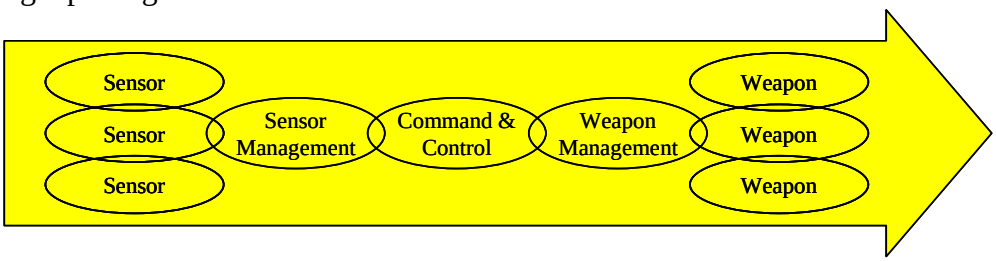

Figure 2. Components of an Engagement Sequence

Figure 2 describes a conceptual framework of an ESG. There are several possible ESGs within the BMDS, all requiring various levels of integration and coordination. One ESG "Standard Missile -3 Engage on SPY-1" ("SM-3 Engage on SPY-1") describes a sea-based interceptor launched from an Aegis ship using sensor data from the same Aegis ship. Another ESG, "Ground-Based Interceptor Launch on SPY-1" ("GBI Launch on SPY-1") describes the launch of a ground-based interceptor based on information provided by an entirely separate element, in this case an Aegis cruiser or destroyer. Both of these ESGs are included in the currently-fielded BMDS. ESGs will increase in number and become considerably more complex as more sensors and interceptors are added. The C2BMC will eventually provide a fully integrated system that allows multiple kill chains, vice a number of independent single kill chains provided by individual elements.

Warfighter Support – We are developing and delivering a ballistic missile defense capability to warfighters at U.S. Pacific Command, U.S. Strategic Command, and U.S. Northern Command. At the same time, the Army National Guard's 100th Missile Defense Brigade, the Air Force's Space Warfare Center and Navy crews manning ships in the Pacific Fleet are on station operating the fielded BMDS. This budget submission contains the financial resources required to fully support these fielded, and soon-to-be-fielded, BMDS components by enabling BMDS capability to transition from development to fielded use. The budget also addresses Doctrine, Organization, Tactics, Materiel, Leadership, Personnel and Facilities (DOTMLPF) considerations.

An effective training program is critical to the operational readiness and overall performance of the BMDS. Using Joint Chiefs of Staff Training Guidance, we have developed the BMDS Training and Education Center to allow for integrated, effective, and timely training in coordination with the U.S. Strategic Command. The MDA Joint Warfighter Center and the Command and Control, Battle Management and Communications element are working hand-in-hand with warfighters in the development of the Concurrent Testing, Training and Operations – Distributed Multi-Echelon Training System (CTTO-DMETS). This jointly-created training program is crucial to prepare everyone assigned to the BMDS elements, supporting headquarters, and command authorities for the challenges they face as they operate the BMDS.

MDA also works collaboratively with the Combatant Commanders and the Military Services through a Warfighter Involvement Process (WIP) in various venues such as exercises, war games, seminars, studies and conferences. The WIP is structured to generate opportunities to collaborate with the warfighters in defining, advocating and prioritizing requirements for additional BMDS capabilities. The MDA budget also funds the BMDS Operations Center on a 7/24/365 basis, providing real-time situational awareness, operational status, and coordinating the configuration of the BMDS to support operations, training, and developmental requirements.

International Participation – Ballistic missile defense is a global effort that requires us to work closely with our friends and allies to dissuade potential adversaries from acquiring ballistic missiles and, should it be necessary, defeat ballistic missile attacks. International participation in missile defense remains a pillar of our nation's counter-proliferation strategy and a key aspect of our missile defense program strategy.

In 2006, international participation in missile defense grew substantially as we worked with our international partners to develop and deploy defenses against the threat posed by North Korean and Iranian ballistic missile and nuclear weapon development activities. For example, our partnership with the Government of Japan has proven to be a model of cooperation as we worked together to deploy PAC-3 missiles, and an AN/TPY-2 Radar and associated C2BMC network and communications to Japan. These systems will be helpful in the defense of both the United States and Japan.

The Government of Japan's investments in the joint Standard Missile-3 (SM-3) Cooperative Development program will also result in substantial benefits in coming years. The program is focused on developing a new 21-inch diameter SM-3 Block IIA missile in order to provide an enhanced mobile mid-course intercept capability against long-range ballistic missiles. This new missile will allow us to better defend our nation, deployed forces, and friends and allies like Japan. This development effort builds upon the successful U.S.-Japan Cooperative Research

program which concluded with the flight test of a new lightweight nosecone on a SM-3 Block IA missile in 2006.

Our long-standing partnership with the United Kingdom also has continued to expand, as we worked together to increase the capabilities of the Fylingdales Early Warning Radar, improve our C2BMC situational awareness, and explore new areas of future cooperation. We also worked with the Government of Denmark to initiate upgrading of the Thule Early Warning Radar to the configuration of our other early warning radars. Upgrades at Fylingdales and Thule will significantly enhance our capability to detect and track ballistic missile threats emerging from the Middle East.

In 2006, we examined options for enhancing both the defenses of our European allies and the United States by deploying long-range ground-based interceptors and additional sensors in Europe. The results of our analysis showed that fielding missile defense assets in Europe would provide a significant capability to defend our European allies as well as the United States from the evolving ballistic missile threat from the Middle East. Toward that defensive goal, the United States is entering more detailed discussions with Poland and the Czech Republic in 2007 regarding the possible basing of missile defenses in their countries.

