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: **0603895C BMD System Space Program**

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Total PE Cost	16,237	24,686	12,549					
WX33 MD Space Exp Center	3,892	9,973	10,276					
WX16 NFIRE	11,550	8,855	0					
WX23 BMDS Space Interceptor Study	0	5,000	0					
ZX40 Program-Wide Support	795	858	2,273					

There is no funding allocated in this PE 0603895C for FY 2010 for NFIRE. NFIRE Program funding will be captured in PE 0603893C, Project WX12, for FY2010.

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 fully explain the relationship between different parts of the proposed program.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System Space Program provides the core facilities, infrastructure, and 24/7 satellite operation centers for the STSS Demonstrator and NFIRE satellites as well as integration of MDA and other space assets into the BMDS. The BMDS Space Program enhances the capability of systems like Aegis, GMD, and THAAD by leveraging space-based sensor data to expanding their range and operational effectiveness.

The Missile Defense Space Experimentation Center (MDSEC) provides MDA elements with a single location for BMDS space sensor layer operations and integration to support the ballistic missile defense mission. MDSEC annual operating expenses provide security, configuration management, engineering, test, experiment, data, and logistics support for MDA stakeholders within the MDSEC. The MDSEC will develop and refine on-orbit operations for the STSS demonstration satellites.

In addition to the on-going launch preparation for STSS and satellite operations for NFIRE at the MDSEC, the facility provides a multi-level security environment for sensor data management and integration across all space and terrestrial sensor data activities. MDSEC experiments leverage DoD (Defense Support Program, Space Based Infrared System) and National Security Space capabilities. MDSEC activities support analysis, demonstration and integration of space sensor capabilities into developmental and operational MDA elements. MDSEC enables the development of advanced technology and algorithms including fusion of multiple sensor types (radar, overhead persistent infrared, electro-optical and other merging sensor technologies). MDSEC supports mission integration of space-based missile tracking (boost and midcourse phases), sensor and weapons cueing via C2BMC, features and discrimination, kill and impact point assessments into C2BMC, Aegis, Terminal High Altitude Area Defense (THAAD), Ground-Based Midcourse Defense (GMD), and other (non-MDA) mission areas to include space situational awareness, technical intelligence, and battle space characterization.

A.1 System Element Description

NFIRE

The Near Field Infrared Experiment (NFIRE) technology project collects near field phenomenology data for use in plume to hardbody handover algorithms for boost phase interceptor programs. MDA will use this data to validate the models and simulations that are fundamental to developing the guidance and endgame homing algorithms for boost phase interceptors. A secondary objective of the experiment is to collect hyper-temporal short wave infrared and visible data for assessing early launch detection and tracking capability. The experiment will include three plume signature mission types: targets of opportunity, dedicated fly-bys, and ground observations. NFIRE carries a Laser Communication Terminal, to conduct communication experiments with the German Terra SAR-X satellite. These experiments will test low earth orbit satellite-to-ground and satellite-to-satellite capabilities of the terminal for potential incorporation into the Ballistic Missile Defense System. The laser communication experiment is conducted on a non-interference basis with the other MDA missions. The NFIRE satellite is operated from the MDSEC by the Ballistic Missile Defense Space System. Data products are utilized by multiple programs to improve missile engagement performance. Funding for NFIRE in FY2010 will be provided under PE 063893C, Space Tracking and Surveillance Systems (STSS).

MDSEC

The MDSEC provides infrastructure to operate and control MDA satellites such as NFIRE and Space Tracking and Surveillance System (STSS). In addition, the MDSEC provides infrastructure to integrate and demonstrate missile defense space capabilities with other defense and national security

systems. The MDSEC infrastructure provides MDA stakeholders capabilities for supporting flight tests, conducting concept development, demonstrations, experiments, and developing and evaluating algorithms within a multi-security level environment.

