Missile Defense Agency

Fiscal Year (FY) 2011

Budget Estimates

Overview

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Missile Defense Agency
Fiscal Year (FY) 2011 Budget Overview

This overview is intended to serve informed readers as a stand-alone summary of our Ballistic Missile Defense System (BMDS) program priorities for FY 2011. It also describes key programmatic and management initiatives.

The Missile Defense Agency (MDA) is requesting an $8.416 billion funding level for FY 2011 -- a 6.6 percent increase from the appropriated FY 2010 level of $7.892 billion.

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I. INTRODUCTION

Key Accomplishments

While FY 2009 was in many ways a year of significant transition for the Ballistic Missile Defense program and MDA, the day-to-day work of the Agency to achieve its mission still proceeded at a high operational tempo. We participated in several warfighter activities in support of real world events, tested new capabilities, and delivered hardware and software to the warfighter in defense of the nation. We also systematically and rigorously restructured our test program and subsequently developed a revised Integrated Master Test Plan (IMTP); and supported development of the Phased Adaptive Approach that can be used for defense of deployed U.S. forces, friends, and Allies in Europe and globally. The FY 2011 President's Budget request reflects significant new policies and initiatives in homeland and regional defense, enhanced testing, and technology development to adapt and respond to future threats. Described below are some specific key accomplishments.

Delivering Capabilities to the Warfighter

Throughout the year, we continued to add increments of capability to the BMDS for use by the warfighter. In terms of homeland defense, we delivered four Ground Based Interceptors (GBIs) and Ground Based Midcourse Defense (GMD) Fire Control and Command Launch Equipment hardware upgrades and software improvements. Further, we completed the fourth operational silo at Vandenberg Air Force Base (VAFB). In addition, we transferred the upgraded Cobra Dane radar and the Beale and Fylingdales upgraded early warning radars (UEWRs) to the Air Force for operations in support of the BMD mission. In terms of regional defense, we delivered 19 Standard Missile (SM)-3 Block IAs; installed the first generation, Aegis BMD Weapon System (AWS) 3.6.1 on six Aegis BMD ships and achieved its certification for Fleet Tactical Operations; added our 19th Aegis BMD ship; and installed AWS 4.0.1 on the USS Lake Erie for test purposes. We also delivered the first Terminal High Altitude Area Defense (THAAD) battery ground equipment—an Army Navy/Transportable Radar Surveillance (AN/TPY-2), three launchers, and two THAAD Fire Command and Control Tactical Station Groups (TSGs)--and began taking delivery of the launchers and TSGs for the second THAAD battery. In the sensors area, we deployed, on a contingency basis, an AN/TPY-2 radar to Israel and delivered another AN/TPY-2 radar, which can now be assigned to the Army when a unit is available. The Command and Control, Battle Management and Communications (C2BMC) capabilities were improved by the activation of C2BMC servers at U.S. European Command (USEUCOM), providing track forwarding to in-theater Aegis BMD, situational awareness of the regional BMD mission, and control for the forward-based AN/TPY-2 radar in support of Defense of Israel. Additionally, we installed enhanced C2BMC hardware and software at command and control nodes in U.S. Pacific Command (USPACOM), U.S. Strategic Command (USSTRATCOM) and U.S. Northern Command (USNORTHCOM) in anticipation of FY 2010 operational testing of the next BMDS system upgrade.

Proving Capabilities

The restructuring of MDA's test program and plan was a significant accomplishment in FY 2009. Working with the Services' Operational Test Agencies and the Warfighter (represented by the Joint Forces Component Command for Integrated Missile Defense), and with the support of the Director of Operational Test and Evaluation, we transitioned to test objectives based on data to verify, validate, and accredit BMDS models and simulations and collected data to determine operational effectiveness, suitability, and survivability. The revised IMTP, which extends through FY 2015, focuses on proving system capabilities through the collection of identified flight test data to ensure adequate test investments and a solid foundation to anchor BMDS models and simulations. In the future, we will revise and update the IMTP semi-annually.

Accomplishments in our targets program proved very beneficial to testing in FY 2009 and will pay dividends in the future. We delivered 18 of 21 planned targets; prepared the target development and acquisition strategy and plan; crafted multiple Requests for Proposal (RFPs); and developed a new target cost model.

As for noteworthy flight and ground testing in FY 2009, we achieved five of eight successful hit-to-kill intercepts and a number of "firsts" in BMDS testing. For example,

- In the most operationally realistic Ground Based Midcourse Defense (GMD) flight intercept test to date, we successfully engaged a target launched from Kodiak Island in Alaska by a GBI launched from VAFB in California; correlated sensor data from four on-line sensors; and performed the functions to discriminate and intercept the dynamic lethal object from a target scene.
- In a THAAD flight test, we demonstrated the first salvo engagement of an endo-atmospheric threat-representative separating ballistic target. This test was conducted as a Developmental Test/Operational Test with oversight from the U.S. Army Test and Evaluation Command. Soldiers of the 6th Air Defense Artillery Brigade conducted launcher, fire control, and radar operations using tactics, techniques, and procedures developed by the U.S. Army Air Defense Center.
- Short Range Ballistic Missile (SRBM) intercepts were successfully demonstrated using Aegis BMD Standard Missile (SM)-2 Block IV interceptor in Stellar Daggers and the SM-3 Block IA in Stellar Avenger.
- Demonstrations of BMDS interoperability were major objectives of several key tests. For example, AWS 3.6.1 demonstrated a successful exchange of data via interoperable messaging with C2BMC, THAAD, GMD, and an AN/TPY-2 radar. Also, the Commander Operational Test and Evaluation Force assessed AWS 3.6.1 as operationally effective and suitable.
- We extended integrated and distributed ground testing in support of defense of Israel; successfully demonstrated the ability of forward-based AN/TPY-2 radars to cue Aegis BMD and the Arrow Weapon System; and provided improved regional BMD situational awareness and demonstrated the flow of BMD track data across regional commands.

Developing Future Missile Capabilities That Are Adaptable and Responsive

Our robust technology development program made significant progress this past year. We initiated concept exploration of intercepting Medium-Range Ballistic Missiles (MRBMs) and Intermediate-Range Ballistic Missiles (IRBMs) early in flight, leveraging existing Unmanned Aerial Vehicles and space assets for pervasive sensor netting to extend the engagement zone of BMDS interceptors. We achieved significant accomplishments in the Airborne Laser (ABL) and Space Tracking and Surveillance System (STSS) demonstration efforts. ABL achieved flight certification; ground tested the laser through the full weapon system; accomplished target tracking; compensated for atmospheric distortion and characterized beam control versus a boosting missile; and conducted "first light in flight" firing of the laser to include propagation of the high energy beam into the atmosphere. Planning to transition the ABL to a National laser research platform continued. STSS completed integration and assembly and successfully launched two vehicles into space orbit.

The Way Ahead

In his 17 September 2009 introduction of the Phased Adaptive Approach (PAA) for missile defense in Europe, President Obama stated his intent to deploy a missile defense system that best responds to the threats that our Nation faces and utilizes technology that is both proven and cost-effective. The President also stated the need to provide capabilities sooner, build on proven systems, and offer greater defenses against the threat of missile attack. MDA has designed its programs and budget request to achieve the President's objectives.