The North Atlantic Treaty Organization (NATO) continues to examine its missile defense requirements. In the past year, NATO completed a Missile Defense Feasibility Study focused on the protection of NATO population centers and territory against longer-range missile threats. Also, in 2007, NATO's Active Layered Tactical Ballistic Missile Defense (TBMD) Program office will establish an Integrated Test Bed to assist in the design of a system for the integration of national TBMD assets for the protection of deployed forces.

Our program strategy for international participation in missile defense includes our cooperation with the Government of Israel on the Arrow program and the new David's Sling Short-Range Ballistic Missile Defense (SRBMD) effort. Australia is an important partner in missile defense as well. We recently concluded a Research, Development, Test and Evaluation Annex with the Government of Australia, which identified several promising areas for technical cooperation on missile defense that will be helpful to both our nations. We have also planned for Indian government participation at a missile defense simulation exercise designed to inform the Indian officials on missile defense issues.

III. SIGNIFICANT CHANGES FROM THE FY07 BUDGET SUBMISSION

The following is a summary of the significant program changes reflected in this year's budget compared to the FY07 submission.

Aegis BMD: For the Aegis program we added 48 additional Standard Missile 3 (SM-3) Block IB interceptors and provided funding to begin the near-term and far-term sea-based terminal program. The near-term sea-based terminal program will modify already existing SM-2 Block IV missiles to address incoming ballistic missiles in the terminal phase. The far-term program will begin the design and development of a more advanced sea-based terminal capability. Beginning in Fiscal Year 2013, we also provide long-lead funding for the SM-3 Block IIA program, developed in cooperation with Japan. This new missile will be capable of defending against intermediate and long-range ballistic missiles in the midcourse phase of flight.

Theater High Altitude Area Defense (THAAD): We added funding for the procurement of two more THAAD Fire Units. Each Fire Unit includes a mobile fire control center, transportable radar, three mobile launchers and 24 THAAD interceptors. The procurement of these additional two Fire Units will give operational commanders a total of four Fire Units which can be rapidly deployed to address short and medium range threats.

Space Tracking Surveillance System (STSS): The STSS follow-on program is an effort to develop a small operational satellite constellation based on the demonstrated capability of the Block 2006 satellites. An operational constellation would be able to detect and track enemy missiles through all phases of flight and close the BMDS interceptor fire control loop. The first launch of the Block 2012 satellites was scheduled for the 2012-2013 timeframe. Congressional reductions and MDA programmatic considerations delay the launch date of the STSS follow-on satellites until at least 2016-2017.

Kinetic Energy Interceptor (KEI): The Ballistic Missile Defense System Interceptors mission is to develop, test, and field land and sea-based interceptor capabilities that will augment our capabilities against the current threat, keep pace with anticipated threats, and support our efforts to develop a layered defense. BMDS Interceptors is a strategically deployable, land-mobile, Kinetic Energy Interceptor element, consisting of a very fast, high acceleration, heavy lift interceptor, a land-mobile fire control and communications system, and a land-mobile launcher. Building upon BMDS sensor and Command Control, Battle Management, and Communication capabilities, the Missile Defense Agency will exploit the interceptor's mobility and early engagement capability, and distributed sensors to attack and defeat the adversary in new ways across the entire battle space.

MDA's Kinetic Energy Interceptor (KEI) is the centerpiece of the Interceptors element. The KEI program has three complementary objectives: (1) to develop a midcourse interceptor capable of replacing the current fixed Ground-based Interceptor (GBI) when the deployed GBIs become obsolete; (2) to develop this interceptor so that it could be strategically deployed as an additional midcourse capability with mobile land- or sea-based launchers; and (3) to assume the boost- and ascent-phase intercept mission within the BMDS if the Airborne Laser (ABL) fails to meet its performance objectives.

To pursue these objectives, MDA has modified the KEI program beginning in Fiscal Year 2008 to focus on initially developing a single interceptor that can perform all three missions. The KEI would replace the GBIs in fixed sites and assume the midcourse coverage currently provided by the Ground-based Missile Defense (GMD) element. If deployed on mobile land or sea-based launchers, its speed and ability to launch from a wider range of geographic locations will enable it to expand BMDS midcourse coverage even further.

Its speed and high acceleration also will permit early threat engagement in the boost/ascent regime where target intercepts and observations from the kill vehicle offer the greatest defensive payoff. A boost phase intercept destroys a missile before it can release its payload and any countermeasures; the additional capability to intercept in the early ascent phase enables single forward-based sites to deny and defend extremely large regions and fills coverage gaps that may arise due to geopolitical basing limitations, threat enhancements, and an adversary's unanticipated or challenging launch tactics.

Multiple Kill Vehicle Program (MKV)*:* The MKV payload is an evolutionary upgrade for all of the BMDS midcourse elements, and is an integral component of a broad BMDS strategy for addressing the expected utilization of complex countermeasures by potential adversaries. For the FY 08 budget, we have revised the goals for the MKV program. They now include: (1) Expand volume kill capability to include both land- and sea-based options; (2) Maximize commonality and modularity of kill vehicle components; (3) Consolidate BMDS multiple and unitary kill vehicle design and development efforts; and (4) Lower schedule and technical risk.

To achieve these goals, we will pursue a common MKV approach across the BMDS by providing an open technology and architectural standard for two complementary and competing development efforts. Our plan is to employ a single integrated management structure to develop land- or sea-based systems with multiple and unitary kill vehicle capabilities that take advantage of the open architecture for future growth.

