Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Total PE Cost	503,475	400,751	186,697					
WX19 Airborne Laser Capability Development	470,640	388,609	181,881					
ZX40 Program-Wide Support	32,835	12,142	4,816					

A. Mission Description and Budget Item Justification

A.1 System Element Description

The ABL, on a Boeing 747-400 series aircraft, provides a capability to destroy ballistic missiles in the boost phase of their trajectory and also provides additional classified capabilities. The boost phase is typically the segment from post launch through propellant burnout, includes the first 60-300 seconds of flight and concludes at altitudes between 20-450 kilometers. The ABL program is designing, building, and testing an airborne laser system with unique capabilities to provide early launch defense against ballistic missile threats by acquiring, tracking, and destroying ballistic missiles and to support the multi-tiered BMDS concept.

A.2 System Element Budget Justification and Contribution to the Ballistic Missile Defense System (BMDS)

The primary mission of ABL is to significantly increase the overall defensive capability of the BMDS by destroying threat ballistic missiles in their early launch phase thus reducing the number of targets faced by successive defenders, and by addressing certain threats that are difficult for other elements to counter. ABL is the primary boost-phase defense element being developed for the BMDS, uniquely adding the capability to destroy ballistic missiles of any class (i.e. from short range ballistic missiles to intercontinental ballistic missiles) during the boost phase. By destroying missiles during their boost phase, ABL negates the threat prior to its ability to deploy multiple reentry vehicles, submunitions, or countermeasures. Following successful engagement by ABL, warheads and engagement debris do not reach the intended target areas, with a reasonable probability that the threat missile debris will fall within the hostile country's own territory, reducing the possible effect of debris on protected areas and assets and perhaps serving as a deterrent. Secondary missions for an operational ABL will be to provide additional threat protection through early ballistic missile launch warning, launch site estimation, cueing to the BMDS, impact point prediction and post-boost vehicle engagement. ABL's sensor capabilities can further increase the robustness of the BMDS by enhancing the performance of downrange elements. In addition, ABL's mobility and speed-of-light engagement capability present adversaries with additional complexities when trying to develop or employ countermeasures. ABL adds unique warfighting flexibility through its ability to deploy quickly to areas of interest and to adapt more readily to evolving situations that may threaten the US or its allies.

Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

The best way to dissuade, deter, and defeat ballistic missile threats is through integrated ballistic missile defense capabilities - weapons, sensors and Command and Control, Battle Management and Communications (C2BMC). A potential or actual attack may cross regions and may fly higher and faster than stand-alone, autonomous capabilities operated by a single Military Service can defend against. Integrated BMD capabilities draw on space-, land-, and sea-based assets operated by multiple Services to provide both the best sensor information on the enemy missile's location and track as well as a more diverse and effective set of weapon options for the Combatant Commander to defeat the attack - all connected by a unifying C2BMC system. As a result, an effort funded in a Program Element may be critical to success of efforts in other Program Elements - we refer to these connections as ``interdependencies``. Throughout the budget justification material, we have attempted to highlight interdependencies in order to explain for fully the relationship between different parts of the proposed program.

A.3 Major System Element Goals

The development of the 1st ABL, which is a technology demonstrator (referred to as the 1st ABL technology demonstrator throughout the remainder of this document) will be accomplished by incrementally stepping through key Knowledge Points (KPs) which reflect increasing degrees of integration and testing of the overall weapon system. The KPs are established on a calendar year basis, and are taken from major milestones within the program. Some of the major overall program objectives/milestones are:

- Complete integration and ground/flight testing of the ABL weapon system combining the High Energy Laser (HEL), Beam Control/Fire Control (BC/FC), and Battle Management Command Control Computers Communication and Intelligence (BMC4I) segments
- Conduct Flight Test/Laser- 01 (FTL-01), an ABL weapon system lethal demonstration against a threat-representative boosting ballistic missile
- Conduct additional lethal demonstrations against a variety of targets
- Continue ground testing and sustain capability to meet Ballistic Missile Defense System (BMDS) requirements
- Evaluate operational effectiveness and affordability of the ABL weapon system

Each milestone supports decisions to complete subsequent program milestones. After FTL-01 and continuing through mid-FY10, the ABL program will continue to demonstrate viability of the ABL weapon system by conducting additional lethal demonstration efforts followed by further system characterization, support and development activities. The planned ground test program for 2010, combined with analysis for beginning evaluation of affordability, will provide the foundation for determining the optimal path forward for ABL.

Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

A.4 Major Events Schedule and Description

Major Event	Project	Timeframe	Description
Flight Test			
Program Milestones			
1st ABL Lethal Demonstration	WX19	4Q FY 2009	• CY09 Knowledge Point #11, Lethal Demonstration
Flight Tests			
Complete High Power System Integration Flight Testing	WX19	4Q FY 2009	
Demonstrate High Energy Laser Performance in Flight	WX19	4Q FY 2009	• CY09 Knowledge Point #9
Engagement of High Power Missile Alternative Range Target Instrument	WX19	4Q FY 2009	• CY09 Knowledge Point #10
Engagement of Low Power Missile Alternative Range Target Instrument	WX19	4Q FY 2009	• CY09 Knowledge Point #8
Additional Lethal Demonstration Events	WX19	1Q FY 2010 - 2Q FY 2010	•
Ground Test			
Program Milestones			
1st Light Through Beam Control/Fire Control	WX19	4Q FY 2008	• CY08 Knowledge Point #7 (Completed Nov 08)
1st Light into the Laser Calorimeter	WX19	4Q FY 2008	• CY08 Knowledge Point #6 (Completed Sep 08)
Ground Test			
Complete High Power System Integration Ground Testing	WX19	4Q FY 2009	
Other			
Program Milestones			
Aircraft and Support Systems Ready for High Power System Integration	WX19	1Q FY 2008	• CY07 Knowledge Point #5 (Completed Dec 07)
Complete Life Cycle Affordability Study	WX19	4Q FY 2010	

Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

B. Program Change Summary	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget (FY2009 PB)	510,241	421,229	423,927	
Current President's Budget (FY2010 PB)	503,475	400,751	186,697	
Total Adjustments	-6,766	-20,478	-237,230	
Congressional Program Reductions	0	-20,478	0	
Congressional Rescissions	0	0	0	
Total Congressional Increases	0	0	0	
Total Reprogrammings	1,262	0	0	
SBIR/STTR Transfer	-8,028	0	0	
Adjustments to Budget Years	0	0	-237,230	

The FY08 decrease of $6.766 million includes SBIR/STTR transfer and MDA reprogrammings

The FY09 decrease of $20.478 million reflects MDA Congressional specific reductions

The FY10 decrease of $237.230 million reflects MDA adjustments for infrastructure reductions and efficiencies

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
WX19 Airborne Laser Capability Development	470,640	388,609	181,881					
RDT&E Articles Qty	0	0	0					

Note: Target funding transitioned to the Targets and Countermeasures Program Element beginning in FY09. For Ballistic Missile Defense (BMD) System Level Test Schedule information, please refer to the BMD System Level Test Schedule.

A. Mission Description and Budget Item Justification

In the FY08-FY09 timeframe, the development of the 1st ABL technology demonstrator will continue incrementally stepping through key knowledge points (KPs) that represent increasing degrees of integration and testing of the ABL weapon system. Accomplishment of each KP represents significant levels of accumulated understanding that confirm the ABL's viability for future integration of its boost-phase defense capabilities into the Ballistic Missile Defense System (BMDS). In this time period, the 1st ABL technology demonstrator will continue ground and flight testing, leading to a lethal demonstration of the weapon system against a threat-representative ballistic missile (Flight Test Laser-01) in the fourth quarter of FY09. After FTL-01 and continuing through mid-FY10, the ABL program will continue to demonstrate viability of the ABL weapon system by conducting additional lethal demonstration efforts followed by further system characterization, support and development activities. The ABL will continue ground testing to gain knowledge of the capability of the weapon system. The ABL program will also complete an affordability study to address life cycle cost of the weapon system. ABL will perform product requirements analysis/derivation, design, development, testing and delivery of verified Modeling and Simulation tools in support of Ballistic Missile Defense System events.

Current Program Knowledge Points (KPs) are:

- Engagement against a Low Power Missile Alternative Range Target Instrument (MARTI) (KP#8) - This KP will validate and characterize Low Power (using the Surrogate High Energy Laser) ABL performance against boosting targets
- Demonstrate High Energy Laser (HEL) performance Internal/External on the Aircraft in Flight (KP#9) - This KP will demonstrate functionality of the optical system with the HEL on the aircraft in flight
- Engagement against a High Power Missile Alternative Range Target Instrument (MARTI) (KP#10) - This KP will validate and characterize High Power (using the High Energy Laser) ABL performance against boosting targets
- FTL-01, ABL Technology Demonstrator lethal demonstration (KP #11) - This KP will demonstrate ABL capability to negate a threat representative boosting ballistic missile. Following FTL-01, additional lethal demonstration events will be conducted to further evaluate geometries and/or ranges of the current ABL configuration

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

Modeling and Simulation (M&S) activities support all phases of ABL's development including development of modifications to the ABL Weapon System, development, flight test missions, ground tests, wargames, exercises, and performance assessment. Models and simulations are tailored to the specific need of a component in its current phase of development, ranging from low-to-medium fidelity analyses supporting concept definitions studies, to high-fidelity models used to support engineering development, or testing and are integrated into the BMD Digital Simulations Architecture. Digital simulations support Program Assessment events, which provide critical system level performance data relative to all elements, the system engineer, M&S developers, Operational Test Agency and Warfighter. Further, the M&S Digital tools are accredited for each application and for specific objectives; tools are put through a rigorous verification and validation process, reviewing coding and specifications, and comparing analyses against actual flight test results. Planning support is required to assist in the V&V plan development, test execution, analysis for V&V reports and program office M&S certification. The Digital End-to-End simulation of the BMDS requires a Predictive Avoidance (PA) Integrated V&V Plan and Report (at both element and system level), and a PA-system level Accreditation Plan and Report.

