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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	514,989	586,121	1,076,983	1,116,740	1,099,649	1,077,632	823,583
0811 Ballistic Missile Defense Radars Block 2006	236,290	0	0	0	0	0	0
0911 Ballistic Missile Defense Radars Block 2008	259,351	0	0	0	0	0	0
0011 Ballistic Missile Defense Radars Block 2010	6,638	0	0	0	0	0	0
AX11 Ballistic Missile Defense Radars Block 1.0	0	5,569	5,723	0	0	0	0
BX11 Ballistic Missile Defense Radars Block 2.0	0	28,821	101,879	2,979	0	0	0
CX11 Ballistic Missile Defense Radars Block 3.0	0	97,183	96,191	21,842	18,694	19,814	14,888
DX11 Ballistic Missile Defense Radars Block 4.0	0	100,223	150,505	239,713	137,808	1,220	7,926
EX11 Ballistic Missile Defense Radars Block 5.0	0	15,802	144,042	226,844	193,327	187,228	115,679
WX11 Ballistic Missile Defense Radars Capability Development	0	170,826	257,646	221,330	300,079	427,821	253,664
XX11 Ballistic Missile Defense Radars Sustainment	0	154,568	296,472	360,520	418,280	412,143	406,860
0602 Program-Wide Support	12,710	0	0	0	0	0	0
ZX40 Program-Wide Support	0	13,129	24,525	43,512	31,461	29,406	24,566
Amount Included in PE 0904903D				-151,670	-111,212	-120,268	-131,192
Total PE Cost Reflected in R-1	514,989	586,121	1,076,983	965,070	988,437	957,364	692,391

Note: The content previously planned in projects 0811, 0911, and 0011 are now captured in projects AX11, BX11, CX11, DX11, EX11, WX11, and XX11 for FY08-13 in accordance with the MDA revised Block structure. Beginning in FY09, all radar efforts have been transferred into the Sensors PE to maximize efficiency and increase commonality across the BMDS. This includes efforts associated with the Cobra Dane and UEWR radars, the SBX radar, the THAAD Fire Unit radars and the European Midcourse Radar.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

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A. Mission Description and Budget Item Justification

A.1 System Element Description

The Ballistic Missile Defense System (BMDS) architectural objectives for the Sensors Directorate are to close existing sensor coverage gaps and expand the capability provided for the warfighter by increasing their means of engaging threats. The Sensors Directorate's mission is to develop, acquire, field, test and operate BMDS sensors utilizing the Block approach to deliver increasing BMDS capabilities. MDA is using an integrated layered approach to develop a sensor network that is integrated with the BMDS through the Command and Control, Battle Management and Communication (C2BMC) system. Sensor networking and data fusion are coordinated efforts between C2BMC and the Sensors. The Sensor Program Element (PE) supports BMDS-level test requirements as delineated through the MDA Integrated Master Test Plan (IMTP) and contributes to BMDS Concurrent Test, Training and Operations (CTTO) activities that will safely separate test, evaluation, and training venues from real-world activities; and allow injection of high-fidelity simulations to run realistic scenarios on operational equipment and networks. CTTO will enable end-to-end testing of the BMDS and enable BMDS training that allows operators to exercise any or all BMDS elements, as needed. The Sensor elements in this PE have been defined in coordination with Systems Engineering. Through FY07, the development and fielding of these Sensors occurred in the following BMDS blocks: Block 2006 (Project 0811), Block 2008 (Project 0911), Block 2010 (Project 0011) and Block 2012 (Project R111). Beginning with FY08, MDA transitioned to a new BMDS Block structure and the BMDS Radar pertinent Blocks are as follows: Block 1.0 (Project AX11), Block 2.0 (BX11), Block 3.0 (Project CX11), Block 4.0 (Project DX11), Block 5.0 (Project EX11), Capability Development (Project WX11), and Sustainment (Project XX11).