The first development path will focus on the development of a carrier vehicle that can transport multiple smaller kill vehicles. The carrier vehicle will perform several important functions, such as:

- Releasing several small individual kill vehicles;
- Providing information to ground- or space-based sensors and the associated algorithms with the information provided with its infrared sensor;
- Communicating information to the individual kill vehicles and to the other midcourse elements, including GMD, KEI and the Aegis Ballistic Missile Defense System;
- Reviewing the results of the engagement and assisting with the kill assessment; and
- Acting as a kill vehicle and intercepting the threat object itself.

The second development path adds flexibility to the first path and will use different technology but the same common architecture and standards. This path will focus on developing a dispenser with multiple kill vehicles, one of which is designated as the lead kill vehicle. The lead kill vehicle provides most of the same essential functions as the Carrier Vehicle discussed above, including assigning the other kill vehicles to threat objects. In this approach, any of the other kill vehicles can assume the lead mission should the lead kill vehicle malfunction, providing redundancy and enhanced mission assurance.

Ground-Based Midcourse Defense (GMD): We have made three important adjustments to the GMD program, including the restructuring of the dual booster development program. The dual-booster program was instituted in 2001 to mitigate the risk of a single booster vendor and to leverage the complementary performance of the Orbital Sciences Company booster (OBV) and the Lockheed Martin booster vehicle-plus (BV+) boosters. Since 2001, we have completed four successful flight tests with the OBV booster and have conducted analysis showing that the 2-stage OBV booster provides performance that is similar to the BV+ booster. We have therefore canceled the BV+ booster effort for GMD and reinvested the operations and support costs associated with a dual booster strategy to support other program requirements.

Next, we have started construction on a third missile field at Ft. Greely in order to maximize our operational flexibility and accelerate the delivery of six interceptors in 2007, a year earlier than currently planned. Finally, we are increasing the number of operational silos

that will be available at Vandenberg Air Force Base (VAFB) from two to four, and adding a fifth silo at VAFB that will be dedicated to testing.

Sensors: We also made adjustments to the sensors program to support the installation of a proposed ground-based interceptor site in Europe. The European Mid-course Radar, an X-band radar currently located at the Kwajalein Atoll, will be modified and relocated to a site in Europe to provide critical midcourse tracking data for the European ground-based interceptor site.

High Altitude Airship: The High Altitude Airship (HAA) program has been cancelled due to funding constraints.

IV. BLOCK HIGHLIGHTS

A Block is a biennial increment of integrated program capabilities, tested as part of the BMDS and evaluated for its military utility. Once evaluated, the Block's elements and components are available for fielding, as directed, and may be available to the warfighter for operational use. Fielding may occur at any time during the Block.

We are reviewing our block structure and intend to submit a report to the Department as requested by Congress. In this budget we do not associate programs with a block if the estimated schedule results in capability beyond Block 12. Instead, we refer to these programs as "Capability Investments."

Additionally, we will provide a report on the BMDS Statements of Goals and Baselines to the Congressional defense committees in March 2007. This report complies with section 223 of the National Defense Authorization Act of 2004 (PL 108-136).

Maintaining and sustaining the fielded capability remains our highest priority. Although sustainment costs are not discussed separately in this section, they comprise an increasing amount of the total funding for each Block. As Figure 3 shows, the annual sustainment cost for all Blocks is approaching $1 billion per year.

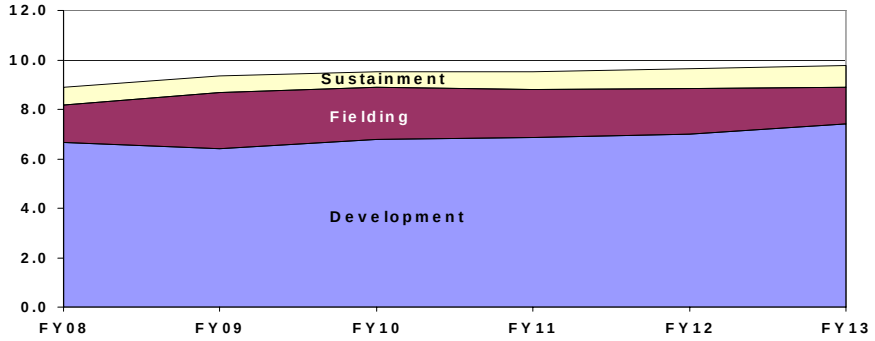

Figure 3. Development, Fielding and Sustainment Funding

Block 2006. Our program of work for Block 2006 continues to focus on fielding an initial GBI and Aegis interceptor capability for the BMDS while making plans to close gaps and improve this capability by deploying additional forward-based sensors. Funding for Block 2006 is shown in Table 1. Major initiatives in Block 2006 include:

Fielding:

- Additional operational silos and Ground-Based Interceptors at Fort Greely, Alaska and Vandenberg Air Force Base, California;
- Additional sea-based interceptors and Aegis BMD ships;
- An Upgraded Early Warning Radar at Fylingdales, UK;
- A Forward-Based X-Band Radar (AN/TPY-2) in Japan;
- A Sea-Based X-Band Radar in Alaska;
- Initial Global Integrated Fire Control at the Pacific Air Operations Center, Hawaii;
- Additional C2BMC planning and situational awareness capabilities at USNORTHCOM, USPACOM and USSTRATCOM.

Development:

- Completion of the Space Tracking and Surveillance System (STSS) ground segment, and the launch of two STSS developmental satellites;

- Initial integration of the Aegis BMD Signal Processor (BSP) will significantly improve the discrimination capability of the Aegis system, allowing for detection, acquisition and intercept against more diverse and longer-range threats.