ABL will support System Pre-Flight predictions for each system level flight test using the test framework set up with the BMDS configuration for a particular flight test. This provides the confidence in Flight Test execution by predicting element performance and exercising element interfaces. This work is also used to proof out the construct of the flight test to ensure if the required data and data management plan will support System Post Flight Reconstruction objectives. System Post Flight Reconstruction (SPFR) will use a Hardware in the Loop (HWIL) and/or a Digital M&S Environment to replicate the day of flight for the BMDS configuration, modified to represent the actual environment conditions and target dynamics observed in flight. The results of this testing are used to increase confidence in the models and simulations by anchoring the results with emphasis on the critical engagement conditions (CECs) and empirical measurement events (EMEs) back to the real world event. SPFR is used for validation (anchoring) of models and simulations.

MDA Element testing is based on an integrated, comprehensive, and phased test program. Element systems, subsystems, and components are tested early in development and are necessary prior to conducting BMD-System level testing. ABL Element level testing is funded as part of a developmental program and reflected in this Program Element (PE) submission. This PE also provides ABL participation in the consolidated MDA-wide System Test Program and the resources for the, planning, design, execution and management of ABL in BMD System testing in accordance with the BMDS Test Policy, MDA Directive 3202.03 (Jan 09).

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

B. Accomplishments/Planned Program

	FY 2008	FY 2009	FY 2010	FY 2011
1ST ABL	405,112	316,602	58,752	
RDT&E Articles (Quantity)	0	0	0	

Continue the program for developing the 1st ABL technology demonstrator, to include completing the integration of the High Energy Laser modules onto the aircraft (after which it will be a fully integrated weapon system) and initiation of the High Power System Integration phase of testing. The primary objectives of ground testing during the High Power System Integration phase are to demonstrate, verify, and characterize the 1st ABL technology demonstrator operations and performance, characterize functionality and performance of the entire ABL weapon system and verify the readiness of the 1st ABL technology demonstrator for High Power System Integration flight tests. The primary objective of the High Power System Integration flight test series is to build up to and accomplish Flight Test Laser-01 (FTL-01), the first test demonstrating ABL' s lethality capability, negating a threat-representative ballistic missile during the boost phase. The ABL program will also complete an affordability study to address life cycle cost of the weapon system.

FY08 Accomplishments:

Laser ($57.6 million):

- Continued support of High Energy Laser integration activities to include material analysis, structural analysis and performance measurements
- Continued to perform High Energy Laser performance data analysis during ground testing
- Continued to support High Energy Laser and Beam Control/Fire Control (BC/FC) laser integration

Aircraft ($9.4 million):

- Continued aircraft engineering support during High Energy Laser component integration and testing
- Continued work on aircraft service bulletins to address deficiencies related to airworthiness/safety issues
- Continued aircraft integration efforts to install remaining chemical/beam containment provisions

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

Battle Management ($11.1 million):

- Continued software support for High Power System Integration efforts
- Continued component refurbishment to support High Power System Integration efforts
- Performed ground functional testing of communication networks, predictive avoidance, mission planning, and the Link 16 data link activities

Beam Control/Fire Control (BC/FC) ($90.0 million):

- Completed beam control component refurbishment to support High Power System Integration efforts
- Continued integration with the High Energy Laser
- Initiated Beam Control/Fire Control and High Energy Laser ground testing activities
- Initiated design, implementation and integration of system performance enhancements coupled with parallel improvements to simulation and system integration tool suites

Air Vehicle Integration and Test ($204.3 million):

- Completed wiring, plumbing, and installation of High Energy Laser components on the aircraft
- Completed High Energy Laser activation and began testing of the High Energy Laser subsystems
- Initiated integrated weapon system testing with Beam Control/Fire Control, High Energy Laser, and Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I) subsystems on the ground
- Continued planning for High Power System Integration flight tests of the integrated ABL weapon system

Program Management/System Engineering ($30.6 million):

- Continued System Engineering and Structural Integrity, Quality Assurance, Safety, Hardware and System Analysis and Integration efforts
- Conducted Common Cost Methodology Working Group (CCMWG) efforts in support of ABL life cycle cost estimates and affordability modeling
- Continued studies to capture the 1st ABL technology demonstrator baseline, identify required content, and future ABL improvements

Other Support Activities ($2.1 million):

- Continued implementation of amended security requirements (updated security classification guidance and program protection directives)
- Continued investigation of low cost Active Ranging System (ARS) development alternatives to improve ABL tactical performance parameter estimates (launch point, impact point, track data, etc)

FY09 Planned Program:

Laser ($31.1 million):

- Continue High Energy Laser data analysis in support of High Power Systems Integration ground and flight testing
- Continue aircraft engineering activities in support of the ABL ground and flight test activities

Aircraft ($4.1 million):

- Continue work on aircraft service bulletins to address deficiencies related to airworthiness/safety issues
- Support High Power System Integration, ground and flight testing

Battle Management ($9.9 million):

- Continue software support for High Power System Integration ground and flight test activities
- Perform ground functional testing of communication networks, predictive avoidance, mission planning, and the Link 16 data link
- Continue aircraft engineering activities in support of the ABL ground and flight test activities

Beam Control/Fire Control ($75.3 million):

- Support High Power System Integration ground and flight test activities
- Support Beam Control/Fire Control and High Energy Laser ground testing and data analysis

- Support High Power System Integration flight demonstration data analysis to include pointing accuracy and jitter control analyses
- Continue engineering activities in support of the ABL ground and flight test activities
- Continue design, implementation and integration of system performance enhancements coupled with parallel improvements to simulation and system integration tool suites