We are continuing the development and fielding of capabilities to defeat a limited ballistic missile attack against the United States. Today we have operational GBIs in missile fields at Fort Greely, Alaska, and VAFB in California. The GMD and C2BMC elements of the system, which are on alert 24 hours a day, are manned by Warfighter crews at operational situational awareness displays, sensor management controls, and fire control workstations. By the end of FY 2010, we plan to have 30 ready interceptors available to provide long-range defense. Our FY 2011 request includes funding for additional interceptors with upgraded avionics and completion of Missile Field 2 in FY 2012 at Fort Greely.

The PAA will counter immediate ballistic missile threats to NATO/European populations and U.S. bases, forces, and civilians and is extensible to other regions. The PAA is designed to build on already fielded BMDS assets, including upgraded early warning radars (UEWRs) and C2BMC components. It will feature forward-based BMDS radars in Southern Europe to provide early and precise tracks of threat missiles from the Middle East. These radars also will increase the accuracy of the fire control instructions to interceptors based in the United States, thereby improving the System's overall performance for the protection of the homeland. Phase 1 of the PAA, to be deployed by Calendar Year (CY) 2011, involves deployment of sea-based SM-3 Block IA interceptors and forward-based sensors to protect areas where we see the greatest threat to Europe from short- and medium-range ballistic missiles. By CY 2015, Phase 2 deploys enhanced and proven missile defense systems, to include the SM-3 Block IB interceptor and a land-based "Aegis Ashore" site. We plan to deploy the more capable SM-3 Block IIA interceptor by about 2018 in land- and sea-based configurations in Phase 3 of the PAA to include protection against

IRBMs, and increase the defended area of Europe. Finally, in the 2020 timeframe, we intend to field in Phase 4 more advanced land-based capabilities in Europe using a more capable SM-3 Block IIB missile and space sensors to handle large raid sizes.

In response to Warfighter priorities, we have been focused on developing and delivering a more robust Aegis BMD capability to defeat short- to intermediate-range threats from the sea as well as initial fielding of the first THAAD batteries. Aegis BMD cruisers and destroyers integrated with SM-3 hit-to-kill interceptors, which intercept ballistic missiles in space, and SM-2 terminal interceptors, which intercept missiles as they reenter the atmosphere, provide a robust mobile capability that may be surged to a region to protect deployed forces and allies. Continuing the partnership begun in 2009, MDA and the Navy continue to jointly respond to the need for operational Aegis BMD capability. We are requesting more funds ($161M in FY11-13) to accelerate the number of second generation Aegis BMD systems in the fleet, and the Navy is requesting funds to bring online three additional ships with BMD capability and upgrade one existing Aegis BMD ship with the most modern capability. Together, MDA and the Navy will bring an additional 10 Aegis BMD ships online between FY 2010 and FY 2012.

We expect to have 61 SM-3 Block IAs in inventory by the end of fiscal year 2010. The SM-3 is a very capable interceptor, and we are evolving that capability as well as the Aegis Weapon System to intercept a target earlier in its flight and provide that capability from land locations, which we call Aegis Ashore. We are also developing C2BMC software that will allow us to better leverage sensors that are not part of the BMD system, which will greatly expand the area defended by a single Aegis Weapon System (sea or land based) and THAAD batteries. To further augment our regional defenses, we plan to have 26 THAAD interceptors in inventory by the end of fiscal year 2010. THAAD interceptors reach much farther than PATRIOT Advanced Capability (PAC)-3 interceptors and can defend a larger area by intercepting targets in the upper atmosphere and in space after apogee.

In our FY 2011 request, we are submitting new Program Elements (PEs) for the new Phased Adaptive Approach, including funding for developing and testing Aegis Ashore capability and Airborne Infrared (ABIR) sensor platforms. In response to Warfighter requests, we are also asking for significant funding increases ($3.4B in FY11-15) to procure additional THAAD batteries and interceptors, AN/TPY-2 radars, and Aegis BMD Block IB interceptors. We are also requesting funds for the continuing development and testing of the next generation of Aegis Weapon System and interceptors and the upgrading of additional Aegis BMD ships.

Another step we have taken to meet the President's direction is to establish a robust testing program to demonstrate these capabilities and prove they can reliably and effectively help U.S. forces accomplish their mission. Working closely with the Services' Operational Test Agencies, we are executing a rigorous test program documented in the IMTP that includes expanding our flight and ground test programs to test BMDS capabilities against medium-, intermediate-, and long-range threats. Because our flight tests are very expensive, as high as $200 million for a long-range flight test, and are impacted by safety constraints and long planning timelines, we focus our flight and ground test programs on fully validating models and simulations. Validated models and simulations are then used to run thousands of operationally realistic test scenarios across a full range of engagement conditions at a fraction of the cost of a flight test. Our test program also

helps demonstrate the integration of system assets, such as GMD, THAAD, AN/TPY-2, C2BMC, and the AN/SPY-1 radar on Aegis BMD ships. Integration expands BMD capability by pairing weapons and sensors according to mission needs.

We are also addressing the need to have more reliable, less costly targets. Our new target acquisition strategy, initiated in FY 2009, streamlines a set of target classes to increase quality control, account for intelligence uncertainties, control costs, and ensure the availability of backup targets. Since it takes about two years to build and deliver a high quality target, we expect to complete contract acquisition in 2010 and realize the benefits of the new strategy in the FY 2012 – 2013 time frame.

Before new capabilities are deployed, the simulations that model their performance must be anchored under conditions that represent realistic threats and environments. These tests will help build the confidence of U.S. and allied stakeholders in simulations of the ballistic missile defense system.

We continue to work with our allies and friends to develop and field operationally and cost-effective missile defenses because having coalition partners for this mission gives us a distinct advantage. Over the past several years, our involvement with foreign nations has grown significantly. We currently are working with or talking to more than 20 countries and NATO about missile defense.

MDA is also implementing the direction of the Weapon Systems Acquisition Reform Act of 2009 to make the system more affordable and operationally effective. This includes fostering competitive contracting to motivate innovation and keep costs down. In other words, we are taking significant steps to meet the Administration's objective of developing and producing sound capability improvements at a reasonable cost.

The Ground Based Midcourse Defense (GMD) program is an example of our competitive contracting approach. We intend to award a competitive Development and Sustainment Contract (DSC) for the future development; fielding; testing; systems engineering support; integration and configuration management; equipment manufacturing and refurbishment; and training, operations and sustainment support for GMD and associated support facilities. The GMD competitive acquisition approach will help minimize the risk of obsolescence, provide opportunities for periodic weapons system refresh, allow decision makers to make informed trades between cost, schedule, and performance, and based on historic data, will likely result in a cost savings of approximately 15 percent.

We also must design missile defenses that can adapt to future threats. As a hedge against future uncertainty, we have a number of on-going development programs to push the edge of the technology envelope. For example, we are requesting funds to begin development of a Precision Tracking Space System (PTSS). We are also requesting funds in FY 2011 to develop technologies that will kill missiles with directed energy and high velocity versions of the SM-3 family of missiles to intercept targets early in flight.

II. PROGRAM HIGHLIGHTS

In accordance with the Ballistic Missile Defense Review, the FY 2011 program is balanced to develop, rigorously test, produce, and integrate a BMDS architecture. The FY 2011 program has four focus areas based on the Agency's strategic goals:

- Provide capabilities to *defend the territory of the United States* against ballistic missile threats from rogue nations
- Enhance missile defense to *defend* our deployed forces, allies, and friends *against regional threats* including defeating large raid sizes and intercepting early in flight
- *Prove our BMDS works* before making production decisions ("fly before buy")
- *Develop future missile capabilities* that are adaptable and responsive to intelligence-based judgments of the threat.

