Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date February 2008

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 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	0	16,552	29,771	41,638	56,199	133,915	157,548
WX33 MD Space Exp Center	0	3,971	9,977	29,787	29,777	29,776	29,776
WX16 NFIRE	0	11,786	8,959	0	0	0	0
WX23 BMDS Space Test Bed	0	0	9,977	10,236	24,814	100,247	123,073
ZX40 Program-Wide Support	0	795	858	1,615	1,608	3,892	4,699

Note: The Agency has consolidated funding for non-STSS space activities executed by the Space Applications Product Center in this Program Element:

- Missile Defense Space Experimentation Center (MDSEC) - In FY07, initial funds were made available in the STSS PE (0603893C) Project 0812, to begin laying ground work for standup of this center. Beginning in FY08, the content for the MDSEC, as a continuation of the efforts reported in Project 0812, is captured in Project WX33 in accordance with the MDA revised Block Structure .

- Near Field Infrared Experiment (NFIRE) - In FY07, NFIRE was funded in the STSS PE (0603693C) and Advanced Technology PE (0603175C); in FY06 in PE 0603175C; and in FY05 in PE 0603884C. Beginning in FY08, the content for NFIRE, as a continuation of the efforts reported in Projects 0516 and 0812, is captured in Project WX16 in accordance with the MDA revised Block Structure.

A. Mission Description and Budget Item Justification

A.1 System Element Description
The Ballistic Missile Defense System Space Program will conduct a variety of space efforts to collect data and assess the utility of space systems -- and to assess the technical risk and viability of developing additional space sensor layer capabilities.

The Near Field Infrared Experiment (NFIRE) technology effort will collect high and low resolution images of a boosting rocket to improve our understanding of exhaust plume phenomenology and plume-to-rocket body discrimination.

The Space Applications Product Center stood up and operates the Missile Defense Space Experimentation Center (MDSEC) at the Missile Defense Integration & Operations Center (MDIOC). The MDIOC was formerly know as the Joint National Integration Center (JNIC). The 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

MDA Exhibit R-2 (PE 0603895C)

1177

Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date **February 2008**

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

stakeholders within the MDSEC. The MDSEC will develop and refine on-orbit operations for the STSS demonstration satellites. This includes engineering and installation of an MDSEC Interchange System (MIS) to provide for exchange of archived and real-time data from STSS and future BMDS programs. 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 also supports advanced technology and algorithm development including fusion of multiple sensor types (radar, overhead non-imaging infrared, electro-optical and other merging sensor technologies). MDSEC supports mission integration of space-based missile track (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.

NFIRE

The Near Field Infrared Experiment (NFIRE) technology project will collect 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 will carry 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 experiments will be conducted on a non-interference basis with the other MDA missions. The NFIRE satellite will be operated from the MDSEC by the MDA Space Applications Product Center. Data products will be utilized by multiple programs to improve missile engagement performance.

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 demonstrate integration of 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, experiments, and developing and evaluating algorithms within a multi-security level environment.

MDA Exhibit R-2 (PE 0603895C)

1178

Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date **February 2008**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE **0603895C BMD System Space Program**

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 for retrieval and playback of sensor data. 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.

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.

Space Test Bed
MDA believes that a mix of terrestrial and space-based offers the most effective global defense against ballistic missiles. Therefore, we continue to examine space capability as a potential complement to the BMDS.

Near term funding for the space testbed program will be used to refine concepts and prepare to conduct focused experiments demonstrating the viability of the concepts.

A.2 System Element Budget Justification and Contribution to the Ballistic Missile Defense System (BMDS)
Under the management of the Space Applications Product Center, this Ballistic Missile Defense Space System program element will plan, conduct and integrate multiple ground and space-dependent tests, demonstrations, and experiments that provide capability improvements, reduce developmental cycle times and/or improve integrated BMDS performance at the Missile Defense Space Experimentation Center (MDSEC).

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), Project HERCULES, CONUS Kinetic Energy Interceptor (CKEI), and C2BMC.