Air Vehicle Integration and Test ($168.4 million):

- Complete ground testing of the High Energy Laser subsystem
- Complete weapon system ground testing with High Energy Laser, Beam Control/Fire Control, and Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I) subsystems
- Continue ABL weapon system flight test program (multiple engagements culminating in negation of a boosting missile target)

Program Management/System Engineering ($27.2 million):

- Continue System Engineering and Structural Integrity, Quality Assurance, Safety, Hardware and System Analysis and Integration efforts, and Program and Contract Management support activities

Other Support Activities ($.6 million):

- Continue implementation of amended security requirements (updated security classification guidance and program protection directives)
- Continued investigation of low cost Active Ranging System (ARS) development alternatives to improve ABL tactical performance parameter estimates (launch point, impact point, track data, etc)
- Update Adversary Data Package to support future Ballistic Missile Defense System capability development
- Update Near-Field Plume data fidelity to support boost phase engagement capability development

FY10 Planned Program ($58.8 million):

- Conduct additional lethal demonstration events during 1st Quarter FY10, followed by system characterization, support, and development activities

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

- Complete Tail 1 Technology Demonstrator development contract (closeout of contractual requirements)
- Verify the highest priority 1st ABL Technology Demonstrator contract technical requirements
- Prepare and deliver final data packages required by contract
- Conduct an affordability study to address life cycle cost of the weapon system

	FY 2008	FY 2009	FY 2010	FY 2011
Industrial Base	5,986	5,692	2,900	
RDT&E Articles (Quantity)	0	0	0	

Enhance the ABL specific industrial base with the focus on large optics, optical coatings and targeted manufacturing shortfalls for current and future ABL weapon systems. Maintain and utilize an industrial base to ensure ABL unique personnel, facilities and processes are available to meet future ABL requirements. Provide a rapid response capability if a critical component is needed while addressing sparing and long lead requirements.

FY08 Accomplishments:

- Continued development of advanced optics, coatings, and substrates to enable higher power/increased reliability laser operations
- Maintained optics testing capabilities while testing new optics, materials, and coatings to maintain ready spares/aircraft availability
- Continued improvements to bulkhead window production capability to enable higher power/longer and safer High Energy Laser (HEL) operations

FY09 Planned Program:

- Continue development of advanced optics, coatings, and substrates to enable higher power/increased reliability laser operations
- Maintain optics testing capabilities while testing new optics, materials, and coatings to maintain ready spares/aircraft availability
- Continue improvements to bulkhead window production capability to enable higher power/longer and safer High Energy Laser (HEL) operations

FY10 Planned Program:

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

- Continue development of advanced optics, coatings, and substrates to enable higher power/increased reliability laser operations
- Maintain optics testing capabilities while testing new optics, materials, and coatings to maintain ready spares/aircraft availability
- Continue improvements to bulkhead window production capability to enable higher power/longer and safer High Energy Laser (HEL) operations

	FY 2008	FY 2009	FY 2010	FY 2011
Technology Insertion	9,250	0	0	
RDT&E Articles (Quantity)	0	0	0	

Develop technologies that will improve ABL lethality, reliability, maintainability and improve ABL's contribution to the Ballistic Missile Defense System (BMDS). Provide technical/schedule/cost risk reduction for the 1st ABL Technology Demonstrator and future ABLs. Focus on critical performance risk items and areas for high-payoff to operational utility.

Note: Beginning in FY09, limited resources shifted focus to successful lethal demonstration and maintenance of the 1st ABL Technology Demonstrator.

FY08 Accomplishments:

- Continued next-generation tracking laser development to extend ABL operational range/reach
- Continued to develop and build next generation mirrors, cameras, and navigation aids to improve ABL acquisition and tracking performance
- Continued efforts to reduce optical jitter and improve beam control performance to enhance ABL lethality

	FY 2008	FY 2009	FY 2010	FY 2011
Direct Support Activities	47,161	66,315	32,800	
RDT&E Articles (Quantity)	0	0	0	

Direct support activities include support for test activities involving ABL system characterization, and Adjunct Missions (AM). These activities also require support from the ABL Combined Test Force (CTF) to plan and execute ground and flight test activities, airborne and boosted diagnostics for flight tests, and lethality and survivability assessment efforts. After FTL-01 and continuing through mid-FY10, the ABL program will continue to

demonstrate viability of the ABL weapon system by conducting additional lethal demonstration efforts followed by further system characterization, support and development activities.

FY08 Accomplishments:

Combined Test Force ($15.6 million):

- Supported integration of the High Energy Laser (HEL) into the ABL aircraft
- Planned for High Power System Integration (HPSI) ground test activities
- Planned for HPSI flight test activities

Lethality and Survivability ($16.4 million):

- Continued subscale and full-scale lethality evaluation testing to support lethal demonstration
- Continued intelligence, lethality data collection, assessments and evaluation
- Continued traditional susceptibility-driven survivability assessment
- Conducted High Energy Laser System Test Facility (HELSTF) ground tests to support laser lethality effectiveness analysis efforts

Diagnostics/Instrumentation ($15.2 million):