Block 2006 Funding FY06-13 ($M Then-Year)

Project	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FYDP FY 08-13
PAC-3 Block 2006		2	1						**1**
GMD Block 2004/2006 Development	2277	2592	664	448					**1112**
ABL Block 2006	432	595							
Radars Block 2006	251	223	169	143					**312**
Test & Evaluation Block 2006	91	128							
Targets & Countermeasures Block 2006	266	159							
C2BMC Block 2006	147	166	173	61					**234**
Hercules Block 2006	21								
Joint Warfighter Support Block 2006	32	53							
AEGIS BMD Block 2006	449	395	75	43					**118**
STSS Block 2006	215	246	185	118	84	77	47	41	**551**
CTTO Block 2006		22							
Total	**4181**	**4561**	**1268**	**812**	**84**	**77**	**47**	**41**	**2329**

Table 1. Funding for Block 2006

Block 2008. Block 2008 expands our capability to protect the United States, deployed forces, allies and friends by continuing to field an initial capability while also closing gaps and improving this capability. Block 2008 also extends BMDS coverage of deployed forces, allies and friends by introducing the capability to defend against short-to medium-range ballistic missiles in the terminal phase of flight and increase radar coverage by adding forward-based radars. Funding for Block 2008 is in Table 2. Significant Block 2008 efforts include:

Fielding:

- Additional Ground-Based Interceptors at Fort Greely, Alaska;
- Additional sea-based interceptors;
- One Terminal High Altitude Area Defense (THAAD) fire unit;
- Two additional Forward-Based X-Band Radars (AN/TPY-2);
- Upgraded Early Warning Radar at Thule, Greenland;
- C2BMC capability in European Command (EUCOM) and Central Command (CENTCOM);
- Near-Term Aegis Sea-Based Terminal Defense.

Development:

- The GMD Block 2008 program will provide advanced discrimination algorithms and an upgraded version of Exoatmospheric Kill Vehicle (EKV) software to improve system performance and enable additional Engagement Sequence Groups (ESG). We will also complete the integration of the Sea-Based X-Band Radar (SBX) with highly sophisticated algorithms to enhance target acquisition and discrimination of more complex threats.

- Aegis BMD will build upon the development of the BMDS Systems Processor (BSP) to provide a full upgrade to the Aegis BMD Weapons System and an upgraded SM-3 missile, SM-3 Block IB. The SM-3 Block IB missile includes improvements to the Divert and Attitude Control System (DACS) and the Advanced Signal Processor (ASP) to support new discrimination algorithms. Other improvements include the integration of a two-color seeker and the development of an improved Throttleable Divert and Attitude Control System.

- The STSS Block 2008 program includes a software upgrade based on data gathered and lessons learned from the STSS Block 2006 development and subsequent on-orbit operations.

Block 2008 Funding FY06-13 ($M Then-Year)

Project	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FYDP FY 08-13
THAAD Block 2008	974	918	733	575	245	28	29	26	**1635**
GMD Block 2008	68	339	1604	1306	496	336			**3741**
Radars Block 2008	28	275	544	507	161	195			**1406**
CTTO Block 2008			42	38					**79**
Test & Evaluation Block 2008		45	114	120					**234**
Targets & Countermeasures Block 2008	3	19	161	140					**300**
Hercules Block 2008	29								
AEGIS BMD Block 2008	254	576	721	593	166	31			**1512**
Sea-Based Terminal Block 2008		15	62	10					**72**
STSS Block 2008		35	28	24	14	14	7	3	**90**
C2BMC Block 2008	5	17	74	209	180	73			**536**
Joint Warfighter Support Block 2008			46	48					**94**
Total	**1361**	**2238**	**4128**	**3569**	**1261**	**678**	**36**	**29**	**9700**

Table 2. Funding for Block 2008

Block 2010. Fielding and development efforts will continue in Block 2010 with emphasis on closing gaps and improving BMDS capabilities. Funding for Block 2010 is detailed in Table 3. Significant Block 2010 efforts include:

Fielding:

- Expanded BMDS capability with the addition of a third GBI missile site in Europe;
- Additional Aegis SM-3 interceptors;
- The second THAAD fire unit;
- Upgrade and deployment of the European midcourse radar.

Development:

- GMD efforts will include an enhanced flight and testing program for additional Engagement Sequence Groups, including the capability to launch or engage a Ground-Based Interceptor on sensor data provided by a AN/TPY-2;

- The Aegis BMD Block 2010 program will integrate Aegis BMD with the Navy-developed Open Architecture system. This effort will transition Aegis BMD from older, military-standard computers to newer commercial-off-the-shelf (COTS) computing platforms, and is necessary for Aegis BMD to remain compatible with Navy assets as the Navy ship modernization program is implemented.

Block 2010 Funding FY06-13 ($M Then-Year)									
Project	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FYDP FY 08-13**
THAAD Block 2010		20	125	255	77	15	16	16	**503**
GMD Block 2010		63	206	561	1637	1335	69	79	**3887**
Radars Block 2010		7	45	310	661	424	266	270	**1976**
CTTO Block 2010					36	33			**69**
Test & Evaluation Block 2010			30	42	125	117	9		**323**
Targets & Countermeasures Block 2010	1	3	2	39	189	157			**387**
Hercules Block 2010	5								
AEGIS BMD Block 2010		40	71	163	451	325	32	29	**1071**
C2BMC Block 2010			1	8	99	183	98	56	**447**
Joint Warfighter Support Block 2010					51	54	56	58	**219**
Total	**5**	**133**	**480**	**1378**	**3325**	**2644**	**547**	**509**	**8883**

Table 3. Funding for Block 2010

Block 2012. The Block 2012 program will continue to expand upon Block 2010, particularly with respect to efforts that close gaps and improve the capability. Funding for Block 2012 is in Table 4. Significant Block 2012 efforts include:

Fielding:

- Additional ground-based interceptors at third missile site in Europe;
- Additional Aegis Standard Missile-3 interceptors;
- Two additional THAAD fire units;
- Upgraded Early Warning Radars at Otis Air Force Base, Massachusetts and Clear, Alaska;

- Adjunct radar to use in conjunction with the AN/TPY-2 forward-based X-band radars.