The following discussion provides a summary of the highlights of the major Program Elements and does not necessarily include a discussion of all of the funding that resides in that Program Element.

Continuing a Viable Homeland Defense

Ground Based Midcourse Defense (GMD) (PE 0603882C): For the Future Years Defense Plan (FYDP), we are requesting $5.883B, including $1.346B in FY 2011. We will continue the development of long-range GMD capabilities with the deployment of 26 Ground-based Interceptors (GBIs) at Ft. Greely, Alaska and four GBIs at VAFB in California. We are requesting $359M to continue the improvement and expansion of the interceptor fleet, including an additional five GBIs with upgraded avionics (Fleet Avionics Upgrade/Obsolescence Program – FAU/OP) to support the new test program and Stockpile Reliability Program. We intend to complete Missile Field 2 in a 14-silo configuration by FY 2012. Once completed, we will transfer six GBIs currently deployed in Missile Field 1 to Missile Field 2. We plan to decommission Missile Field 1, since it was designed as a test asset only (i.e. not hardened or robust for long-term operational deployment), once Missile Field 2 is fully operational. Although we do not need to deploy more than 26 operational interceptors at Ft. Greely, completion of Missile Field 2 will allow for a contingency deployment of up to eight additional GBIs if needed over the next decade.

Sea Based X-Band Radar (SBX) (PE 0603907C): For the FYDP, we are requesting $820M, including $153M in FY 2011. The FY 2011 request includes $98M for the operations and sustainment of the SBX platform and its support vessel (the Dove) and $43M for operations and sustainment of the X-band radar in support of BMDS flight testing, as well as the completion of software upgrades that provide an improved capability to discriminate between countermeasures and re-entry vehicles.

BMD Sensors (PE0603884C): The BMD Sensors PE supports both the homeland and regional missions. For the former, we are requesting $23M in FY 2011 to sustain and upgrade Cobra Dane and the Upgraded Early Warning Radars (UEWRs) (Beale, Fylingdales and Thule). The Cobra Dane radar will undergo minor changes to existing hardware and will receive

software upgrades. The UEWR upgrades will include replacing decades-old processing hardware and the associated software. Finally, we will continue planning and design analysis to upgrade the Clear Early Warning Radar in Alaska to a UEWR for robust sensor capability for homeland defense.

Enhancing Regional Defense

Missile Defense Capability in Europe: The Phased Adaptive Approach:

- *Land Based SM-3 (PE 0604880C)*: This is a new PE. For the FY 2011 – 2015 Future Years Defense Plan (FYDP), we are requesting $1.047B of Research, Development, Test & Evaluation (RDT&E) funding, including $281M for FY 2011, to develop, test and deploy an Aegis Ashore capability for the Phased Adaptive Approach (PAA). The first Aegis Ashore battery is scheduled to be deployed by CY2015 with 24 SM-3 Block IB interceptors. The FY 2009 Appropriations bill included MILCON funding for the European missile defense sites in Europe which is no longer required. In FY 2010, the Congress rescinded the FY 2009 funds but appropriated $68.5M to construct an Aegis Ashore test facility at the Pacific Missile Range Facility (PMRF) in Hawaii. This project was not authorized since the President did not publicly announce his European Phased Adaptive Approach until September 17, 2009, well after the House and Senate had completed the conference agreement on the Defense Authorization Bill. In the FY 2011 President's Budget, the Department is requesting a modification to the FY 2010 Defense Authorization Act to seek authorization for the $68.5M Aegis Ashore Test Facility at PMRF.
- *Airborne Infrared (ABIR) (PE 0604884C)*: This is also a new PE. For the FYDP, we are requesting $501M of RDT&E funding, including $112M for FY 2011, for the development, testing and fielding of ABIR sensor platforms to support tracking large ballistic missile raid sizes for Phase 2 of the Phased Adaptive Approach. Three ABIR combat air patrols, each with four ABIR platforms, are scheduled to be available by CY2015. The forward-based ABIR platforms are a key to increasing our ability to defeat large ballistic missile raids and enable early intercepts.

Ballistic Missile Defense System Procurement (PE 0208866C): We are proposing significant increases in regional capability in response to warfighter requests. For the FYDP, we are requesting $8.669B of Procurement funding, including $953M for FY 2011, to procure additional THAAD batteries and interceptors, Aegis SM-3 Block IB interceptors, and AN/TPY-2 radars as outlined below:

- $4.013B in the FYDP, including $859M in FY 2011, to buy a total of nine THAAD batteries and 431 interceptors by 2015. This is an increase of three additional THAAD batteries and 142 additional interceptors compared to the program described in the President's Budget request for FY 2010. In addition, the FY 2011 program now provides a total of 42 THAAD launchers to increase the number of THAAD launchers per battery from three (FY 2010 program) to six.

- $3.129B in the FYDP, including $94M in FY 2011, to buy a total of 436 Aegis SM-3 Block IA and IB interceptors by 2015. This is an increase of 107 interceptors compared to the FY 2010 program.
- $1.527B in the FYDP starting in FY 2012, to add an additional three AN/TPY-2 radars to our previous procurement plan for a total of 14 AN/TPY-2 radars by 2015 compared to the FY 2010 program, which planned delivery of 11 AN/TPY-2 radars.

Terminal Defense (PE 0603881C): For the FYDP, we are requesting $2.046B, including $436M in FY 2011. The request includes $64M to complete the hardware deliveries, including ground components and 23 interceptors that were incrementally funded, and $62M for hardware and software improvements and enhanced modeling and simulation. The THAAD system can engage the enemy's incoming reentry vehicle (RV) above or in the earth's atmosphere in the terminal phase of flight. To launch THAAD interceptors using data from other BMDS sensor elements, we are integrating THAAD into our BMDS C2BMC by upgrading THAAD's communications and command and control system. We are also requesting $63M for continued flight and ground testing and the completion of Insensitive Munitions/Final Hazard Classification testing. Beginning in FY 2012, we intend to transition the operations and support costs for THAAD batteries to the Operation and Maintenance (O&M) appropriation.

BMD Aegis (PE 0603892C): For the FYDP, we are requesting $5.602B, including $1.467B in FY 2011. The request includes $165M to complete manufacturing of 30 SM-3 Block IB interceptors that are incrementally funded from the RDT&E appropriation. All additional SM-3 Block IB interceptors are fully funded from the Procurement appropriation after the Under Secretary of Defense for Acquisition, Technology and Logistics has approved initial production. The remainder of the request is primarily devoted to continuing the hardware and software developments as outlined below:

- $143M for the continuing development and testing of the Aegis BMD 4.0.1 Combat System. The System expands the Aegis BMD Weapons System (AWS) effectiveness by allowing the use of both the SM-3 Block IA and the SM-3 Block IB interceptor. It improves engagement performance against an expanded threat set and surveillance and track performance against some IRBMs as well as the capability of using remote BMDS sensor information to launch an interceptor (termed "Launch-on-Remote").
- $99M to continue the upgrade of three additional Aegis BMD engagement ships (two Aegis BMD 3.6.1 destroyers and one 4.0.1 destroyer).
- $255M for continuing development and testing of the SM-3 Block IB interceptor. The SM-3 IB is the next upgrade entering the fleet. The seeker, signal processor, and propulsion system of the Block IB missile kinetic warheads are improved versions of the proven Block IA missile and will result in increased missile effectiveness against growing technical sophistication of ballistic missiles. This missile upgrade, in combination with the BMD signal processor, provides Aegis BMD and the BMDS with an improved capability to identify closely spaced objects and probability of kill against advanced threats; it also expands the number of possible simultaneous engagements.
- $110M for system-level testing, including two important flight tests: (1) exercise the PAA's Phase 1 capability with an Aegis BMD AWS 3.6.1 and SM-3 IA interceptor

engagement of an MRBM target; and (2) test an Aegis BMD AWS 4.0.1 and SM-3 Block 1B missile engagement and intercept of an MRBM target.