MDA Exhibit R-2 (PE 0603895C)

1179

Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date **February 2008**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE **0603895C BMD System Space Program**

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 sensor satellites on-orbit operations
- Conduct satellite operations for MDA space sensor satellites (NFIRE, STSS)
- Develop and install MIS to provide robust access to MDA space data
- Develop a security environment to support data integration, test, and experiments across multiple security levels
- Develop an integration laboratory to support testing, 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

A.4 Major Events Schedule and Description

Major Event	Project	Timeframe	Description
Contract Activity			
Near Field Infrared Experiment			
On-Orbit Operations	WX16	4Q FY 2007 - 4Q FY 2009	• Mission operations anticipated to continue through FY09
Missile Target Flight Test Mission 2B	WX16	2Q FY 2008	• Second of two dedicated fly-by tests to conduct high resolution observation
MDSEC			
MDSEC Interchange System (MIS)	WX33	1Q FY 2007 - 4Q FY 2013	• Efforts to design, install, and mature common secure data architecture for sensor data retrieval/playback in a colaborative envirnoment
Target Signature Experiments	WX33	3Q FY 2007 - 4Q FY 2008	• Efforts to include collection and analysis of target signature data for subsequent use in algorithm development/verification
Sensor Tracking Experiments	WX33	3Q FY 2007 - 4Q FY 2009	• Demonstration of infrared sensors to explore contribution to the BMDS architecture

MDA Exhibit R-2 (PE 0603895C)

1180

Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification	Date February 2008

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

B. Program Change Summary	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008 PB)	0	27,666	35,093
Current President's Budget (FY 2009 PB)	0	16,552	29,771
Total Adjustments	0	-11,114	-5,322
Congressional Specific Program Adjustments	0	-11,000	0
Congressional Undistributed Adjustments	0	-114	0
Reprogrammings	0	0	0
SBIR/STTR Transfer	0	0	0
Adjustments to Budget Years	0	0	-5,322

FY08 decrease of $11.114 million includes a Congressionally specific program decrease of $11 million and a portion of the MDA Congressional undistributed reduction.

FY09 decrease of $5.322 million reflects MDA programmatic changes to support program requirements.

MDA Exhibit R-2 (PE 0603895C)

1181

UNCLASSIFIED

	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
WX33 MD Space Exp Center	0	3,971	9,977	29,787	29,777	29,776	29,776
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: Missile Defense Space Experimentation Center (MDSEC) - In FY07, initial funds were made available in the STSS PE (0603893C) Project 0812, to begin laying ground work for standup of this center. Beginning in FY08, the content for the MDSEC, as a continuation of the efforts reported in Project 0812, will be captured in Project WX33 in accordance with the MDA revised Block Structure .

A. Mission Description and Budget Item Justification
The Space Applications Product Center stood up and 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, experiments, algorithm development and test, and concept exploration. The annual operating expenses for the MDSEC provide overhead functions to include security, configuration management, engineering, test, experiment, data, and logistics support for satellite operations and other MDA stakeholders. One of the major developments within the MDSEC is the MDSEC Interchange System (MIS). The MIS will provide a common secure data architecture for the storage, retrieval, and playback of MDA space sensor data for experiments, integration, and algorithm development and testing. The MIS interfaces with multiple space sensor layer data sources (STSS, External Sensors Lab, NFIRE, STSS Surrogate Testbed and Defense Support Program). 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 and X-Lab), modeling and simulation, and advanced features, discrimination, typing, clutter mitigation, and target kill and impact point assessments.

Project: WX33 MD Space Exp Center
Line Item 84 -
6 *of* 28
UNCLASSIFIED
MDA Exhibit R-2A (PE 0603895C)

1182

	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
MDSEC	0	3,971	9,977
RDT&E Articles (Quantity)	0	0	0

The MDSEC provides a centralized physical and virtual infrastructure for MDA Space Sensor Layer elements to conduct satellite on-orbit operations, flight experiments, test algorithms and concept exploration. Initial activities began with the STSS Ground Segment (See PE 0603893C) in FY06 and FY07 to capture the requirements and extent of the MDSEC mission at the Missile Defense Integration and Operations Center (MDIOC) at Schriever AFB CO.