Development:

- Aegis BMD Block 2012 will support autonomous engagements (SM-3 engagements using data from other BMDS elements and external sensor data) against SRBMs, IRBMs, MRBMs and some ICBM-range threats. Aegis Block 2012 will also begin the integration of the 21-inch SM-3 Block IIA missile and the purchase of long-lead items for the deployment of this missile.

Block 2012 Funding FY06-13 ($M Then-Year)									
Project	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FYDP FY 08-13**
THAAD Block 2012				68	505	713	539	365	**2190**
GMD Block 2012							1061	1079	**2139**
Radars Block 2012					91	154	441	317	**1004**
CTTO Block 2012							9	9	**18**
Test & Evaluation Block 2012					56	78	82	4	**220**
Targets & Countermeasures Block 2012					6	39	210	217	**472**
AEGIS BMD Block 2012		9	27	130	317	413	688	758	**2333**
C2BMC Block 2012						9	153	197	**358**
Total	**0**	**9**	**27**	**198**	**975**	**1406**	**3181**	**2947**	**8734**

Table 4. Funding for Block 2012

Capabilities Investments. Capabilities investments are those programs under development that will address threat maturation, uncertainty and surprise beyond the current FYDP (2008-2013), after Block 2012. These are major program developments and options for the future such as boost phase or space programs. Capability investments also include programs that are being developed in cooperation with an international partner such as Arrow or Aegis SM-3 Block IIA and advanced technology programs. Funding for Capability Investments is shown in Table 5. Significant Capabilities Investments include:

- **Airborne Laser:** The Airborne Laser program (ABL) is designing a revolutionary speed-of-light directed energy system on an airborne platform to acquire, track and destroy ballistic missiles of all ranges in their boost phase of flight. The ABL system will integrate a High Energy Laser (HEL), a Beam Control/Fire Control system (BC/FC), and a Battle Management, Command, Control, Communications, Computers and Intelligence system (BMC4I) into a modified 747 aircraft. The ABL system will also be able to provide launch warning, launch site prediction and cueing information to the BMDS. The program is focused on achieving a lethal intercept of a target, which has been delayed from FY08 to FY09. Funding is also provided for long-lead items for the follow-on operational aircraft incorporating lessons learned from the development aircraft.

- **Ballistic Missile Defense Interceptors:** The Ballistic Missile Defense Interceptors program develops a Kinetic Energy Interceptor (KEI) that focuses on a very fast, high acceleration, heavy lift booster. The booster will serve as a follow-on replacement for the currently deployed Ground-Based Interceptor Orbital Boost Vehicle. The KEI

program includes an option for a land-mobile launcher and a land-mobile fire control and communications system. The KEI program will also maintain the option for a future boost/ascent phase interceptor. Key knowledge points include a booster flight test in FY08 and intercept flight testing in 2012.

- **Multiple Kill Vehicles:** The Multiple Kill Vehicle program (MKV), previously described in Section III, will provide a land- and sea-based volume kill capability against long range threats in the midcourse phase of flight.

- **Space Tracking and Surveillance System Follow-On**: The Space Tracking and Surveillance System Follow-On (STSS Follow-On) will build on the lessons learned from the STSS Block 2006 program and eventually grow to an operational constellation with global coverage.

- **Space Test Bed:** The Space Test Bed will investigate the potential utility and technical feasibility of a space-based defensive layer to complement the BMDS. This proof-of-concept activity will provide options to support future deployment decisions.

Capability Investments Funding FY06-13 ($M Then-Year)									
Project	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FYDP FY 08-13**
Advanced Technology Development	143	186	113	104	110	115	122	125	**689**
Israeli Arrow Program	123	135	81	84	78	80	82	83	**487**
Airborne Laser (ABL)			517	404	412	639	782	970	**3724**
BMDS Interceptor	190	337	214	371	487	694	798	541	**3104**
Test & Evaluation						4	114	198	**315**
Classified Programs	270	353	325	308	374	532	798	801	**3139**
Japanese Cooperative Program	35	51	74	135	206	222	194	127	**958**
Space Tracking and Surveillance System (STSS) Follow-On		30	106	190	288	390	696	903	**2571**
Multiple Kill Vehicles (MKV)	48	142	265	345	448	608	664	830	**3160**
NFIRE			12	9					**21**
Space Test Bed			10	15	15	25	101	124	**290**
Hercules		48	51	52	51	53	51	52	**309**
Sea-Based Terminal			13	39	60	65	130	163	**470**
Total	**809**	**1281**	**1781**	**2056**	**2529**	**3425**	**4530**	**4916**	**19237**

Table 5. Capability Investments

Mission Area Investments. Mission Area Investments are those Agency-wide programs that are necessary to operate the Agency while implementing and expanding the BMDS across current and future Blocks. Mission Area Investments include: Systems Engineering, Modeling and Simulation, Intelligence and Security, Safety, Quality and Mission Assurance, Tests, Targets, and other areas identified in the table below.