- $228M for continuing development and testing of the Aegis BMD 5.0 capability. Aegis BMD 5.0 will integrate Aegis BMD 4.0.1 with the Open Architecture system developed by the Navy. This will allow the transition of Aegis BMD from older military standard computers to a commercial-off-the-shelf (COTS) computing system and will ensure the Aegis BMD system remains compatible with Navy assets as ship modernization plans are executed. A significant advantage of Aegis BMD 5.0 is that it will enable any Aegis ship to serve as a candidate for the BMD mission.
- $119M for development of Aegis BMD 5.1. Aegis BMD 5.1 integrates the SM-3 Block IIA missile with the 5.0 Open Architecture AWS and is capable of using remote BMDS sensor information to engage an incoming target (Engage-on-Remote).

Aegis SM-3 Block IIA Co-Development (PE 0604881C): This PE was established in the FY 2010 budget. We are requesting $1.705B for the FYDP, including $319M in FY 2011, for the development and testing of the SM-3 Block IIA interceptor which is being co-developed in cooperation with the Government of Japan. The SM-3 Block IIA missile will have a significant increase in velocity and range due to 21-inch diameter rocket motors, a two-color seeker, and an increased divert capability incorporated in an advanced kill vehicle. With these improvements, the SM-3 Block IIA missile will be able to defend a larger area against a wider range of threats than the Block I missiles.

BMD Sensors (PE0603884C): For the FYDP, we are requesting $2.873B, including $455M in FY 2011. The Sensors PE also supports the homeland defense mission, but most of the FY 2011 request is focused on the development of enhanced regional capabilities using the X-band AN/TPY-2 radar. The AN/TPY-2 radar is capable of operating in either a forward-based mode to provide information to the BMDS, or in terminal mode to provide information to a co-located THAAD battery. We are requesting $129M in FY 2011 for operations and sustainment of AN/TPY-2 radars worldwide and communications sustainment. We are also requesting $50M in FY 2011 for common software upgrades including the verification and validation of the first common software build (CX-1) that will allow the AN/TPY-2 radar to operate in a forward based mode or a THAAD radar mode. We are also requesting $36M for a Concurrent Test, Training and Operations (CTTO) capability that will provide operational BMDS sensors (to include the UEWRs, Cobra Dane and SBX) the capability to conduct simultaneous training and testing while continuing to operate the missile defense capability. For testing, we are requesting $68M for Sensors participation in BMDS flight and ground tests and for element test infrastructure; $26M for modeling and simulation (M&S) activities supporting all phases of sensor development; and $17M for development work related to Unifying Missile Defense Functions (communications, sensor registration, correlation, system track, system discrimination, battle management, and hit-to-kill assessment), which further increase BMDS integration.

Proving Missile Defense Works Through Enhanced Testing

BMD Test and Targets (PE 0603888C): For the FYDP, we are requesting $4.872B, including $1.113B in FY 2011. MDA conducted a systematic review of the BMDS testing

program in 2009, using a new approach that transitioned from the use of "architecture based" test objectives to "technical parameter-based" test objectives to collect data to anchor models and simulations (M&S). Flight testing can be too expensive and manpower intensive to be used as the sole means of statistically proving the effectiveness of the BMDS. We must therefore gather a set of pre-determined empirical data in our flight and ground testing programs and compare the results to those predicted by our models to support independent accreditation of our models and simulations. Under the new parameter-based approach, MDA and the Services' Operational Test Agencies have identified the specific data to be gathered and the circumstances in which to measure them – Critical Engagement Conditions (CECs) and Empirical Measurement Events (EMEs). We have identified, scheduled, and resourced over 120 test events over the FY 2011 to FY 2015 time period. In FY 2011 we are requesting $559M to support system level flight and ground tests, operate MDA range facilities and support Combined Test, Training, and Operations (CTTO) and the Distributed Multi-Echelon Training System (DMETS).

One of our most difficult test challenges is to acquire an inventory of reliable targets to represent a wide variety of threat ballistic missile parameters. In the past, our target acquisition strategy was comprised of uniquely combining and modifying older U.S. missile systems to perform as targets. These unique configurations were expensive and difficult to manage from a quality control standpoint. Over the past year, we have initiated steps to acquire a new set of targets. We are requesting $517M to provide threat representative targets of all ranges (short, medium, intermediate and intercontinental), to include Foreign Materiel Acquisitions with enhanced payloads to test, verify, and validate the performance of the BMDS. This Targets and Countermeasures (TC) funding includes $115M for non-recurring engineering and $250M for participation in BMDS flight tests utilizing short-, medium-, intermediate-, and intercontinental-range launch vehicles (LVs), reentry vehicles (RVs), and associated objects; $44M for Systems Engineering support; and $39M for inventory storage, aging surveillance and transportation of TC hardware in support of these tests. New competitive contracts will be awarded in FY 2011 to procure inventories of targets to allow the availability of backup targets for every flight test starting in FY 2012.

Test Planning and Modeling and Simulations: Evaluating the BMDS is likely one of the most challenging test endeavors ever attempted by the Department of Defense because of the global distribution of the system, high complexity of the engagements, and few live fire events. Ideally, comprehensive and rigorous testing is enabled by a stable configuration of the system being tested; a clearly defined threat; a consistent and mature operational doctrine; sufficient resources to repeat tests under the most stressing conditions; and a well-defined set of criteria of acceptable performance. Unfortunately, none of these situations applies to the BMDS. The hardware and software configurations of the BMDS frequently change since the system elements are still under development. There are significant uncertainties surrounding the nature and specifics of the ballistic missile defense threat. Moreover, the operational doctrine for simultaneous theater, regional, and homeland defense needs refinement. Further, costs can range between $40 million to $200 million per BMDS flight test, making the repetition of a very elaborate flight test cost-prohibitive.

In light of these challenges, the BMDS performance evaluation strategy is to develop models and simulations (M&S) of the BMDS capability and compare their predictions to

empirical data collected through comprehensive flight and ground testing to verify and validate their accuracy. Then, rather than physically test all combinations of BMDS configurations, engagement conditions, natural and man-made environments, and target phenomena, BMDS M&S can be used to assess full BMDS performance. These models are anchored by Critical Engagement Conditions (CECs) and Empirical Measurement Events (EMEs) data gathered via the MDA flight test program. The resultant models will be used in extensive BMDS technical assessments, which will augment the scenarios run in ground and flight tests with hundreds of additional cases to cover the threat, environmental and operational conditions needed to complete a high-confidence assessment of BMDS performance.

To that end, we are changing from an architecture-based approach to a verification, validation, and accreditation (VV&A) based parameter approach to testing. The validation of our models and simulations will enable our war fighting commanders to have confidence in the predicted performance of the BMDS, especially when those commanders consider employing the BMDS in ways other than originally planned or against threats unknown at this time. Despite this desire to rely on models, the complex phenomena associated with missile launches and associated environments mean that some performance measurements can only be investigated through flight and ground testing of the operational BMDS.