FY08 Planned Program
- Develop and refine satellite on-orbit operations
- Engineer and install a MIS that will:
  o Establish access to STSS data at multiple security levels
  o Provide for the exchange of archived and real-time data and data products from established and future BMDS programs
  o Establish MIS connectivity to X-Lab, MDA C-Net, BMDS elements and external users
- Integrate new MDSEC stakeholders, physically and virtually
  o Support demonstration and development of Project Hercules algorithms
  o Support demonstration and development of External Sensors Laboratory (ESL) algorithms
- Expand infrastructure support to MDSEC stakeholders
  o Enhance Lab and Video Distribution Switch infrastructure for satellite operations
- Evolve MDSEC security to support cross domain data integration
- Conduct tracking, sensor netting (cuing) and sensor registration experiments

FY09 Planned Program
- Continue maturation of satellite on-orbit operations
- Continue maturation of MIS
  o Increase capability and connectivity to support specific experiments
- Demonstrate space-based IR sensor contributions to BMDS performance
  o Identify X-Lab/MDSEC experiments to illustrate space sensor contributions
- Conduct tracking, sensor performance, sensor netting (cuing), sensor registration experiments

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2008

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

- Support system development of boost phase operational capability

C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0207998C BRAC	0	103,219	159,938	61,931	8,724	0	0	333,812
PE 0603175C Ballistic Missile Defense Technology	183,849	108,423	118,718	115,234	120,152	127,012	130,358	903,746
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,082,454	1,045,276	1,019,073	795,659	719,847	548,283	439,752	5,650,344
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,985,140	2,243,213	2,209,262	2,276,848	1,385,258	946,437	1,103,532	13,149,690
PE 0603883C Ballistic Missile Defense Boost Defense Segment	622,218	510,241	421,229	423,927	652,642	799,792	991,839	4,421,888
PE 0603884C Ballistic Missile Defense Sensors	514,989	586,121	1,221,143	1,184,280	1,099,649	1,077,632	823,583	6,507,397
PE 0603886C Ballistic Missile Defense System Interceptors	341,358	340,107	386,817	500,966	708,803	815,433	553,136	3,646,620
PE 0603888C Ballistic Missile Defense Test and Targets	584,615	621,861	673,691	672,976	690,938	708,991	719,209	4,672,281
PE 0603890C Ballistic Missile Defense System Core	425,889	413,934	432,262	482,947	605,219	561,947	571,498	3,493,696
PE 0603891C Special Programs - MDA	347,377	196,892	288,315	304,234	538,050	818,136	786,349	3,279,353
PE 0603892C Ballistic Missile Defense Aegis	1,125,426	1,126,337	1,157,783	1,234,220	1,078,539	1,066,712	1,102,542	7,891,559
PE 0603893C Space Tracking & Surveillance System	311,402	231,528	242,441	266,509	560,130	735,727	938,191	3,285,928
PE 0603894C Multiple Kill Vehicle	133,615	229,943	354,455	488,294	649,632	708,582	879,385	3,443,906
PE 0603896C BMD C2BMC	249,179	447,616	289,277	287,194	270,762	256,767	259,159	2,059,954
PE 0603897C BMD Hercules	46,268	52,462	55,955	55,289	56,400	51,902	52,784	371,060
PE 0603898C BMD Joint Warfighter Support	49,833	49,394	69,982	73,997	77,205	80,168	81,948	482,527
PE 0603904C Missile Defense Integration & Operations Center	104,389	78,557	96,404	100,437	100,366	101,512	102,840	684,505
PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
PE 0605502C Small Business Innovative Research - MDA	142,510	0	0	0	0	0	0	142,510
PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

Project: WX33 MD Space Exp Center

MDA Exhibit R-2A (PE 0603895C)

1184

UNCLASSIFIED

	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

D. Acquisition Strategy

All functions and operations of the MDSEC are currently financed through a 10-year MDIOC Research and Development 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.