Mission Area Investments Funding FY06-13 ($M Then-Year)									
Project	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FYDP FY 08-13**
BMD Information Management Systems	109	110	126	131	142	144	139	141	**823**
BRAC	8		103	160	62	9			**335**
Modeling & Simulation	90	93	101	104	109	110	113	115	**651**
Headquaters Management & PRMRF	113	103	92	93	75	75	75	75	**484**
Intelligence & Security	22	21	24	26	37	45	47	48	**228**
Joint National Integration Center (JNIC)	72	107	100	103	107	108	109	111	**638**
MD Space Exp Center			5	10	30	30	30	30	**135**
Producibility & Manufacturing Technology	31	36	38	41	43	44	45	46	**257**
Program-Wide Support	178	209	232	259	321	262	263	273	**1611**
Safety, Quality & Mission Assurance	20	23	30	39	39	39	41	41	**229**
SBIR/STTR	133								
System Engineering	123	124	134	137	147	161	166	168	**912**
Test & Targets	240	240	230	240	238	243	263	266	**1481**
Total	**899**	**1066**	**1215**	**1343**	**1352**	**1270**	**1290**	**1314**	**7783**

Table 6. Mission Area Investments

Production Rate. As required by Section 223 of the National Defense Authorization Act of 2004 (PL 108-136), the following table provides an estimate of the production rate capacity of the facilities that will produce the assets being fielded.

	Production Rate Capacity
Ground Based Interceptors (GBI)	**One per month**
Standard Missile 3 (SM-3)	**Two per month**
THAAD Interceptors	**Three per month**
AN/TPY-2 Radars	**Two per year**

Table 7. Production Rate Capacity

V. BALLISTIC MISSILE DEFENSE MANAGEMENT

Since its establishment, MDA has been a leader in innovative approaches to acquisition. We plan to continue this leadership throughout the FYDP. Our focus is on knowledge-based acquisition, streamlined oversight, transitioning capability from acquisition to operations, workforce management and financial accountability. We are also responding to Base Realignment and Closure (BRAC) commission recommendations to change the Agency's geographic footprint.

Knowledge-Based Acquisition – MDA began applying knowledge-based acquisition practices to our least mature acquisition efforts such as the Kinetic Energy Interceptor and the Airborne Laser. We are now beginning to describe our more mature programs, including Ground Based Midcourse and Aegis BMD, using knowledge-based acquisition. It is important to note, however, that as a practical matter we have often used knowledge-based practices in these programs, such as when we halted our GMD fielding when we experienced issues with our test campaign. Knowledge-based decision-making is critical because it allows us to make sure we are getting what we want out of our development efforts and provides us with flexibility to set our program priorities within a given budget. Each added increment of funding for a program depends on what we have actually achieved in that program. Ultimately, capability-based acquisition allows us to deploy real capabilities, where none existed before, in response to grave threats to our nation faster than the 15-20 year cycles common under the standard requirements-based approach.

Oversight. The Under Secretary of Defense for Acquisition, Technology and Logistics (USD/AT&L), within the Office of the Secretary of Defense (OSD), maintains oversight of MDA through frequent formal and informal interaction. The Quarterly Executive Review (QER) provides a forum for USD/AT&L and other key stakeholders within OSD, Combatant Commanders, DoD components and the Joint Staff to conduct an enterprise-wide review of key BMDS decisions, guide new ideas and technologies as they develop into capabilities, consider evolving priorities and requirements of the warfighter community, and formulate recommendations on the way ahead. Additionally, MDA briefs various components within the Department of the Defense frequently and regularly; in the past year, we have briefed the Secretary, the Deputy Secretary, the Under Secretary for Intelligence, the Under Secretary for Policy, the Joint Chiefs of Staff, the Combatant Commanders, and the Director of Programs, Analysis and Evaluation. We have also briefed State Department and White House officials and provide regular information briefings to the Congressional defense committees.

Transitioning Missile Defense Capability to the Warfighter. As we complete the fielding of the first increment, we are working closely with the warfighter to develop an approach that helps define Services and Combatant Commanders (COCOMs) responsibilities for BMDS capabilities. This approach acknowledges that MDA's spiral-development based acquisition process differs from the Services' traditional acquisition processes, and that therefore, the Services must have significant lead time and robust program information to meet the operations and support budgeting requirements for the capabilities they will be responsible for operating. The aim is to minimize ambiguities in accountability and responsibility, while building trust among the BMDS stakeholders.

In the 2006-2008 timeframe, MDA delivered operational assets for use by the COCOMs, including Aegis BMD engagement ships and an AN/TPY-2 forward-based radar. MDA and the military departments are planning to share responsibility and costs of operating and supporting future BMDS assets used for both operations and development as well.

MDA is also working with the lead military departments, COCOMs, and key stakeholders to address Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF) responsibilities in anticipation of transition and documenting both

agreements and open issues in the Transition and Transfer Plan as required by section 223 of the National Defense Authorization Act of 2004 (PL 108-136). The Transition and Transfer Plan assumes:

- It is not possible to fully transfer BMDS elements or components to Service or COCOM management under the traditional acquisition cycle model;
- No clean break, or transfer, will occur between MDA's development program and Service operation and procurement;
- Elements will be evaluated, procured, and transitioned to operational use while concurrently developing and operating the BMDS; and
- The duration of shared responsibilities will be tailored to each situation.

Missile Defense Workforce. The recruiting, retaining and developing of a high-performance and accountable missile defense workforce is one of our highest goals. We must have the right mix of expertise working in a results-oriented organizational culture. This requires a workforce that is committed, diverse, adaptable, and team-oriented at all levels of MDA. To ensure our continued success, we will take steps to minimize the impact on MDA from the impending shift of much of our workforce out of the National Capital Region, in accordance with the recommendations of the 2005 Base Realignment and Closure (BRAC) commission. We will also develop objectives to ensure a steady stream of strong leaders who can set clear direction, adapt to changing circumstances, manage change creatively, and reward and reinforce desired behaviors and results.

Consistent with this goal, MDA has established four objectives: align human capital planning with MDA's mission and DoD's civilian human capital strategic goals; develop and maintain a mission-ready workforce; create a results-oriented performance culture; and establish a cadre of world-class enterprise leaders.