MDSEC capabilities include the MDSEC Interchange System (MIS) and the MDSEC Integration Lab. The MIS will provide a common secure data architecture for MDA, DoD, and National Security Space sensor data and a satellite sensor tasking request tool interface with stakeholders. The MDSEC Lab provides a common location for stakeholder collaboration with access to the space sensor layer data via the MIS during tests and experiments.

Modeling and simulation (M&S) activities support all phases of STSS development at the MDSEC, including development of modifications to the Satellite Tool Kit (STK) Mission Planning and Analysis Tools. M&S efforts support the various Data Collection Events, System Functional and Performance Test, 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 definition 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, OTA 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 PA Integrated V&V Plan and Report (at both element and system level), and a PA-system level Accreditation Plan and Report.

The MDSEC Space Sensor Layer activities include integration and experimentation across a broad range of BMDS activities to include target signatures, sensor registration, health and status, sensor performance, sensor and weapons netting with C2BMC, modeling and simulation, and advanced features, discrimination, typing, and assessments.

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

Under the management of the Missile Defense Space Systems, this Ballistic Missile Defense Space System program element will plan, conduct and integrate multiple ground and space-dependent tests, demonstrations, and experiments at the MDSEC that provide capability improvements, reduce developmental cycle times and/or improve integrated BMDS performance.

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: 0603895C BMD System Space Program

MDSEC is a collaborative experimentation environment for all BMDS elements that rely on, experiment with, integrate with, or seek to improve the BMDS capability by utilizing space-based, systems-derived data. Programs currently interacting within the MDSEC activity are: STSS, NFIRE, External Sensors Laboratory (ESL), BMDS Overhead Persistent Infrared (OPIR) Architecture (BOA), Project HERCULES, CONUS Kinetic Energy Interceptor (CKEI), and C2BMC. Through these experiments MDSEC support the full range of MDA Unifying Missile Defense Functions (UMDFs), which increase the effectiveness of the BMD System (including probability of engagement success, increase in defended area and raid size capacity, additional redundancy of architecture, unity of command) through the integration of MDA developed capabilities. The MDSEC Sensor Registration Health & Status Monitoring (SRHSM) Experiment feeds directly into UMDF efforts such as Sensor Registration (reporting of sensor errors/biases) and Correlation (ensuring the information from multiple sensors seeing a threat relates to the same object). Other MDSEC experiments support UMDFs ranging from, System Track (creating a single engageable track of a threat from multiple reports provided by different land, sea, and space based multiple sensors), Discrimination (identifying object details to determine the target from debris or decoys), Battle Management (combining the best sensors and shooters to ensure the highest probability of a kill), Hit/Kill Assessment (determining if the target selected was destroyed after missile impact), to Communications (providing the worldwide connection of sensors and shooters to command authorities). These MDSEC experiments support the UMDFs and are implemented across the BMDS elements to create and utilize system level data and decisions that allow Combatant Commanders the ability to automatically and manually optimize sensor coverage and interceptor inventory to defend against all ranges of ballistic threats.

A.3 Major System Element Goals

Near Field Infrared Experiment (NFIRE)

- Launch the NFIRE satellite (completed 24 April 2007)
- Conduct multiple data collection missions from the MDSEC against ground, air, space and ballistic missile targets
- Conduct low earth orbit satellite-to-satellite and satellite-to-ground laser communication experiments
- Provide data to validate the models and simulations that are fundamental to developing the navigation, guidance and control, and endgame homing algorithms, as well as laser communication proof of concept

Missile Defense Space Experimentation Center (MDSEC)

- Develop and refine ground operational concepts for MDA space systems, sensors, data, services, and networks
- Conduct satellite operations for MDA space sensor satellites (NFIRE, STSS)

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: **0603895C BMD System Space Program**