- Developed dedicated airborne diagnostics platform for use in High Power System Integration (HPSI) flight tests and modified to provide required instrumentation capabilities
- Continued development and test of a loitering airborne target for high power testing
- Continued fabrication, integration and testing of low power Missile Alternative Range Target Instrument (MARTI) diagnostic missiles for HPSI (5)
- Continued fabrication, integration and testing of high power MARTI diagnostic missiles (3)

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

FY09 Planned Program:

Combined Test Force ($25.8 million):

- Plan for and support HPSI flight test activities to include the first ABL lethal demonstration
- Support Airborne Diagnostic Target (ADT) development and test
- Support and conduct flying operations for HPSI flight tests
- Plan for and support flight test activities involving ABL participation in Ballistic Missile Defense System (BMDS) test events
- Plan for and support test activities for the ABL Characterization and Capability Demonstration phase after the lethal demonstration
- ADT funding transferred to another test organization for acquisition and execution

Lethality and Survivability ($8.4 million)

- Continue subscale and full-scale lethality evaluation testing to support lethal demonstration and system envelope characterization flight test activities
- Continue intelligence, lethality data collection, assessments
- Conduct High Energy Laser System Test Facility (HELSTF) ground tests to support laser lethality effectiveness analysis efforts
- Begin aircraft vulnerability assessments and investigations

Diagnostics/Instrumentation ($32.1 million):

- Ensure dedicated Airborne Diagnostic Target (ADT) is available for use in High Power System Integration (HPSI) flight tests and modified to provide required instrumentation capabilities
- Integrate and launch Terrier Lynx (or equivalent) target missiles for HPSI flight tests
- Continue fabrication, integration and testing of high power Missile Alternative Range Target Instrument (MARTI) diagnostic missiles
- Launch low power and high power MARTI diagnostic missiles for ABL performance characterization tests

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

FY10 Planned Program:

Combined Test Force ($21.3 million):

- Plan for and support weapon system maintenance activities
- Plan for and support ground and flight test activities for the ABL Characterization and Capability Demonstration phase: system characterization and adjunct missions
- Create and present safety documents to the test wing safety review boards

Lethality and Survivability ($3.3 million)

- Continue intelligence, lethality data collection, assessments and evaluation

Diagnostics/Instrumentation ($8.2 million)

- Ensure dedicated Airborne Diagnostic Target (ADT) is available for use during additional flight tests in the first and second quarters of FY10

	FY 2008	FY 2009	FY 2010	FY 2011
Trade Studies	0	0	0	
RDT&E Articles (Quantity)	0	0	0	

Trade studies eliminated in FY09.

The Characterization and Capability Demonstration section supports continued operations of the 1st ABL aircraft.

	FY 2008	FY 2009	FY 2010	FY 2011

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

Characterization and Capability Demonstration	0	0	87,429	
RDT&E Articles (Quantity)	0	0	0	

After FTL-01 and continuing through mid-FY10, the ABL program will continue to demonstrate viability of the ABL weapon system by conducting additional lethal demonstration efforts followed by further system characterization, support and development activities. The ABL will continue ground testing to gain knowledge of the capability of the weapon system. ABL will perform product requirements analysis/derivation, design, development, testing and delivery of verified Modeling and Simulation tools in support of Ballistic Missile Defense System events. The program will consolidate engineering and operations data and evaluate and characterize system capabilities.

FY10 Planned Program:

Conduct additional lethal demonstration events during 2nd Quarter FY10 to further evaluate geometries and/or ranges of the current ABL configuration ($21.5 million)

Maintain weapon system chemical operations and initiate post Flight Test Laser-01 (FTL-01) ground test program to further characterize weapon system performance ($6.0 million):

- Initiate High Energy Laser power tuning/optimization testing, for increases in High Energy Laser power to provide a longer range kill capability
- Initiate wavefront analysis to provide a longer range kill capability
- Initiate Beam Control/Fire Control adjustments to improve jitter and pointing accuracy

Conduct sustainment activities to maintain the ABL weapon system ($59.9 million):

- Sustain the ABL weapon systems (Laser, Beam Control/Fire Control, and Battle Management subsystems)
- Provide Quality Safety and Mission Assurance (QSMA) operations to ensure compliance with Agency requirements for design, test, manufacturing, quality, safety and reliability

- Continue implementation of ABL program security requirements
- Update Adversary Data Package to support future Ballistic Missile Defense System capability development

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

- Update Near-Field Plume data to support boost phase engagement capability development

	FY 2008	FY 2009	FY 2010	FY 2011
Targets	3,131	0	0	
RDT&E Articles (Quantity)	0	0	0	

Note: Beginning in FY09, ABL Targets funding transfers to the MDA Targets and Countermeasures Program Element.

Airborne Laser (ABL) provides funds for integrated ballistic missile target hardware (boosters, launch vehicles, reentry vehicles, and associated objects), launch services to include mission planning, range and element data deliverables, communications security equipment and management, target range support (telemetry data collection equipment, range safety support equipment and launch control center unique displays), logistics support, Government Furnished Equipment and services, transportation, mission assurance and mission coordination with element and range to support flight tests which support the continued development and verification of the Ballistic Missile Defense System (BMDS).