Project: WX33 MD Space Exp Center

Line Item 84 -

9 *of* 28

MDA Exhibit R-2A (PE 0603895C)

UNCLASSIFIED

1185

UNCLASSIFIED

		Date
Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis		**February 2008**

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

I. Product Development   Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
MDSEC								
MDIOC Research and Development Contractor	SS/MIPR	MDIOC/ CO	0	3,971	1/4Q	9,977	1/4Q	13,948
Subtotal Product Development			0	3,971		9,977		13948

Remarks

All functions and operations of the MDSEC are currently financed through a 10-year MDIOC Research and Development 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 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
MDSEC								
Subtotal Support Costs			0	0		0		0

Remarks

III. Test and Evaluation   Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Subtotal Test and Evaluation								

Remarks

Project: WX33 MD Space Exp Center

MDA Exhibit R-3 (PE 0603895C)

					Date		
Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis					**February 2008**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**				R-1 NOMENCLATURE **0603895C BMD System Space Program**			

IV. Management Services   Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
MDSEC								
Subtotal Management Services			0	0		0		0

Remarks

Project Total Cost			0	3,971		9,977		13,948

Remarks

Project: WX33 MD Space Exp Center

MDA Exhibit R-3 (PE 0603895C)

1187

	Date
Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile	**February 2008**

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

Fiscal Year	2007				2008				2009				2010				2011				2012				2013			
	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
MDSEC																												
MDSEC Interchange System (MIS)																												
Target Signature Experiments																												
Sensor Tracking Experiments																												
Security																												
Tracking Experiments																												
Sensor Netting Experiments																												
Sensor Registration Experiments																												
Sensor Performance Experiments																												
Features and Discrimination Experiments																												
Typing and Assessment Experiments																												
Model Performance																												

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

Project: WX33 MD Space Exp Center

MDA Exhibit R-4 (PE 0603895C)

1188

UNCLASSIFIED

Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date **February 2008**	

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 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
MDSEC							
MDSEC Interchange System (MIS)	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Target Signature Experiments	3Q-4Q	1Q-4Q					
Sensor Tracking Experiments	3Q-4Q	1Q-4Q	1Q-4Q				
Security		1Q-4Q					
Tracking Experiments		1Q-4Q	1Q-2Q				
Sensor Netting Experiments		1Q-4Q	1Q-4Q	1Q-4Q			
Space-based IR Contributions		1Q-4Q					
Sensor Registration Experiments		3Q-4Q	1Q-2Q				
Sensor Performance Experiments		4Q	1Q-4Q				
Features and Discrimination Experiments			3Q-4Q	1Q-4Q	1Q-4Q		
Typing and Assessment Experiments			3Q-4Q	1Q-4Q	1Q-4Q		
Model Performance				3Q-4Q	1Q-3Q		

Project: WX33 MD Space Exp Center

Line Item 84 -   13 *of* 28   MDA Exhibit R-4A (PE 0603895C)

UNCLASSIFIED

1189

	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
WX16 NFIRE	0	11,786	8,959	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: In FY07, NFIRE content is located in BMD Technology PE 0603175C, Proj 0502 and STSS PE 0603893C, Proj 0812. In FY 2008, content for NFIRE in F08-13, will be captured in the BMDS Space Program PE 0603895C, Proj WX16 in accordance with the MDA revised Block Structure.

In FY07, the April launch of the NFIRE Satellite and the execution of the Target 2A in Aug 2007 were captured in the R-4 of PE 0603893C. On-Orbit Operations began in Aug 2007 with the launch of 2A and is captured in the R-4 for PE 0603893C, Proj 0812, and continued in the R-4 for PE 0603895C, Proj WX16.

A. Mission Description and Budget Item Justification

The Near Field Infrared Experiment (NFIRE) technology effort will collect high and low resolution images of a boosting rocket to improve our understanding of exhaust plume phenomenology and plume-to-rocket body discrimination. 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. 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 will carry 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 experiments will be conducted on a non-interference basis with the other MDA missions. The NFIRE satellite will be operated from the Missile Defense Space Experimentation Center (MDSEC) by the MDA Space Applications Product Center. Data products will be utilized by multiple programs to improve missile engagement performance.

NFIRE Goals:
- Launch the Near Field Infrared Experiment satellite (complete 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

	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

- 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

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
NFIRE	0	11,786	8,959
RDT&E Articles (Quantity)	0	0	0

Note: NFIRE was funded in Program Elements 0603175C and 0603893C for FY07. The FY07 accomplishments are reflected under Program Element 0603893C, Proj 0812 .