Financial Management and Accounting. We support and are actively participating in several Defense Department financial management initiatives and programs to include the Financial Improvement and Audit Readiness (FIAR) initiative and the Defense Agencies Initiative (DAI) financial system pilot program. The FIAR initiative comprises the efforts throughout the Department to identify and resolve impediments for obtaining an unqualified audit opinion on financial statements. The overall approach and key milestones are identified in the Department's FIAR plan that is submitted biannually to Congress. Our efforts will be included in the March 2007 submission of the FIAR plan. To support our identified key milestones, we have developed a comprehensive Financial Improvement Plan that includes audit readiness actions as well as actions needed to comply with the Office of Management and Budget Circular A-123, Appendix A, "Internal Control over Financial Reporting" requirements. As part of our system improvement efforts, we are providing the DAI with dedicated resources and funding support to develop and implement a compliant financial system, and have provided knowledgeable staff to work with the OSD committee responsible for developing a Standard Financial Information Structure. We are continuing to work proactively to achieve the goals and objectives of the Chief Financial Officers Act, establishing and implementing effective financial management policies, internal controls, and systems that will provide accurate, reliable, and timely financial information to assist in making key resource and investment decisions.

Base Realignment and Closure (BRAC). The 2005 Defense Base Realignment and Closure Commission approved recommendations directing the relocation of several Missile Defense Agency directorates from the National Capital Region (NCR) to government facilities at Fort Belvoir, Virginia and Redstone Arsenal, Alabama. Specifically, a headquarters command center for MDA will be relocated to Fort Belvoir, while all other functions, with the exception of the Command and Control Battle Management and Communications (C2BMC) Directorate and the Ballistic Missile Defense System Sensors Directorate, will be relocated to Redstone Arsenal. The transfer of personnel to Redstone Arsenal is in progress, and construction will start in FY08 for the facilities to be opened in two phases in FY10 and FY11. The Fort Belvoir Headquarters Command Center (HQCC) is planned to be complete by late FY10. MDA Headquarters Command Center is scheduled to move to Fort Belvoir in FY11.

VI. PRESIDENT'S BUDGET SUBMISSION AND ORGANIZATION

The table below provides a breakdown of Program Element funding by fiscal year across the FYDP.

PE Title	PE Number	FY08	FY09	FY10	FY11	FY12	FY13	FY08-13 Totals
Technology	0603175C	119	110	116	121	128	131	**724**
Terminal	0603881C	963	1004	924	851	679	501	**4922**
Midcourse	0603882C	2520	2360	2180	1700	1153	1183	**11095**
Boost	0603883C	549	432	448	679	830	1026	**3964**
Sensors	0603884C	778	985	939	792	724	604	**4822**
BMDS Interceptor	0603886C	227	393	522	730	836	570	**3280**
BMD Test & Targets (includes MILCON)	0603888C	586	628	663	682	696	705	**3960**
BMD Products	0603889C							**0**
BMD Core	0603890C	482	511	559	580	579	588	**3299**
Special Programs	0603891C	323	305	369	527	789	792	**3106**
BMD Aegis	0603892C	1059	1129	1222	1068	1055	1089	**6622**
Space Tracking & Surveillance System	0603893C	332	348	413	501	778	981	**3353**
Multiple Kill Vehicle	0603894C	271	353	461	618	673	843	**3220**
BMD System Space	0603895C	28	35	47	56	134	157	**457**
BMD Command and Control, Battle Management and Communications (C2BMC)	0603896C	259	295	301	283	267	269	**1674**
BMD Hercules	0603897C	54	54	54	55	53	54	**325**
BMD Joint Warfighter Support	0603898C	49	50	54	57	59	60	**329**
BMD Joint National Integration Center (JNIC)	0603904C	104	107	112	112	114	115	**663**
BMD Concurrent Test and Operations	0603905C							**0**
Regarding Trench	0603906C	2	3	5	5	9	9	**33**
Mgmt Hq/PRMRF	0901598C/ 0901585C	92	93	75	75	75	75	**484**
BRAC	0207998C	103	160	62	9			**335**
	Total	**8899**	**9357**	**9526**	**9499**	**9630**	**9755**	**56666**
Defense-Wide Resources	0904903D			-1500	-1500	-1500	-1500	**-6000**
MDA Total Less Defense-Wide Resources		**8899**	**9357**	**8026**	**7999**	**8130**	**8255**	**50666**

Table 8. Funding By Program Element

Table 9 provides a breakdown of Program Element by Block for funds included in this budget submission.

PE Title	PE Number	BMDS Funding for FYDP 08-13 ($M Then-Year)							
		Capability Blocks					Mission Area Investments	Capability Investments	PE Totals
		Block 2004	Block 2006	Block 2008	Block 2010	Block 2012			
Technology	0603175C						36	689	724
Terminal	0603881C		1	1635	503	2190	105	487	4922
Midcourse	0603882C		1112	3741	3887	2139	215		11095
Boost	0603883C						241	3724	3964
Sensors	0603884C		312	1406	1976	1004	123		4822
BMDS Interceptor	0603886C						176	3104	3280
BMD Test & Targets (includes MILCON)	0603888C			614	779	710	1542	315	3960
BMD Products	0603889C								0
BMD Core	0603890C						3299		3299
Special Programs	0603891C							3106	3106
BMD Aegis	0603892C		118	1584	1071	2333	89	1428	6622
Space Tracking & Surveillance System	0603893C		551	90			140	2571	3353
Multiple Kill Vehicle	0603894C						59	3160	3220
BMD System Space	0603895C						171	286	457
BMD Command and Control, Battle Management and Communications (C2BMC)	0603896C		234	536	447	358	99		1674
BMD Hercules	0603897C						16	309	325
BMD Joint Warfighter Support	0603898C			94	219		16		329
BMD Joint National Integration Center (JNIC)	0603904C						663		663
BMD Concurrent Test and Operations	0603905C								0
Regarding Trench	0603906C							33	33
Mgmt Hq/PRMRF	0901598C/ 0901585C						484		484
BRAC	0207998C						335		335
	Block Total	**0**	**2329**	**9700**	**8883**	**8734**	**7808**	**19212**	**56666**