FY08 Accomplishments:

- Continued range coordination and mission management activities for Foreign Military Asset (FMA) missions (FY09/FY10)
- Continued storage of Lance and FMA missiles

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

C. Other Program Funding Summary

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Total Cost
PE 0603175C Ballistic Missile Defense Technology	106,437	119,308	109,760						-
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,034,478	956,686	719,465						-
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,198,664	1,507,481	982,922						-
PE 0603884C Ballistic Missile Defense Sensors	574,231	777,693	636,856						-
PE 0603886C Ballistic Missile Defense System Interceptors	330,874	385,493	0						-
PE 0603888C Ballistic Missile Defense Test and Targets	619,137	919,956	966,752						-
PE 0603890C Ballistic Missile Defense Enabling Programs	416,937	402,778	369,145						-
PE 0603891C Special Programs – MDA	193,157	175,712	301,566						-
PE 0603892C Ballistic Missile Defense Aegis	1,126,337	1,113,655	1,690,758						-
PE 0603893C Space Tracking & Surveillance System	226,499	208,923	180,000						-
PE 0603894C Multiple Kill Vehicle	223,084	283,481	0						-
PE 0603895C BMD System Space Program	16,237	24,686	12,549						-
PE 0603896C BMD C2BMC	439,997	288,287	340,014						-
PE 0603897C BMD Hercules	51,387	55,764	48,186						-
PE 0603898C BMD Joint Warfighter Support	45,400	69,743	60,921						-
PE 0603904C Missile Defense Integration & Operations Center (MDIOC)	77,102	106,040	86,949						-
PE 0603906C Regarding Trench	1,945	2,968	6,164						-
PE 0603907C Sea Based X-Band Radar (SBX)	155,244	146,895	174,576						-
PE 0603908C BMD Europ Intercep Site	0	362,007	0						-
PE 0603909C BMD Europ Midcourse Radar	0	76,537	0						-
PE 0603911C BMD European Capability	0	0	50,504						-
PE 0603912C BMD European Comm Support	0	27,008	0						-
PE 0603913C Israeli Cooperative	0	0	119,634						-
PE 0605502C Small Business Innovative Research BMDO	137,409	0	0						-
PE 0901585C Pentagon Reservation	5,971	19,667	19,709						-
PE 0901598C Management Headquarters – MDA	83,907	81,174	57,403						-

Note: The Ballistic Missile Defense System (BMDS) is an integrated, interoperable, global defense system. The programs which comprise the BMDS are interdependent.

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

D. Acquisition Strategy

The ABL program is structured to develop and field an affordable and effective ABL fleet for optimum early phase missile defense capability. The ABL program employs an evolutionary acquisition strategy to balance needs and available capability with resources to put capability into the hands of the warfighter quickly. The success of the strategy depends on continuous definition of requirements and technology maturity leading to development and production of systems that provide increasing capability. The testing, sustained operations, targeted studies, and technology maturation with the 1st ABL technology demonstrator provide the key to success with this strategy.

In fiscal years 2008 and 2009, the ABL program will complete integration and demonstration of the weapon system with the shootdown of a threat representative ballistic missile during its boost phase. The demonstration will validate the viability of ABL's boost phase defense capability.

After FTL-01 and continuing through mid-FY10, the ABL program will continue to demonstrate viability of the ABL weapon system by conducting additional lethal demonstration efforts followed by further system characterization, support and development activities to evaluate geometries and ranges of the current ABL configuration. The ABL will continue ground testing to gain knowledge of the capability of the weapon system. ABL will further refine maintenance requirements during the Characterization and Capabilities Demonstration period following lethal demonstration. The ABL program will also complete an affordability study to address life cycle cost and major cost drivers of the weapon system. ABL will perform product requirements analysis/derivation, design, development, testing and deliver verified Modeling and Simulation tools in support of Ballistic Missile Defense System events.

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

I. Product Development Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2009 Cost	FY 2009 Award/ Oblg Date	FY 2010 Cost	FY 2010 Award/ Oblg Date	FY 2011 Cost	FY 2011 Award/ Oblg Date	Total Cost
1ST ABL										
Prime Contract	C/CPAF	Boeing Defense & Space Group/ Seattle, WA	371,755	281,292	1/4Q	49,752	3Q			702,799
BMDS Security	C/CPAF	Boeing Defense & Space Group/ Seattle, WA	55	1,860	1/4Q	0	N/A			1,915
Technical Support Costs	C/CPAF	Northrop Grumman/ Kirtland AFB/ Various	20,233	20,060	1/4Q	6,000	3Q			46,293
FFRDC Support	MIPR	Aerospace/ Kirtland AFB	1,200	1,260	1/4Q	0	N/A			2,460
Technical Support Costs	C/MIPR	Tecolote Research/ Kirtland AFB	1,358	1,800	1/4Q	0	N/A			3,158
Logistics Costs	C/CPAF	Boeing Defense & Space/ AFRL/DOE/ Seattle, WA, Tyndall AFB FL, KAFB NM	1,480	600	1/4Q	0	N/A			2,080
Government and Other Support Costs	MIPR	AFRL/ Kirtland AFB/ MA, Multiple	1,478	1,430	1/4Q	0	N/A			2,908
Government and Other Costs	C/FP	ABL SPO/Kirtland AFB/ Multiple	2,482	2,697	1/4Q	0	N/A			5,179
Government and Other Costs	MIPR	ACC/ VA	367	350	1/4Q	0	N/A			717
Government and Other Costs	MIPR	Brooks City Base/ TX	400	225	1/4Q	0	N/A			625
Other Support Costs	MIPR	Tyndall AFB/ FL	135	125	1/4Q	0	N/A			260
CCMWG/Program Integration Support	C/CPAF	Boeing Defense & Space/ Seattle, WA	1,934	1,800	1/4Q	0	N/A			3,734
Active Ranging System	MIPR	ESC Hanscom AFB/ MA	2,000	1,000	1/4Q	0	N/A			3,000
Technical Support Costs	C/Various	KAFB/WPAFB/ Multiple	235	241	1/4Q	0	N/A			476
Common Threat	Various	Multiple	0	1,862	N/A	0	N/A			1,862
Cost Affordability/Risk Reduction	C/CPAF	Boeing Defense & Space Group/ Seattle, WA	0	0	4Q	3,000	3Q			3,000
Industrial Base										