FY08 Planned Program
- Launch Missile Target Flight Test Mission 2B
- Continue On-Orbit Operations at the MDSEC
- Continue data collection and analysis on position/orientation of Missile 2A and Missile 2B relative to their 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
- Conduct laser communications experiments to assess the viability of the technology
- Support, as requested by AFSPC and other agencies, Space Situational Awareness

FY09 Planned Program
- 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

Project: WX16 NFIRE
MDA Exhibit R-2A (PE 0603895C)

1191

UNCLASSIFIED

	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0207998C BRAC	0	103,219	159,938	61,931	8,724	0	0	333,812
PE 0603175C Ballistic Missile Defense Technology	183,849	108,423	118,718	115,234	120,152	127,012	130,358	903,746
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,082,454	1,045,276	1,019,073	795,659	719,847	548,283	439,752	5,650,344
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,985,140	2,243,213	2,209,262	2,276,848	1,385,258	946,437	1,103,532	13,149,690
PE 0603883C Ballistic Missile Defense Boost Defense Segment	622,218	510,241	421,229	423,927	652,642	799,792	991,839	4,421,888
PE 0603884C Ballistic Missile Defense Sensors	514,989	586,121	1,221,143	1,184,280	1,099,649	1,077,632	823,583	6,507,397
PE 0603886C Ballistic Missile Defense System Interceptors	341,358	340,107	386,817	500,966	708,803	815,433	553,136	3,646,620
PE 0603888C Ballistic Missile Defense Test and Targets	584,615	621,861	673,691	672,976	690,938	708,991	719,209	4,672,281
PE 0603890C Ballistic Missile Defense System Core	425,889	413,934	432,262	482,947	605,219	561,947	571,498	3,493,696
PE 0603891C Special Programs - MDA	347,377	196,892	288,315	304,234	538,050	818,136	786,349	3,279,353
PE 0603892C Ballistic Missile Defense Aegis	1,125,426	1,126,337	1,157,783	1,234,220	1,078,539	1,066,712	1,102,542	7,891,559
PE 0603893C Space Tracking & Surveillance System	311,402	231,528	242,441	266,509	560,130	735,727	938,191	3,285,928
PE 0603894C Multiple Kill Vehicle	133,615	229,943	354,455	488,294	649,632	708,582	879,385	3,443,906
PE 0603896C BMD C2BMC	249,179	447,616	289,277	287,194	270,762	256,767	259,159	2,059,954
PE 0603897C BMD Hercules	46,268	52,462	55,955	55,289	56,400	51,902	52,784	371,060
PE 0603898C BMD Joint Warfighter Support	49,833	49,394	69,982	73,997	77,205	80,168	81,948	482,527
PE 0603904C Missile Defense Integration & Operations Center	104,389	78,557	96,404	100,437	100,366	101,512	102,840	684,505
PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
PE 0605502C Small Business Innovative Research - MDA	142,510	0	0	0	0	0	0	142,510
PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

Project: WX16 NFIRE

MDA Exhibit R-2A (PE 0603895C)

1192

		Date
Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis		**February 2008**

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

I. Product Development   Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
NFIRE								
Prime Contractor	SS/CPAF	General Dynamics/ AZ	0	3,870	1/2Q	712	1Q	4,582
Science Team	SS/MIPR	MIT/LL/MA	0	1,355	1/4Q	1,355	1/4Q	2,710
Track Sensor Payload	SS/MIPR	AFRL/NM	0	454	1/4Q	473	1/4Q	927
MDIOC Research and Development Contractor (JRDC)	SS/CPAF	MDIOC/CO	0	6,107	1/4Q	6,419	1/4Q	12,526
Subtotal Product Development			0	11,786		8,959		20745

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 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 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 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Subtotal Test and Evaluation								

Remarks

Project: WX16 NFIRE   MDA Exhibit R-3 (PE 0603895C)