- Develop and install MIS to provide robust access to MDA space data and stakeholder net-centric sensor tasking request interface
- Develop a security environment to support data integration, test, demonstrations, and experiments across multiple security levels
- Develop an integration laboratory to support testing, demonstrations, experiments, integration and algorithm development
- Demonstrate connectivity and integration of space sensor layer data for the BMDS community and external users
- Conduct experiments to test algorithm validity for Missile Defense Space Systems
- Provides infrastructure to demonstrate integration of missile defense space capabilities with other defense and national security systems

A.4 Major Events Schedule and Description

Major Event	Project	Timeframe	Description
Contract Activity			
Near Field Infrared Experiment			
Laser Comm Terminal Experiments/Operations	WX16	1Q FY 2008 - 4Q FY 2009	• Continuation of test efforts on the NFIRE secondary payload, German-provided Laser Communication Terminal payload. The payload has successfully tested both Satellite-to-Satellite and Satellite-to-Ground communications.
On-Orbit Operations	WX16	1Q FY 2008 - 4Q FY 2009	• Mission operations anticipated to continue through FY09
Targets of Opportunity	WX16	1Q FY 2008 - 4Q FY 2009	• Activity includes efforts associated with mission planning, execution of test, and analysis of data. Tests will be performed on Targets of Opportunity (TOOs) on assets within the field-of-view of the NFIRE satellite and as operations of the NFIRE asset allow.
Missile Target Flight Test Mission 2B	WX16	4Q FY 2008	• Second of two dedicated fly-by tests to conduct high resolution observation
MDSEC			
Target Signature Experiments (MDSEC)	WX33	1Q FY 2008 - 4Q FY 2010	• Efforts to include collection and analysis of target signature data for subsequent use in algorithm development/verification
Sensor Netting Experiments (MDSEC)	WX33	3Q FY 2008 - 4Q FY 2010	• Activities focused on management of sensors for cuing, track processing, and distributed tracking.
Sensor Tracking Experiments (MDSEC)	WX33	4Q FY 2009 - 4Q FY 2010	• Demonstration of infrared sensors to explore contribution to the BMDS architecture
Sensor Performance Experiments	WX33	1Q FY 2010 - 4Q FY 2010	• Activities that focus on State Vector Accuracy--velocity, position, acceleration, minimum detectable object, closely spaced objects
Model Performance	WX33	2Q FY 2010 - 4Q FY 2010	• Activities associated with assessing and improving BMDS models.
Sensor Registration Experiments	WX33	2Q FY 2010 - 4Q FY 2010	• Experiment with focus on sensor bias analysis and heath/status reporting.
BMDS Space Interceptor Study			
Studies and Scenario Development	WX23	3Q FY 2009 - 4Q FY 2009	• Space-Based Interceptor feasibility study
Other			

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: **0603895C BMD System Space Program**

Major Event	Project	Timeframe	Description
MDSEC			
Targets of Opportunity	WX33	1Q FY 2010	• Participation in collection of data from targets of opportunity: FTX-06, JFTM-03, JTT-12
Targets of Opportunity	WX33	2Q FY 2010	• Participation in collection of data from targets of opportunity: FTK-02, FTS-01,GTI-04
Targets of Opportunity	WX33	3Q FY 2010	• Participation in collection of data from targets of opportunity: GMD 3-Stage Intercept, FTT-13, GTD-04
Targets of Opportunity	WX33	4Q FY 2010	• Participation in collection of data from targets of opportunity: FTM-15, GTX-05b, FTS-02

B. Program Change Summary	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget (FY2009 PB)	16,552	29,771	41,638	
Current President's Budget (FY2010 PB)	16,237	24,686	12,549	
Total Adjustments	-315	-5,085	29,089	
Congressional Program Reductions	0	-5,085	0	
Congressional Rescissions	0	0	0	
Total Congressional Increases	0	0	0	
Total Reprogramming	-51	0	0	
SBIR/STTR Transfer	-264	0	0	
Adjustments to Budget Years	0	0	-29,089	

FY08 decrease of $0.315 million includes SBIR/STTR transfer and MDA reprogramming.