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2009 Cost	FY 2009 Award/ Oblg Date	FY 2010 Cost	FY 2010 Award/ Oblg Date	FY 2011 Cost	FY 2011 Award/ Oblg Date	Total Cost
Contract	SS/MIPR	Multiple, i.e. Lockheed Martin/Multiple/ MD, CA	5,986	5,692	3Q	2,900	3Q			14,578
Technology Insertion										
Contract	SS/MIPR	Multiple, i.e. Lockheed Martin/Multiple/ MD, CA	9,250	0	N/A	0	N/A			9,250
Characterization and Capability Demonstration										
Prime Contract	C/CPAF	Boeing Defense & Space Group/ Seattle, WA	0	0	4Q	73,552	2Q			73,552
BMDS Security	C/CPAF	Boeing Defense & Space Group/ Seattle, WA	0	0	N/A	1,600	2Q			1,600
Technical Support Costs	C/CPAF	Northrop Grumman/ Kirtland AFB/Various	0	0	N/A	6,000	2Q			6,000
Government and Other Support Costs	MIPR	AFRL, Kirtland AFB/ MA, Multiple	0	0	N/A	700	1Q			700
Government and Other Support Costs	C/FP	ABL SPO/ Kirtland AFB, Multiple	0	0	N/A	2,600	1Q			2,600
Government and Other Support Costs	MIPR	ACC/ VA	0	0	N/A	400	2Q			400
FFRDC Support	C/MIPR	Aerospace/ KAFB	0	0	N/A	1,000	1Q			1,000
Technical Support Costs	C/MIPR	Tecolote Research / KAFB	0	0	N/A	900	2Q			900
Common Threat	Various	Multiple	0	0	N/A	677	4Q			677
Subtotal Product Development			420,348	322,294		149,081				891,723

Remarks

Common threat engineering produces common and consistent adversary trajectory and signature data to enable Ballistic Missile Defense (BMD) System and sub-system concept and requirements, design, verification, and assessment. Common Threat data is contained in the Adversary Capability Document (ACD) and Adversary Data Packages (ADP) and drives BMDS ground tests, flight tests, digital simulations, and pre-mission analysis activities. It is also used to develop the BMD System Description Document and BMD System Specification.

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

II. Support Costs Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2009 Cost	FY 2009 Award/ Oblg Date	FY 2010 Cost	FY 2010 Award/ Oblg Date	FY 2011 Cost	FY 2011 Award/ Oblg Date	Total Cost
Subtotal Support Costs										

Remarks

III. Test and Evaluation Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2009 Cost	FY 2009 Award/ Oblg Date	FY 2010 Cost	FY 2010 Award/ Oblg Date	FY 2011 Cost	FY 2011 Award/ Oblg Date	Total Cost
Direct Support Activities										
Combined Test Force	MIPR	AFFTC/ Edwards AFB	15,600	25,775	2/4Q	21,300	4Q			62,675
Lethality and Survivability Baseline Tests	MIPR	AFRL/Eglin AFB/ NM, FL	16,416	8,418	1Q	3,300	N/A			28,134
Diagnostics/Instrumentation	MIPR	Hanscom AFB, Peterson AFB, Hill AFB, Kirtland AFB/ MA, CO, UT, NM	15,145	32,122	4Q	8,200	4Q			55,467
Targets										
Multiple	C/Various	Various	3,131	0	N/A	0	N/A			3,131
Subtotal Test and Evaluation			50,292	66,315		32,800				149,407

Remarks

Targets funding transitioned to the Targets and Countermeasures Program Element beginning in FY09.

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date **May 2009**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE **0603883C Ballistic Missile Defense Boost Defense Segment**

IV. Management Services Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2009 Cost	FY 2009 Award/ Oblg Date	FY 2010 Cost	FY 2010 Award/ Oblg Date	FY 2011 Cost	FY 2011 Award/ Oblg Date	Total Cost
Subtotal Management Services										

Remarks

Project Total Cost			470,640	388,609		181,881				1,041,130

Remarks

Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

Fiscal Year	2008				2009				2010				2011				2012				2013				2014				2015			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Program Milestones																																
Aircraft and Support Systems Ready for High Power System Integration	▲																															
1st Light into the Laser Calorimeter				▲																												
1st Light Through Beam Control/Fire Control				▲																												
1st ABL Lethal Demonstration								△																								
Complete Life Cycle Affordability Study												△																				
Flight Tests																																
Complete High Power System Integration Flight Testing								△																								
Demonstrate High Energy Laser Performance in Flight								△																								
Engagement of High Power Missile Alternative Range Target Instrument								△																								
Engagement of Low Power Missile Alternative Range Target Instrument								△																								
Additional Lethal Demonstration Events									△	△																						
Ground Test																																