1193

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date **February 2008**

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

IV. Management Services   Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Subtotal Management Services								

Remarks

Project Total Cost			0	11,786		8,959		20,745

Remarks

Project: WX16 NFIRE

MDA Exhibit R-3 (PE 0603895C)

1194

	Date
Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile	**February 2008**

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

Fiscal Year	2007				2008				2009				2010				2011				2012				2013			
	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
Near Field Infrared Experiment																												
On-Orbit Operations					△———————————————△																							
Missile Target Flight Test Mission 2B					△																							
Laser Comm Terminal Operations					△———————————————△																							

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

Project: WX16 NFIRE

MDA Exhibit R-4 (PE 0603895C)

1195

Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail		Date **February 2008**
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 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Near Field Infrared Experiment							
On-Orbit Operations	4Q	1Q-4Q	1Q-4Q				
Missile Target Flight Test Mission 2B		2Q					
Laser Comm Terminal Operations		1Q-4Q	1Q-4Q				

Project: WX16 NFIRE

MDA Exhibit R-4A (PE 0603895C)

1196

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date **February 2008**

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 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
WX23 BMDS Space Test Bed	0	0	9,977	10,236	24,814	100,247	123,073
RDT&E Articles Qty	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

The Space Test Bed is being explored as a potential solution to enhance BMDS capability in the future. Space systems have advantages over terrestrial based systems through increased access to ballistic missile targets, independent of adversary country size and threat trajectory. We believe that a mix of terrestrial and space-basing offers the most effective global defense against ballistic missiles.

Near term funding for the space testbed program will be used to refine concepts and prepare to conduct focused experiments demonstrating the viability of the concepts.

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
Space Test Bed Proof of Concept	0	0	9,977
RDT&E Articles (Quantity)	0	0	0

FY09 Planned Program
- Initiate formal steps for potential integration into the BMDS architecture
- Mature planning for early Proof of Concept component demonstrations
- Draft operation concepts in the context of a multi-layer architecture
- Identify Proof of Concept vendor sources for demo components and subassemblies
- Develop multi-year technology and risk reduction investment plan
- Begin development of Proof of Concept Master Program Phasing Schedule
- Identify Proof of Concept long lead items
- Mature options for acquisition strategy

Project: WX23 BMDS Space Test Bed

MDA Exhibit R-2A (PE 0603895C)

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	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0207998C BRAC	0	103,219	159,938	61,931	8,724	0	0	333,812
PE 0603175C Ballistic Missile Defense Technology	183,849	108,423	118,718	115,234	120,152	127,012	130,358	903,746
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,082,454	1,045,276	1,019,073	795,659	719,847	548,283	439,752	5,650,344
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PE 0603884C Ballistic Missile Defense Sensors	514,989	586,121	1,221,143	1,184,280	1,099,649	1,077,632	823,583	6,507,397
PE 0603886C Ballistic Missile Defense System Interceptors	341,358	340,107	386,817	500,966	708,803	815,433	553,136	3,646,620
PE 0603888C Ballistic Missile Defense Test and Targets	584,615	621,861	673,691	672,976	690,938	708,991	719,209	4,672,281
PE 0603890C Ballistic Missile Defense System Core	425,889	413,934	432,262	482,947	605,219	561,947	571,498	3,493,696
PE 0603891C Special Programs - MDA	347,377	196,892	288,315	304,234	538,050	818,136	786,349	3,279,353
PE 0603892C Ballistic Missile Defense Aegis	1,125,426	1,126,337	1,157,783	1,234,220	1,078,539	1,066,712	1,102,542	7,891,559
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PE 0603894C Multiple Kill Vehicle	133,615	229,943	354,455	488,294	649,632	708,582	879,385	3,443,906
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PE 0603897C BMD Hercules	46,268	52,462	55,955	55,289	56,400	51,902	52,784	371,060
PE 0603898C BMD Joint Warfighter Support	49,833	49,394	69,982	73,997	77,205	80,168	81,948	482,527
PE 0603904C Missile Defense Integration & Operations Center	104,389	78,557	96,404	100,437	100,366	101,512	102,840	684,505
PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
PE 0605502C Small Business Innovative Research - MDA	142,510	0	0	0	0	0	0	142,510
PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