FY09 decrease of $5.085 million reflects Congressional adjustments.

FY10 increase of $29.089 million reflects MDA programmatic changes to support program requirements.

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: 0603895C BMD System Space Program

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
WX33 MD Space Exp Center	3,892	9,973	10,276					
RDT&E Articles Qty	0	0	0					

Note:

A. Mission Description and Budget Item Justification

The Missile Defense Space Systems operates the Missile Defense Space Experimentation Center (MDSEC) to provide a single location for MDA elements to conduct satellite on-orbit operations and to conduct flight test, demonstrations, experiments, data integration, algorithm development and test, and concept exploration. The annual operating expenses for the MDSEC provide overhead functions to include security, configuration management, engineering, test, demonstration, experiment, data analysis and integration, and logistics support for satellite operations and other MDA stakeholders such as the Sensors Directorate's External Sensors Lab. The MDSEC Space Layer activities include integration and experimentation across a broad range of BMDS activities to include target signatures, sensor registration, health and status, sensor performance, sensor and weapons netting (with C2BMC and X-Lab), modeling and simulation, and advanced features, discrimination, typing, clutter mitigation, and target kill and impact point assessments.

B. Accomplishments/Planned Program

	FY 2008	FY 2009	FY 2010	FY 2011
MDSEC	3,892	9,973	10,276	
RDT&E Articles (Quantity)	0	0	0	

FY08 Accomplishments:

- Conducted operations for the NFIRE satellite
- Developed and refined satellite on-orbit operations for STSS Demonstration Satellites

FY09 Planned Program:

- Develop and refine satellite on-orbit operations
- Establish access to STSS data at multiple security levels

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: 0603895C BMD System Space Program

- Provide for the exchange of archived and real-time data and data products from established and future BMDS programs
- Provide a net-centric satellite sensor tasking request tool for stakeholders
- Integrate new MDSEC stakeholders as appropriate

FY10 Planned Program:

- Continue maturation of STSS and potentially NFIRE satellite on-orbit operations
- Participate in cooperative tests with other BMDS elements to include planning, execution and analyses; perform data collection on other targets of opportunity including FTK-02, GTI-04, FTT-13, GTD-04, FTM-16 and GTX-05b
- Use test data, modeling and simulation, and integrated BMDS ground tests to demonstrate space-based IR sensor contributions to BMDS performance
- Provide core infrastructure support and conduct joint experiments with the External Sensors Laboratory (ESL), X-Lab, and the BMDS Operational Overhead Persistent Infrared (OPIR) Architecture (BOA)

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: 0603895C BMD System Space Program

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 0603883C Ballistic Missile Defense Boost Defense Segment	503,475	400,751	186,697						
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 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: 0603895C BMD System Space Program

D. Acquisition Strategy

All functions and operations of the MDSEC are currently financed through a 10-year MDSEC JRDC Services Contract. The annual operating expenses are being consolidated into one centralized delivery order on the contract which will include core capabilities (labor and hardware) that are performed in the MDSEC and will support all of the MDSEC participants.

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: 0603895C BMD System Space Program

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
MDSEC										
MDSEC Support (JRDC Svs Contract)	SS/MIPR	MDIOC/ CO	3,892	5,422	1/4Q	6,325	1/4Q			15,639
MDSEC/ESL Experiments	Various	Various/ Various	0	3,683	1/3Q	3,000	1/3Q			6,683
Subtotal Product Development			3,892	9,105		9,325				22,322

Remarks

Operations of the MDSEC are currently financed through a 10-year MDSEC JRDC Services Contract. The annual operating expenses are being consolidated into one centralized delivery order on the contract which will include core capabilities (labor and hardware) that are performed in the MDSEC and will support all of the MDSEC participants.