Legend

▲	Significant Event (complete)	△	Significant Event (planned)
★	Milestone Decision (complete)	☆	Milestone Decision (planned)
◆	Element Test (complete)	◇	Element Test (planned)
▼	System Level Test (complete)	▽	System Level Test (planned)
▲▬▲	Complete Activity	△▬△	Planned Activity

Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

Fiscal Year	2008				2009				2010				2011				2012				2013				2014				2015			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Ground Test																																
Complete High Power System Integration Ground Testing								△																								

Legend

▲	Significant Event (complete)	△	Significant Event (planned)
★	Milestone Decision (complete)	☆	Milestone Decision (planned)
◆	Element Test (complete)	◇	Element Test (planned)
▼	System Level Test (complete)	▽	System Level Test (planned)
▲—▲	Complete Activity	△—△	Planned Activity

Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

Schedule Profile	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Program Milestones								
Aircraft and Support Systems Ready for High Power System Integration	1Q							
1st Light into the Laser Calorimeter	4Q							
1st Light Through Beam Control/Fire Control	4Q							
1st ABL Lethal Demonstration		4Q						
Complete Life Cycle Affordability Study			4Q					
Flight Tests								
Complete High Power System Integration Flight Testing		4Q						
Demonstrate High Energy Laser Performance in Flight		4Q						
Engagement of High Power Missile Alternative Range Target Instrument		4Q						
Engagement of Low Power Missile Alternative Range Target Instrument		4Q						
Additional Lethal Demonstration Events			1Q-2Q					
Ground Test								
Complete High Power System Integration Ground Testing		4Q						

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603883C Ballistic Missile Defense Boost Defense Segment**

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
ZX40 Program-Wide Support	32,835	12,142	4,816					
RDT&E Articles Qty	0	0	0					

A. Mission Description and Budget Item Justification

Program-Wide Support provides funding for common non-headquarters support functions across the entire program. Includes costs for both government civilians performing these functions, as well as outside services and support contractors that augment government staff in these areas. Other costs included provide facility capabilities for MDA Executing Agent locations, such as physical and technical security, legal services, travel and training, office and equipment leases, utilities and communications, supplies and maintenance, and similar operating expenses. Also includes funding for charges on canceled appropriations in accordance with Public Law 101-510, legal settlements, and foreign currency fluctuations on a limited number of foreign contracts.

B. Accomplishments/Planned Program

	FY 2008	FY 2009	FY 2010	FY 2011
Civilian Salaries and Support	32,835	12,142	4,816	
RDT&E Articles (Quantity)	0	0	0	

See Section A: Mission Description and Budget Item Justification

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603883C Ballistic Missile Defense Boost Defense Segment

C. Other Program Funding Summary

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Total Cost
PE 0603175C Ballistic Missile Defense Technology	106,437	119,308	109,760						-
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,034,478	956,686	719,465						-
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,198,664	1,507,481	982,922						-
PE 0603884C Ballistic Missile Defense Sensors	574,231	777,693	636,856						-
PE 0603886C Ballistic Missile Defense System Interceptors	330,874	385,493	0						-
PE 0603888C Ballistic Missile Defense Test and Targets	619,137	919,956	966,752						-
PE 0603890C Ballistic Missile Defense Enabling Programs	416,937	402,778	369,145						-
PE 0603891C Special Programs – MDA	193,157	175,712	301,566						-
PE 0603892C Ballistic Missile Defense Aegis	1,126,337	1,113,655	1,690,758						-
PE 0603893C Space Tracking & Surveillance System	226,499	208,923	180,000						-
PE 0603894C Multiple Kill Vehicle	223,084	283,481	0						-
PE 0603895C BMD System Space Program	16,237	24,686	12,549						-
PE 0603896C BMD C2BMC	439,997	288,287	340,014						-
PE 0603897C BMD Hercules	51,387	55,764	48,186						-
PE 0603898C BMD Joint Warfighter Support	45,400	69,743	60,921						-
PE 0603904C Missile Defense Integration & Operations Center (MDIOC)	77,102	106,040	86,949						-
PE 0603906C Regarding Trench	1,945	2,968	6,164						-
PE 0603907C Sea Based X-Band Radar (SBX)	155,244	146,895	174,576						-
PE 0603908C BMD Europ Intercep Site	0	362,007	0						-
PE 0603909C BMD Europ Midcourse Radar	0	76,537	0						-
PE 0603911C BMD European Capability	0	0	50,504						-
PE 0603912C BMD European Comm Support	0	27,008	0						-
PE 0603913C Israeli Cooperative	0	0	119,634						-
PE 0605502C Small Business Innovative Research BMDO	137,409	0	0						-
PE 0901585C Pentagon Reservation	5,971	19,667	19,709						-
PE 0901598C Management Headquarters – MDA	83,907	81,174	57,403						-

Note: The Ballistic Missile Defense System (BMDS) is an integrated, interoperable, global defense system. The programs which comprise the BMDS are interdependent