The MDA executes a combined developmental and operational test (DT/OT) program that actively involves the OTAs, the Director, Operational Test and Evaluation (DOT&E) and the warfighter community in all phases of test planning, execution, and post-test analysis. Early OTA involvement during a development program provides significant value to the developer, the OTA, and the warfighter.

A BMDS three-phase test review is conducted semi-annually to determine how to validate MDA M&S so that the war fighting commanders have confidence in the assessed performance of the BMDS. In Phase I, the data collection requirements to anchor models and simulations are identified and approved. In Phase II, an unconstrained test design is produced, using test data collection requirements from Phase I. In Phase III, an executable plan is developed by bringing the unconstrained test program in line with budget and resource realities. At the conclusion of the three-phase, semi-annual test plan review, the BMDS OTA Team and MDA produce, with full involvement by the DOT&E and the Joint Functional Component Command – Integrated Missile Defense (JFCC-IMD), approve and update the BMDS Integrated Master Test Plan (IMTP). The updated IMTP is event-oriented and extends until the collection of all identified data is completed to ensure adequate test investments.

In future revisions of the IMTP, the Director, Developmental Test and Evaluation (DDT&E) (a newly established position per the Weapons Systems Acquisition Reform Act of 2009) will participate in activities to update the IMTP and will also be a signatory of the document.

Developing Future Capabilities That Are Adaptable and Responsive

Space Tracking and Surveillance System (STSS) (PE 0603893C): For the FYDP, we are requesting $355M, including $113M in FY 2011. STSS launched two demonstration satellites

on 25 September 2009 and has completed 50 percent of its system functionality testing. For FY 2011 we are requesting $84M to continue testing and operation of the two demonstration satellites, including cooperative tests with other BMDS elements. We are also requesting $24M for the planning and participation of the demonstration satellites against targets of opportunity and scheduled IMTP tests. We will conduct feasibility demonstrations of down-linking STSS data to the Aegis BMD fire control system via C2BMC in preparation of an Aegis BMD remote launch engagement in FY 2012.

Precision Tracking Space System (PE 0604883C): The Precision Tracking Space System (PTSS) is a new Program Element. PTSS consists of prototype satellites, command and control, and ground stations. For the FYDP, we are requesting $1.207B, including $67M in FY 2011. We are developing the technologies to provide a persistent classification and global tracking capability that would greatly enhance the effectiveness of the BMDS because terrestrial-based sensor systems have inherent limitations, in particular their inability to acquire and track missiles around the curvature of the earth, require significant operational costs, and require permission on where, when, and how to operate by the host nation. Lessons learned from the two STSS demonstration satellites currently on orbit will inform our decisions on the development of the PTSS capability. Of the $67M, we are requesting $64M in FY 2011 to complete trade studies, alternatives analysis, and concept review; define and document the internal and external interfaces; conduct software-in-the-loop testing; and completion of the System Requirements Review, System Design Review, and Preliminary Design Review. The goal is to demonstrate the prototype PTSS system in FY 2014.

BMDS Space Program (PE 0603895C): For the FYDP, we are requesting $57M, including $11M in FY 2011. The requested funding is for the operation of the Missile Defense Space Experimentation Center (MDSEC). The MDSEC provides a single location for MDA elements to conduct on-orbit operations for satellites such as the two STSS demonstration satellites. The MDSEC also participates in BMDS tests, including data collection on targets of opportunity. Finally, the MDSEC conducts experiments, data integration, algorithm development and concept exploration to demonstrate the contribution of a space-based infrared sensor to overall BMDS performance.

BMD Technology (PE 0603175C): For the FYDP, we are requesting $1.004B, including $132M in FY 2011. Our advanced technology effort is focused on investing in potentially high payoff but low technology readiness level (TRL) technologies to provide such capabilities as the intercept of an enemy RV early in the battle space; optimized shoot-look-shoot opportunities; options for minimizing the potential impact of debris; and reductions to the number of interceptors required to defeat a raid of threat missiles. To achieve these goals, we are pursuing several efforts, including enhanced command, control, battle management and communications capabilities, high performance interceptor and kill vehicle components, and experiments to integrate ABIR, STSS, and new sensor technologies and to demonstrate early intercept concepts. For FY 2011, we are requesting $52M for C2BMC enhancements that will focus on the potential benefit of migrating the BMDS architecture to a net-centric, service-oriented architecture and combining National sensing capabilities with Airborne Infrared systems. We are requesting $41M in FY 2011 to develop components that increase the speed of our SM-3 family of interceptors with advanced divert capability, faster boosters, and lighter kill vehicles. We have

also included $21M for science and technology research on innovative and breakthrough technologies such as a next-generation radar and electro-optical infrared passive sensors.

Other BMDS Program Highlights

Command and Control, Battle Management and Communications (C2BMC) (PE0603896C): For the FYDP, we are requesting $1.619B, including $343M in FY 2011. The C2BMC system is the backbone for the BMDS integration of sensor and fire control information and provides solutions to the various homeland and regional interceptors. More specifically, the C2BMC system provides: planners to help optimize the deployment of BMD assets; communications links between BMDS elements; a battle management function that allows a shoot-look-shoot approach; control of BMDS radars, correlating and combining sensor data from multiple sensors tracking the same threat into one BMD system track; real-time awareness of the battle as it develops; engagement coordination between BMDS elements; and advanced battle planning capability that enables warfighters to place BMDS assets in ideal locations in anticipation of a ballistic missile threat. To provide this capability, the C2BMC program is being developed, tested and provided to the warfighter in discrete spirals of capability.

- In FY 2011 we are requesting $217M to complete verification testing of Spiral 6.4 and continue development of Spiral 8.2. We are establishing a C2BMC prototyping and analysis activity at Ramstein AFB, Germany, with the Air Force to ensure Spiral 6.4 meets the Warfighter's needs. Spiral 8.2 will provide multi-element engagement coordination, incorporate boost tracking, and improve system-level coordination. The funding will also allow C2BMC to participate in and analyze the results from ground and flight tests, war games and exercises.
- We are requesting $48M in FY 2011 to maintain the C2BMC training and sustainment of deployed systems, and $32M for fielding of Spiral 8.2 hardware at Northern Command (NORTHCOM), Strategic Command (USSTRATCOM), Pacific Command (USPACOM), European Command (USEUCOM) and Central Command (USCENTCOM). Finally we are requesting $35M to develop, test and install communications node equipment and long-haul communications necessary to support the Phased Adaptive Approach.

BMD Enabling Programs (PE 0603890C): One of MDA's strategic goals is to "deliver reliable, high quality, and fiscally sustainable missile defense products." In pursuit of this goal, we are requesting $2.292B for the FYDP, including $403M in FY 2011 for BMD Enabling Programs to continue integration of stand-alone missile defense systems into a layered BMDS. To achieve this integration, Enabling Programs provide the required expertise in systems engineering, threat assessment, manufacturing maturity, modeling and simulation, quality, safety, and mission assurance. In FY 2011 we are requesting Enabling Programs support as follows:

- $124M for Systems Engineering and Integration support to continue the development and improvement of the integrated BMDS and to prove the effectiveness of the system. This support includes the analysis and engineering trades required for developing the Phased Adaptive Approach.