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
MDSEC										
OGA Contractor (SETA)	Various	MDIOC/CO	0	386	1/2Q	371	1/2Q			757
Subtotal Support Costs			0	386		371				757

Remarks

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: 0603895C BMD System Space Program

OGA Contractor (SETA) above reflects JTAAS and MDA/DE system engineering support. BMD Systems Engineering provides System Description Documents and System Specifications for elements to design, build, integrate and test BMDS components. These products optimize performance at the system level and further ensure that the assessment of the designed BMD System is based on sufficient ground and flight testing.

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
Subtotal Test and Evaluation										

Remarks

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
MDSEC										
SDL	MIPR	SDL/UT	0	482	1/2Q	580	1/2Q			1,062
Subtotal Management Services			0	482		580				1,062

Remarks

Space Dynamics Laboratory (SDL) is funded via University Affiliated Research Center (UARC) contract.

Project Total Cost			3,892	9,973		10,276				24,141

Remarks

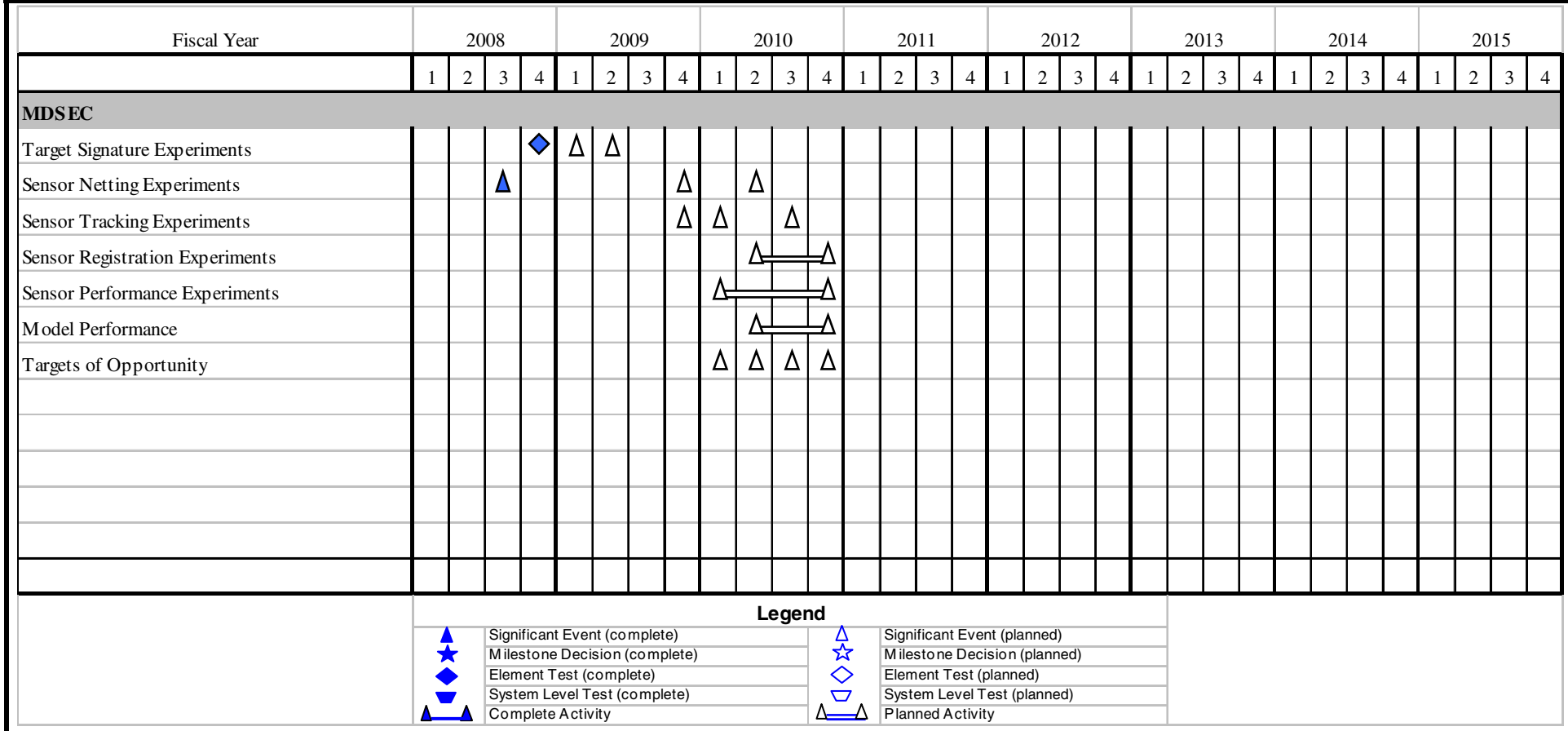
N/A

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: **0603895C BMD System Space Program**



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: 0603895C BMD System Space Program

Schedule Profile	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
MDSEC								
Target Signature Experiments	4Q	1Q,2Q						
Sensor Netting Experiments	3Q	4Q	2Q					
Sensor Tracking Experiments		4Q	1Q,3Q					
Sensor Registration Experiments			2Q-4Q					
Sensor Performance Experiments			1Q-4Q					
Model Performance			2Q-4Q					
Sensor Netting Experiments (MDSEC)	3Q-4Q	1Q-4Q	1Q-4Q					
Sensor Tracking Experiments (MDSEC)		4Q	1Q-4Q					
Target Signature Experiments (MDSEC)	1Q-4Q	1Q-4Q	1Q-4Q					
Targets of Opportunity			1Q,2Q,3Q,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: **0603895C BMD System Space Program**

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
WX16 NFIRE	11,550	8,855	0					
RDT&E Articles Qty	0	0	0					

Note:

A. Mission Description and Budget Item Justification