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	Date
Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	**February 2008**

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

I. Product Development   Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Subtotal Product Development								

Remarks

II. Support Costs   Cost ($ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 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 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Subtotal Test and Evaluation								

Remarks

Project: WX23 BMDS Space Test Bed

MDA Exhibit R-3 (PE 0603895C)

1199

UNCLASSIFIED

					FY 2008		FY 2009	
	Contract	Performing	Total		Award/		Award/	
	Method	Activity &	PYs	FY 2008	Oblg	FY 2009	Oblg	Total
Cost Categories:	& Type	Location	Cost	Cost	Date	Cost	Date	Cost
Space Test Bed Proof of Concept								
Planning & Analysis	Various	Various	0	0	N/A	9,977	4Q	9,977
Subtotal Management Services			0	0		9,977		9977

Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis

Date **February 2008**

APPROPRIATION/BUDGET ACTIVITY
RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)

R-1 NOMENCLATURE
0603895C BMD System Space Program

IV. Management Services   Cost ($ in Thousands)

Remarks

Project Total Cost			0	0		9,977		9,977

Remarks

Project: WX23 BMDS Space Test Bed

Line Item 84 -

24 *of* 28

UNCLASSIFIED

MDA Exhibit R-3 (PE 0603895C)

1200

Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile	Date **February 2008**

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

Fiscal Year	2007				2008				2009				2010				2011				2012				2013			
	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

Space Test Bed

Planning and Analysis — planned activity from FY2009 Q1 to FY2010 Q1

Proof of Concept Operations — planned activity from FY2010 Q1 to FY2011 Q1

Component Demonstrations — planned activity from FY2011 Q3 to FY2013 Q4

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

Project: WX23 BMDS Space Test Bed

MDA Exhibit R-4 (PE 0603895C)

Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail	Date February 2008

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 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Space Test Bed							
Planning and Analysis			1Q-4Q	1Q-2Q			
Proof of Concept Operations				1Q-4Q	1Q-4Q		
Component Demonstrations					3Q-4Q	1Q-4Q	1Q-4Q

Project: WX23 BMDS Space Test Bed

MDA Exhibit R-4A (PE 0603895C)

1202

		Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification		**February 2008**

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

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
ZX40 Program-Wide Support	0	795	858	1,615	1,608	3,892	4,699
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: In accordance with the Missile Defense Agency revised block structure, the content previously planned in Project 0602 for FY08-FY13 is now captured in Project ZX40.

A. Mission Description and Budget Item Justification

Program-Wide Support provides funding for common non-headquarters support functions across the entire program such as strategic planning, program integration, business management, cost estimating, contracting, and financial management, to include preparation of financial statements, reimbursement of financial services provided by DFAS, internal review and audit, earned-value management, and program assessment. Includes costs for both government civilians performing these functions, as well as outside services and support contractors that augment government staff in these areas. Many of these costs reside within the Missile Defense Agency Executing Agents in the Services: Army Space and Missile Defense Command, Army PEO Space and Missile Defense, Office of Naval Research, and various Air Force laboratory and acquisition activities, although some functions and costs within this program element are performed by MDA employees assigned within the National Capital Region (NCR). Other costs included herein 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 fluctuation on a limited number of foreign contracts.

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
Civilian Salaries and Support	0	795	858
RDT&E Articles (Quantity)	0	0	0

See Section A: Mission Description and Budget Item Justification

Project: ZX40 Program-Wide Support

MDA Exhibit R-2A (PE 0603895C)

	Date
Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	**February 2008**

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

C. Other Program Funding Summary

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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PE 0603905C BMD Concurrent Test and Operations	21,870	0	0	0	0	0	0	21,870
PE 0603906C Regarding Trench	0	1,986	2,978	4,964	4,963	8,933	8,933	32,757
PE 0603907C Sea Based X-Band Radar (SBX)	0	165,243	0	0	0	0	0	165,243
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PE 0901585C Pentagon Reservation	15,527	6,019	19,734	5,040	5,284	5,370	5,456	62,430
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

Project: ZX40 Program-Wide Support

MDA Exhibit R-2A (PE 0603895C)

1204