- $16M for Intelligence and Security support for intelligence, counterintelligence and BMDS Information Assurance development and management. Collectively, these efforts provide critical protection against cyber attacks and information regarding threat ballistic missile capabilities (via intelligence), protection of personnel, activities and technology from espionage and terrorism through active and passive activities (via counterintelligence), and BMDS system vulnerabilities (via BMDS information assurance).
- $37M for Production and Manufacturing support. This support applies production tools such as Design and Manufacturing Assembly, supply chain gap analysis, and Continuous Process Improvement approaches such as Lean Six-Sigma to eliminate manufacturing waste, reduce process variability and ensure first time manufacturing quality for the BMDS.
- $112M for Information Technology (IT) support services required to operate and maintain the classified and unclassified local, metropolitan, and wide area networks and IT general services for missile defense in the National Capital Region (NCR), including the Aegis Program Office in Dahlgren, Virginia; the Huntsville, Alabama region; the Colorado Springs region; Kirtland Air Force Base (AFB) in New Mexico; Edwards Air Force Base in California, Elmendorf AFB, Eareckson Air Force Station, and Fort Greely in Alaska, and the Pacific Missile Range Facility in Hawaii. This support includes operation and maintenance of hardware, software and help desk services.
- $65M for Modeling and Simulation (M&S) support. The ability to develop models and simulations that provide a repeatable, consistent and accurate representation of real-world missile defense operations is essential for the future success of the BMDS. The primary mission of the M&S program is to develop system-level models and simulations that compare predictions to empirical data gathered through the comprehensive flight and ground test programs to validate their accuracy.
- $33M for Quality, Safety, and Mission Assurance. This support provides on-site quality surveillance for the MDA Director at contractor facilities across the United States. These Safety, Quality, and Mission Assurance experts provide oversight functions ranging from production work to executive management to reduce cost and risk.

Joint Warfighter Support (PE 0603898C): For the FYDP, we are requesting $327M, including $69M in FY 2011. Joint Warfighter Support is MDA's principal interface to the Warfighter (i.e., the Combatant Commands and their Functional/Service Components; the Joint Staff; and the Military Services). The primary mission of the Joint Warfighter Support is to ensure the effective transition and transfer of BMDS capabilities to the Warfighter through the Warfighter Involvement Process (WIP). The FY 2011 request includes $7M for the continued operations support to the BMDS through the Operational Support Center, which is manned 24 hours per day, 365 days per year to develop, maintain and communicate BMDS situational awareness data concerning the current "health and status" of the BMDS; $36M for support to Combatant Commander exercises and wargames, $7M for BMD education and training, including the operation of the BMDS Training and Education Center and $12M for warfighter interface management and Combatant Commander support.

Israeli Cooperative (PE 0603913C): For the FYDP, we are requesting $581M, including $122M in FY 2011. This amount includes

- $51M for the continued development of Upper Tier component of the Arrow Weapon System. The Upper Tier component of the Arrow Weapon System will provide Israel with an indigenous capability to defend against medium- and long-range ballistic missiles and will provide a cornerstone for the Architecture Enhancement Plan, which is a joint effort to create a combined U.S.-Israel multi-tier Missile Defense Architecture. Another $24M is needed to continue co-production of the Arrow interceptors and the Arrow System Improvement Program (ASIP). The ASIP will enhance the performance of the Arrow Weapon System to defeat longer-range and more robust ballistic missile threats expected to be introduced to the Middle East in the near future.
- $47M for the continued development of the David's Sling Weapon System for protection against Short-Range Ballistic Missiles (SRBMs). The 2006 summer conflict between Hezbollah and Israel underscored the strategic effect of inexpensive short-range ballistic missile attacks on civilian populations. The current Israeli architecture (comprised of PATRIOT and Arrow) has capability against some, but not all of these short-range ballistic missile threats. Consequently, in March 2005 the U.S. and Israel initiated an 18-month feasibility study of a low cost SRBM defense capability, and in September 2008, the United States and Israel signed a project agreement to jointly manage the development of the David's Sling Weapon System.

Directed Energy Research (PE 0603901C): For the FYDP, we are requesting $512M, including $99M for FY 2011. In this request, we have zeroed out funding in the BMD Boost Defense PE - Airborne Laser (ABL) (PE 0603883C) and created a new PE to fund continued research on lasers. The Missile Defense Agency (MDA) will continue focused directed energy research and development to hedge against future threats. Near-term efforts will focus on scaling lasers for use (and test) on operationally viable and logistically supportable platforms to include development of a Diode Pumped Alkaline-gas Laser System (DPALS). Success in this effort could transition to prototyping activities for future BMD systems. MDA will transition the ABL aircraft to a National Laser Test Platform for advanced directed energy research for missile defense. Working with the Director of Defense Research and Engineering (DDR&E) and the High Energy Laser Joint Technology Office, MDA will leverage the airborne test platform to characterize high-energy, long-range laser beam propagation and validate the chemical oxygen iodine laser and other laser models in flight tests. The test platform will also provide a venue for other integrated laser weapon system demonstrations.

III. SPECIAL TOPICS

International Participation

Ballistic missile defense is a global effort that requires the United States to work closely with friends and allies to dissuade potential adversaries from acquiring ballistic missiles and, if necessary, defeat ballistic missile attacks. International participation in missile defense remains a pillar of our nation's counter-proliferation strategy, and one of MDA's strategic goals is "expand international cooperation and development of missile defenses in accordance with national defense policy."

MDA's International Strategy aims to build relationships and communicate the importance of missile defense with the practical effect of expanding global missile defense capability and interoperability. Through the international fielding of missile defense assets, the identification and integration of U.S. and partner assets and systems, technology development efforts, and other forms of cooperation and collaboration, MDA robustly supports national defense policy.

International participation in missile defense continues to grow and is especially responsive to the threat posed by Iranian and North Korean weapon development activities. MDA works closely with Combatant Commanders, the State Department, and other government agencies to support their missions and international missile defense goals.

Most recently, the President approved the Phased Adaptive Approach for missile defense in Europe. This new approach was based on an updated assessment of the Iranian missile threat and a commitment to deploy technology that is proven, cost effective, and adaptable to an evolving security environment. The PAA will build on already fielded BMDS assets to deploy capability in four phases, delivering missile defenses earlier than prior plans for defense of Europe, and will complement NATO missile defense activities. This approach is applicable to other regions of the world if threats emerge.

More broadly, MDA international research partnerships and technology programs provide significant contributions to the BMDS. These partnerships include six "framework" agreements to facilitate BMD cooperation with Japan, the United Kingdom, Australia, Denmark, Italy and the Czech Republic. In the case of the Czech Republic, MDA is continuing its productive partnership with Czech government, industry, and academic sources to further several missile defense technology efforts. Additionally, cooperative activities are under consideration with several other nations.

MDA continues to support efforts to collaborate with the Russian government on missile defense. We have supported several meetings of experts, and MDA stands ready to support more substantive technical and information-sharing initiatives with Russia.

NATO continues to examine its missile defense requirements. As a result of its Missile Defense Feasibility Study, the 2008 NATO Bucharest Summit recognized the importance of protecting member Nations from ballistic missile threats. The subsequent 2009 Strasbourg-Kehl Summit noted that future U.S. contributions of architectural elements could enhance NATO efforts and that missile threats should be addressed in a prioritized manner. As noted above, MDA activities in support of the PAA are expected to complement NATO's missile defense strategy. MDA continues to collaborate closely with NATO's Active Layered Theater BMD Program Office to demonstrate U.S.-NATO BMD interoperability and to ensure an integrated planning capability exists. These efforts give the Department of Defense confidence that interoperability with NATO will be supported throughout PAA's four phases.