The Near Field Infrared Experiment (NFIRE) technology effort collects high and low resolution images of a boosting rocket to improve our understanding of exhaust plume phenomenology and plume-to-rocket body discrimination. MDA is using this data to validate the models and simulations that are fundamental to developing the guidance and endgame homing algorithms for boost phase interceptors. A secondary objective of the experiment is to collect hyper-temporal short wave infrared and visible data for assessing early launch detection and tracking capability. The experiment will include three plume signature mission types: targets of opportunity, dedicated fly-bys, and ground observations. Targets of opportunity may include aircraft flights, space launches and missile tests at a viewing distance of 100 to 1000 kilometers. Dedicated fly-bys are high resolution observations of a dedicated target vehicle at a range of less than 10 kilometers. Ground observations may include bright burning events such as forest fires, volcanoes, and static tests of rocket engines. In addition to the plume data collections, NFIRE carries a Laser Communication Terminal to conduct communication experiments with the German Terra SAR-X satellite. These experiments test low earth orbit satellite-to-ground and satellite-to-satellite capabilities of the terminal for potential incorporation into the Ballistic Missile Defense System. The laser communication experiments are conducted on a non-interference basis with the other MDA missions. The NFIRE satellite is operated from the Missile Defense Space Experimentation Center (MDSEC). Data products will be utilized by multiple programs to improve missile engagement performance.

B. Accomplishments/Planned Program

	FY 2008	FY 2009	FY 2010	FY 2011
NFIRE	11,550	8,855	0	
RDT&E Articles (Quantity)	0	0	0	

FY08 Accomplishments:

- Continued On-Orbit Operations at the MDSEC
- Successfully conducted Laser Communications Experiments/Operations to assess viability of technology
- Conducted Missile Target Flight Test Mission 2B (Sep 08)

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: 0603895C BMD System Space Program

FY09 Planned Program:

- Conduct data analysis on position/orientation of Missile 2B relative to the exhaust plume in order to be able to predict future position and velocity of missile body as well as assess the impact of the earth, earth limb, and space backgrounds
- Continue On-Orbit Operations at the MDSEC to support data collection and analysis on targets of opportunity
- Continue laser communication experiments to assess viability of the technology
- Continue to support, as requested by AFSPC and other agencies, Space Situational Awareness

FY10 Planned Program:

- Funding moved to PE 0603893C, Space Tracking and Surveillance System.