Table 9. Mapping Program Elements to Blocks

VII. SUMMARY

The mission of the Missile Defense Agency is to develop and field an integrated, layered ballistic missile defense system to protect the nation, our deployed forces, allies and friends. We have made significant progress in the last five years in the fielding of an initial missile defense capability, but much work remains to be done. Our near-term objectives are to complete the fielding of the initial capability, maintain and sustain this capability, assist the warfighter in developing the proper tactics and procedures, and work with the Services to develop plans for the eventual transfer of this capability.

This initial BMDS, however, is not sufficient to address the growing ballistic missile threats over time. The Missile Defense Agency is therefore investing resources to close gaps and improve the initial capability. This investment will result in additional sensors and interceptors for use against increasingly numerous and complex threats.

In the past year, North Korea launched several ballistic missiles (including the attempted launch of a long-range ballistic missile capable of striking the United States homeland) and tested a nuclear device; Iran tested several ballistic missiles, and defied warnings from the United Nations regarding its nuclear program; and Hezbollah launched thousands of rockets into northern Israel. We also know that potential adversaries are working hard to improve their ballistic missile capabilities, and we must therefore provide options for the future to stay ahead of them. If we do not, we place our deployed forces in danger, undermine the confidence of our allies, and leave our homeland vulnerable to attack. We cannot afford to take such risks.

VII. ACRONYMS

ABL	Airborne Laser
AFB	Air Force Base
AFOTEC	Air Force Operational Test & Evaluation Center
ASP	Advanced Signal Processor
AST	Arrow Systems Test
ATEC	Army Test & Evaluation Command
BC/FC	Beam Control/Fire Control
BMC4I	Battle Management, Command, Control, Communications, Computers and Intelligence
BMDS	Ballistic Missile Defense System
BRAC	Base Realignment and Closure
BSP	Ballistic Missile Defense System Processor
BV+	Lockheed Martin Booster Vehicle Plus
C2	Command and Control
C2BM	Command and Control, Battle Management
C2BMC	Command and Control, Battle Management and Communication
COA	Courses of Action
COCOM	Combatant Commander
CONOPS	Concept of Operations
COTS	Commercial-Off-The-Shelf
CTTO	Concurrent Test, Training and Operations
DACS	Divert and Attitude Control System
DAI	Defense Agencies Initiative
DGT	Distributed Ground Test
DMeTS	Distributed Multi-Echelon Training System
DoD	Department of Defense
DOT&E	Director, Operational Test & Evaluation
DOTMLPF	Doctrine, Organization, Tactics, Materiel, Leadership, Personnel and Facilities
EKV	Exoatmospheric Kill Vehicle
ESG	Engagement Sequence Group
FBX-T	Forward Based X-Band Radar – Transportable
FIAR	Financial Improvements and Audit Readiness
FY	Fiscal Year
FYDP	Future Years Defense Program
GBI	Ground Based Interceptor
GIFC	Global Integrated Fire Control
GMD	Ground-Based Midcourse Defense
GT	Glory Trip
HAA	High Altitude Airship
HEL	High Energy Laser
HQCC	Headquarters Command Center
ICBM	Intercontinental Ballistic Missile

IFT	Integrated Flight Test
IGT	Integrated Ground Test
IMTP	Integrated Master Test Plan
IRBM	Intermediate Range Ballistic Missile
JNIC	Joint National Integration Center
JTAMDO	Joint Theater and Missile Defense Organization
KEI	Kinetic Energy Interceptor
LRBM	Long-Range Ballistic Missile
LRS&T	Long Range Surveillance and Tracking
M&S	Modeling and Simulation
MDA	Missile Defense Agency
MKV	Multiple Kill Vehicle
MRBM	Medium-Range Ballistic Missile
NATO	North Atlantic Treaty Organization
NCR	National Capital Region
NFIRE	Near-Field Infrared Experiment
OBV	Orbital Sciences Company Boost Vehicle
OLG	OTA Liaison Group
OSD	Office of the Secretary of Defense
OTA	Operational Test Authority
PAC	PATRIOT Advanced Capability
PE	Program Element
PL	Public Law
QER	Quarterly Executive Review
R&D	Research & Development
RDC	Radar Data Collection
RDT&E	Research, Development, Test and Evaluation
RTO	Responsible Test Organization
RV	Reentry Vehicle
SBIR	Small Business Innovative Research
SBIRS	Space-Based Infrared System
SBX	Sea-Based X-Band Radar
SE	Systems Engineering
SEC	Senior Executive Council
SM	Standard Missile
SOA	Service Oriented Architecture
SOG	Statement of Goals
SRBM	Short-Range Ballistic Missile
STSS	Space Tracking & Surveillance System
STTR	Small Business Technology Transfer
TBMD	Tactical Ballistic Missile Defense
THAAD	Terminal High Altitude Area Defense
TTP	Tactics, Techniques and Procedures
UEWR	Upgraded Early Warning Radar

UK	United Kingdom
USD/AT&L	Undersecretary of Defense for Acquisition, Technology and Logistics
USCENTCOM	United States Central Command
USEUCOM	United States European Command
USNORTHCOM	United States Northern Command
USPACOM	United States Pacific Command
USSTRATCOM	United State Strategic Command
VAFB	Vandenberg Air Force Base
WIP	Warfighter Involvement Process