Longstanding relationships continue to evolve, making substantial contributions to security and laying a firm foundation for future cooperation and contributions. Japan has proceeded to field operational Aegis Destroyers with a BMD capability and is also upgrading

their PATRIOT Advanced Capability (PAC)-3 units. Japan is currently fielding a multilayered BMD system that is capable of being interoperable with the U.S. system, including the forward-based U.S. AN/TPY-2 radar at Shariki and our Aegis BMD ships in the region. The X-band radar at Shariki provides precise early detection and tracking to increase the probability we will destroy any lethal target launched by North Korea.

Also, we are continuing our work with Japan through the joint SM-3 Block IIA Cooperative Development Project that promises to deliver a substantial capability to defeat more robust threats. The development of the 21-inch diameter SM–3 Block IIA interceptor will increase our capability to engage more robust threats from Aegis BMD platforms. This effort is one of the largest and most complex cooperative projects ever undertaken between Japan and the United States.

Our long-standing partnership with the United Kingdom has continued to expand as we have increased the capabilities of the Fylingdales Early Warning Radar and improved our combined C2BMC situational awareness, and we are exploring new areas of future cooperation both on a bilateral basis and potentially in concert with other allies. The United States and Denmark completed the Thule Early Warning Radar upgrade to the configuration of other early warning radars and, like the radar at Fylingdales, Thule will significantly enhance our capability to detect and track ballistic missile threats emerging from the Middle East.

The United States and Israel have cooperated on missile defense for over twenty years. Collaborative efforts have grown from early feasibility studies to the development and employment of the Arrow Weapon System, a fully operational missile defense system that is interoperable with U.S. BMDS elements. On-going cooperative programs and forthcoming initiatives will continue to advance this cooperation. These include U.S. and Israeli industrial co-production of Arrow interceptors; the joint short range David's Sling Weapon System; and development of an Israeli upper-tier defense system. The Juniper Cobra exercise in 2009 demonstrated the great potential for integrating U.S. and Israeli missile defense systems.

The upcoming year will include several significant events to demonstrate combined U.S. and Israeli missile defense capabilities and interoperability. U.S. BMDS elements, such as the AN/TPY-2 radar, THAAD, and the Aegis BMD Weapon System, will participate in these flight tests to demonstrate interoperability and enhance combined operations and develop and refine tactics, techniques and procedures associated with this coalition architecture.

The MDA and Israel are jointly developing the David's Sling Weapon System to defend Israel against shorter range ballistic missile and large caliber rocket threats. The first booster fly-out was successfully conducted in February 2009, and the first intercept test is scheduled to occur in 2010, to be followed by the first system flight test in 2011. Upon implementation of the U.S./Israel Upper Tier Interceptor Project Agreement, cooperative efforts will begin to develop and demonstrate the Arrow-3 interceptor with a potential system fly-out test in 2011.

MDA continues to expand its international initiatives in the Middle East, where interest is significant and growing. We continue to work on the development of a Foreign Military Sales (FMS) Letter of Offer and Acceptance for THAAD with the United Arab Emirates. If all options

are exercised, the sale of THAAD to the UAE would be valued at $6.9B and introduce an important new BMD capability in the Gulf Region.

MDA continues to work closely with USCENTCOM on international engagement and outreach on missile defense topics. MDA actively participates in USCENTCOM Bilateral Air and Missile Defense Working Groups that have been established with Bahrain, Kuwait, Saudi Arabia, and Qatar. In FY 2010, we expect Working Group participation to expand to include all six Gulf Cooperation Council (GCC) countries.

Other outreach efforts include the conduct of BMD architecture analyses and participation in the ARCENT International Air and Missile Defense (IAMD) Symposium. The IAMD Symposium includes a mix of hands-on training of the U.S. Military decision making process and senior-level briefings on development of air and missile defense designs. In FY 2010, the IAMD symposium will focus on missile defense, and MDA participation will increase to include simulation support to conceptualize and validate partner nation plans developed as part of the Symposium's training. At USCENTCOM's request, MDA conducted BMD analyses for Bahrain and Saudi Arabia in FY 2009 and will conduct analysis for Kuwait and Oman in FY 2010. BMD analysis for Qatar is expected to take place as part of a larger FMS case for defense analysis.

Elimination of the BMDS Block Structure

With the President's Budget for FY 2009, we presented the Agency's programs and budget below the program element level according to a new capability-based "block structure" that was based on significant increments of capabilities against particular threats. The new structure included five blocks, each being a subset of and contributing to the overall, integrated operational BMD capability pool. However, the House Appropriations Committee stated in its report on our FY 2009 budget that "justification materials should no longer be presented in the Block format, but rather by fiscal year for each activity within the program element." As a result of this congressional direction, we have eliminated use of the capability-based block structure for all planned funding from FY 2011-2015. MDA's budget request for FY 2011 reflects our incremental, evolutionary approach to enhancing the BMDS. Whether the delivered capability is a new component or an enhancement to an existing one, each delivered capability ultimately, following successful testing, constitutes an incremental upgrade to the entire BMDS. With elimination of the BMDS block structure, we began establishing our cost and schedule baselines for components within project elements and performance baselines for homeland and regional BMDS capabilities in the BMDS Accountability Report (BAR) to Congress dated 13 August 2009.

IV. MDA Management

New Acquisition Oversight Process

In recent months, MDA has been establishing a process to better translate capability needs and technology opportunities into stable, affordable, and well-managed BMDS development programs. The Deputy Secretary of Defense approved the BMDS Life Cycle

Management Process in 2008. Our structured and transparent BMDS development management process will be based on certain key principles:

- Baseline reviews to describe and manage development programs through six baselines (resource, schedule, technical, test, contract, and operational)
- Evolutionary delivery of incremental capability to the warfighter
- Distinct and disciplined phases for Materiel Solution Analysis (Concept Exploration), Technology (Concept) Development, and Product Development (Design and Demonstration)
- Use of Knowledge Points for measuring progress and informing key decisions
- Balancing of capability needs and available resources (mature technologies and adequate schedule and funding) at the start of product development–the key decision point for making a substantial investment in a new BMDS capability

These principles are consistent with Federal statutes and the tenets of the Defense Acquisition System (Department of Defense Instruction 5000.02) and acquisition best practices recommended by the Government Accountability Office (GAO). They also reinforce the direction provided by Congress in the Weapon Systems Acquisition Reform Act of 2009.

The reviews mentioned above will emphasize the establishment of sound baselines and confirmation of an affordable, achievable plan for proceeding from one phase to the next. Reviews will consider earned value data and Knowledge Points. All BMDS elements have prime contracts with integrated cost, schedule, and technical baselines along with a performance measurement process. As a result, the Agency has significant cost, schedule, and technical performance transparency on the elements' budgeted dollars. This transparency allows for measurement of deviations to the program baseline to better promote accountability. Product Development baseline reviews will be co-chaired with the lead service Acquisition Executive and Director, MDA. In January 2010, we held our first review with the U.S. Navy Assistant Secretary of Research, Development and Acquisition, and we will complete all reviews by the third quarter of FY 2010.

Missile Defense Agency Engineering and Support Services (MiDAESS)

The MDA acquires contractor support services mostly through headquarters contracts, program level contracts with Other Government Agencies (OGA), direct contracts with OGAs, and General Services Administration orders. To gain efficiencies, MDA has determined the best path forward is to transfer the Advisory and Assistance Services work to an MDA program for enterprise-wide functional management and oversight. In 2007 the MiDAESS program was established to more efficiently and effectively provide engineering and technical support; studies, analyses, and evaluation support; and management and professional services enterprise-wide.