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: 0603895C BMD System Space Program

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 0603883C Ballistic Missile Defense Boost Defense Segment	503,475	400,751	186,697						
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 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: 0603895C BMD System Space Program

D. Acquisition Strategy

N/A

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: 0603895C BMD System Space Program

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
NFIRE										
Prime Contractor	SS/CPAF	General Dynamics/ AZ	2,009	3,200	1Q	0	N/A			5,209
Science Team	SS/MIPR	MIT/LL/ MA	2,035	1,588	1/4Q	0	N/A			3,623
Track Sensor Payload	SS/MIPR	AFRL/ NM	118	120	1/2Q	0	N/A			238
MDIOC Research and Development Contractor (JRDC)	SS/CPAF	MDIOC/ CO	5,000	3,947	1/4Q	0	N/A			8,947
ITU Registration	MIPR	Switzerland	12	0	N/A	0	N/A			12
Subtotal Product Development			9,174	8,855		0				18,029

Remarks

NFIRE funding will be forwarded to several contractors and organizations to include, General Dynamics, AFRL, and the MDIOC.

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)

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: 0603895C BMD System Space Program

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 Test and Evaluation										

Remarks

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			9,174	8,855		0				18,029

Remarks

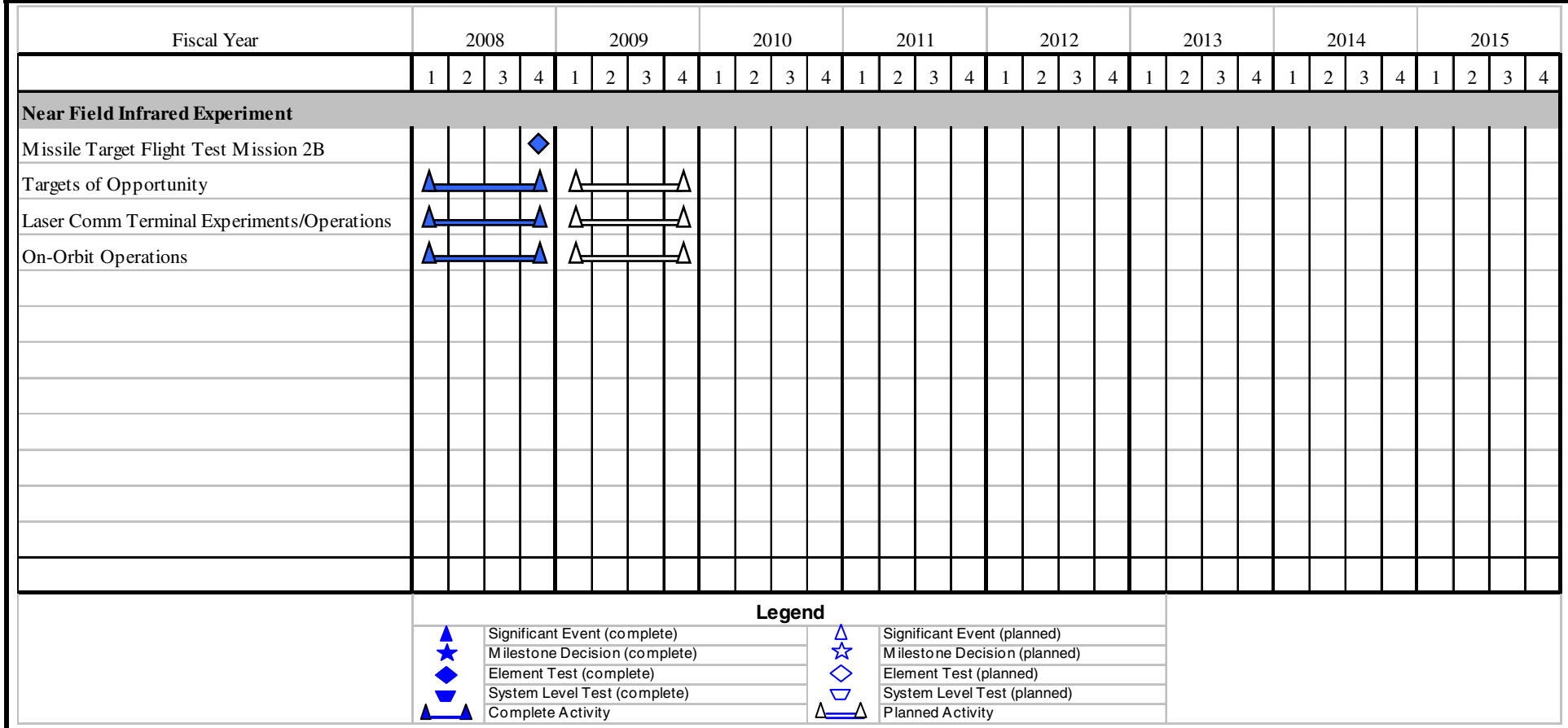
N/A

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: **0603895C BMD System Space Program**



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 **0603895C BMD System Space Program**

Schedule Profile	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Near Field Infrared Experiment								
Missile Target Flight Test Mission 2B	4Q							
Targets of Opportunity	1Q-4Q	1Q-4Q						
Laser Comm Terminal Experiments/Operations	1Q-4Q	1Q-4Q						
On-Orbit Operations	1Q-4Q	1Q-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: 0603895C BMD System Space Program

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
WX23 BMDS Space Interceptor Study	0	5,000	0					
RDT&E Articles Qty	0	0	0					

A. Mission Description and Budget Item Justification

Conduct congressionally directed study.

B. Accomplishments/Planned Program

	FY 2008	FY 2009	FY 2010	FY 2011
BMDS Space Interceptor Study	0	5,000	0	
RDT&E Articles (Quantity)	0	0	0	

FY09 Planned Program

Conduct an independent study of the feasibility and advisability of developing a space-based interceptor element to the BMDS.