Over the course of 2009, the Agency finalized the MiDAESS acquisition strategy. In April 2009 the Small Business Administration concurred with the MiDAESS acquisition cost-benefit analysis, and in May 2009, the Office of the Secretary of Defense approved the MiDAESS acquisition plan. With this approval, MDA released two solicitations in June 2009: Full and Open unrestricted competition and Small Business Set-Aside competition to support

requirements from 16 functional organizations. The Agency received proposals from interested companies in July 2009 and began source selection evaluations in August 2009. The completion of source selection will result in multiple Indefinite Delivery/Indefinite Quantity (IDIQ) contract awards. We anticipate all contracts will be awarded during FY 2010, and some task orders executed under the IDIQ contracts will begin as well.

Base Realignment and Closure (BRAC)

The 2005 Defense Base Realignment and Closure (BRAC) Commission approved recommendations directing the realignment of several MDA functions from the National Capital Region (NCR) to government facilities at Fort Belvoir, Virginia, and the Redstone Arsenal in Huntsville, Alabama. Specifically, a Headquarters Command Center (HQCC) for MDA will be located at Fort Belvoir, while most other MDA mission and mission support activities originally in the NCR will be realigned to Redstone Arsenal.

In support of these realignments, MDA awarded contracts to construct two new facilities: a $38.5 million HQCC at Fort Belvoir, and a $221 million addition to the Von Braun Complex at Redstone Arsenal. HQCC construction began in 2009 and is expected to be completed for occupancy in FY 2011. The HQCC will accommodate 292 positions. The Von Braun project construction began in the fall of 2008. The first phase is being readied for occupancy by late 2010, and the second phase scheduled for completion and occupancy by the BRAC deadline of September 15, 2011. Meanwhile, the transfer of government and contractor positions from the NCR is well underway. Thus far, MDA has transitioned approximately 1,500 of the planned 2,248 positions to Huntsville/Redstone Arsenal.

Human Capital Development

The constantly changing nature of the BMDS mission will drive a variety of requirements and new priorities that will influence how we support that mission. Translating the impact of these changes into how they will affect our total workforce is a mission imperative that we must accomplish in order to sustain a relevant workforce capable of responding to these emergent requirements. To accomplish the Agency's strategic goals, we must foster a motivated high-performing workforce by enhancing retention, recruitment, education, and opportunities for increasing responsibility and authority.

Workforce Planning: We will continue to analyze the structure and alignment of our human capital resources, recognizing that our manpower projections and growth must be framed by a comprehensive human capital strategic plan. This degree of forward planning represents our best effort to analyze critical workforce data and use it for projecting mission and staffing needs in the foreseeable future. We intend to continue monitoring our position vacancy fill rates and deliver quality people in more efficient timeframes. Our in-sourcing strategy will comply with the FY 2008 National Defense Authorization Act, which requires the Department to ensure consideration is given to utilizing government employees to perform new functions and to analyze existing contracted work for opportunities to in-source work to the government workforce. We will also continue to grow the Missile Defense Career Development Program in the future by semi-annually hiring entry-level employees in engineering, science and acquisition career fields. Our first class of 60 career development personnel started in July 2009. Our

second class of 100 began in January 2010. The success of this initiative is closely linked to our national marketing and recruitment outreach efforts to acquire qualified staff, and efforts to leverage technical expertise from other government organizations. Fundamental in this entire talent acquisition process is strengthening our workforce diversity.

Employee Retention: Supplementing our strategic human capital direction are other integral objectives aimed at improving employee job satisfaction and engagement, our performance culture, and the leadership capabilities necessary to retain a workforce that reflects the Agency's vision, mission, and core values. For example, we propose to develop a funding stream to support an Interagency Agreement with Federal Occupational Health for assistance in providing a comprehensive employee wellness program across our Agency, and we will closely analyze results of annual employee surveys to develop plans for tackling issues that our employees perceive as obstacles in how they can best perform their work. We envision retaining our human capital by promoting a healthy workplace and reinforcing this belief with contemporary human capital management policies and initiatives that comply with Office of Personnel Management and Departmental priorities.

Employee Development: Building the capacity to address educational and other developmental requirements for sustaining our technical, supervisory, and executive management skills is an important factor in acquiring and retaining an effective workforce for meeting today and tomorrow's challenges. We will continue to build a sequential leadership development process within the Agency, and identify future skills and competencies that we must obtain through programmed educational and training opportunities for employees who demonstrate the potential for accepting greater responsibilities and career development. We encourage our next generation leaders to fully participate in civilian leadership development programs. We will mature our succession planning approach to identify these performers and open doors for their continued professional development through competitive academic degree programs and other financial assistance initiatives.

Competency Management: We will align our human capital with current and emerging mission and programmatic goals, then develop long-term strategies for acquiring, developing, and retaining a staff to achieve those programmatic goals. We are committed to developing steps that are tailored to address gaps in the competencies, allocation, and deployment of our human capital resources, and aligning these resources so that the sum of their critical skills and competencies enables us to promote an effective matrix management environment for accomplishing the scope of our program goals. We are also committed to ensuring our acquisition certification rates increase as a result of better forecasting and management of Defense Acquisition Workforce Improvement Act continuous training requirements. Integrating new automated tools, such as a Learning Management System, will facilitate our ability to monitor employee training progress, and more accurately evaluate annual budget needs and how well our employees and supervisors collaborate in career development planning.

Summary

By program element, the following table summarizes our spending plans for FY 2011, compared to FY 2009 and FY 2010 appropriated levels.

($millions, then year)

Program Element (PE) Title	PE Number	FY 2009	FY 2010	FY 2011
Procurement				
Aegis	0208866C	102	226	94
THAAD	0208866C	105	419	859
RDT&E				
Technology	0603175C	118	189	132
Terminal	0603881C	951	716	436
Midcourse	0603882C	1473	1027	1346
Boost	0603883C	384	182	
Sensors	0603884C	683	621	455
System Interceptor	0603886C	309		
Test and Targets	0603888C	907	823	1113
BMD Enabling Programs	0603890C	403	359	403
Special Programs – MDA	0603891C	183	250	270
Aegis BMD	0603892C	1054	1436	1467
STSS	0603893C	210	162	113
MKV	0603894C	226		
System Space Program	0603895C	23	12	11
C2BMC	0603896C	275	335	343
Hercules	0603897C	52	48	
Joint Warfighter Support	0603898C	66	61	69
MDIOC	0603904C	103	86	86
Directed Energy Research (new)	0603901C			99
Regarding Trench	0603906C	3	6	8
SBX	0603907C	144	167	153
European Interceptor Site	0603908C	349		
European Midcourse Radar	0603909C	74		
European Capability	0603911C		50	
European Communications Support	0603912C	26		
Israeli Cooperative	0603913C		201	122
Land Based SM-3 (new)	0604880C			281
Aegis SM-3 Block IIA Co-Development (new)	0604881C		256	319
Precision Tracking Space System (new)	0604883C			67
Airborne Infrared (ABIR) (new)	0604884C			112
Small Business Innovative Research	0605502C	125		
Pentagon Reservation	0901585C	20	20	20
Management Headquarters	0901598C	87	52	30
MILCON				
Test and Targets	0603888C	18	6	
Land Based SM-3	0604880C		69	
BMD Aegis	0603892C		25	
European Interceptor Site	0603908C			
European Midcourse Radar	0603909C			
BRAC	0207998C	160	87	9
MDA Total		8632	7891	8416

Table 1: Funding by Appropriation and Program Element, FY 2009 – FY 2011


MISSILE DEFENSE AGENCY
DEPARTMENT OF DEFENSE