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: 0603895C BMD System Space Program

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 0603883C Ballistic Missile Defense Boost Defense Segment	503,475	400,751	186,697						
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 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: 0603895C BMD System Space Program

D. Acquisition Strategy

N/A

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: 0603895C BMD System Space Program

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
BMDS Space Interceptor Study										
Planning and Analysis		TBD	0	5,000	3Q	0	N/A			5,000
Subtotal Product Development			0	5,000		0				5,000

Remarks

N/A

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
Subtotal Test and Evaluation										

Remarks

IV. Management Services Cost ($ in Thousands)

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: **0603895C BMD System Space Program**

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			0	5,000		0				5,000

Remarks

N/A

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: **0603895C BMD System Space Program**

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
BMDS Space Interceptor Study																																
Studies and Scenario Development							△	△																								

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 20099**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE **0603895C BMD System Space Program**

Schedule Profile	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
BMDS Space Interceptor Study								
Studies and Scenario Development		3Q-4Q						

Missile Defense Agency (MDA) Exhibit R-2A Schedule Detail	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603895C BMD System Space Program

COST ($ in Thousands)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
ZX40 Program-Wide Support	795	858	2,273					
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	795	858	2,273	
RDT&E Articles (Quantity)	0	0	0	

See Section A: Mission Description and Budget Item Justification

Missile Defense Agency (MDA) Exhibit R-2A Schedule Detail	Date: May 2009
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603895C BMD System Space Program

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 0603883C Ballistic Missile Defense Boost Defense Segment	503,475	400,751	186,697						
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 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 Schedule Detail	Date **May 2009**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE **0603895C BMD System Space Program**

This page intentionally left blank.