The Ballistic Missile Defense (BMD) Radars Program Element (PE) effort includes:

- Development and delivery of AN/TPY-2 radars for either forward-based or THAAD Fire Unit use to meet the needs of the warfighter
- Upgrade to the Thule Early Warning Radar (EWR)
- Sustainment of deployed radars
- Sea-Based X-Band Radar Sustainment
- Demonstrations and experiments with the External Sensors Laboratory (ESL) for forward-based radar
- Upgrade to the European Midcourse Radar (EMR)
- Development of the Adjunct Sensor
- Continuation of the Airborne Infrared Sensors (AIRS) program evaluating the military utility of AIRS to the BMDS

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All of these projects are providing data to the C2BMC and/or Ground Fire Control (GFC) for sensor networking and distribution to the appropriate weapon system. This approach provides the BMDS the ability to coordinate weapons to extend their effective range beyond local sensors by using more sophisticated engagement strategies.

The AN/TPY-2 used in a forward-based role provides detection and tracking during the boost phase. This significantly reduces the uncertainty in target discrimination and reaction time, increasing the probability of a successful BMDS engagement. The AN/TPY-2 used in a terminal mode as a Fire Unit Radar (FUR) is an integral component of the THAAD Fire Unit. The FUR is capable of tracking multiple threats and multiple interceptors during engagements. It provides surveillance, acquisition, track, discrimination, interceptor communications, and hit assessment data collection for the fire control.

The Thule Early Warning Radar (EWR) located at Thule Air Base, Greenland, is an Ultra High Frequency (UHF) radar that will be upgraded to match the configuration of the already upgraded EWR sensors at RAF Fylingdales, UK and Beale Air Force Base (AFB), CA. This upgrade includes hardware and software modifications to enhance capabilities and integrate the Thule UEWR into the BMDS Sensors Architecture as a midcourse sensor.

The Beale and Fylingdales EWRs located at Beale Air Force Base (AFB) and RAF Fylingdales, UK respectively, are Ultra High Frequency (UHF) radars that are completing their upgrades for Missile Defense to the UEWR configuration. The COBRA DANE radar located at Earekson AFS, Shemya, Alaska will enhance performance and be integrated into the BMDS. Effort prior to FY08 was accomplished under the BMD Midcourse Defense program element (0603882C). Clear and Cape Cod EWR integration into the BMDS will occur after the upgrades are completed by the USAF.

External Sensors are sensors that are not an integral part of the BMDS, but can provide value to the BMDS. The External Sensors Laboratory (ESL) is used to correlate and fuse data from multiple external sources and provide it to the BMDS via an interface with C2BMC. External Sensors provide early detection information for cueing fielded sensors and weapon systems, significantly increasing their effectiveness.

Deploying an Adjunct Sensor with the forward-based AN/TPY-2 will extend tracking/discrimination ranges and support target handover to midcourse sensors. Additional radar software functionality will be added to provide enhanced capabilities.

EMR is a large, steerable, X-band phased array radar currently located at Kwajalein Missile Range, Kwajalein Atoll. EMR will be maintained in caretaker status (warm stand-by) at Kwajalein into FY10. Starting in FY08, the EMR back-end hardware (signal data processing equipment, etc.) will

be upgraded and deployed to a European location to provide BMDS midcourse discrimination capability in defense of the United States and Europe. Locating a high-resolution X-band sensor like the EMR in the European theater will provide discrimination coverage from Intercontinental Ballistic Missiles (ICBMs) in the midcourse phase of flight.

The Sensors PE was provided a FY08 Congressional increase for the Airborne Infrared Surveillance (AIRS) program. AIRS is quantifying the potential benefit of airborne Electro-Optical Infrared (EO/IR) Sensors capabilities to enhance BMDS Engagement Sequence Group (ESG) options.

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

The Ballistic Missile Defense System (BMDS) development approach allows sensor technologies and capabilities to be incorporated as they mature and evolve into a network of sensors at the BMDS level. Overlapping sensor coverage with a diversity of sensor types will improve track, discrimination and kill assessments. The extended sensor coverage and accuracy provided by a network of layered sensors makes the BMDS more efficient, thereby reducing the number of target engagements needed to ensure a high probability of success.

AN/TPY-2 radars can be configured to operate as a THAAD Fire Unit Radar or Forward-Based Radar. AN/TPY-2 radars are transportable, adding flexibility to respond to geographical changes in threats. Under this Program Element, two AN/TPY-2 radars have completed manufacturing (AN/TPY-2 #2, 3), three are in production (AN/TPY-2 #5, 6, 7), and two more are planned (AN/TPY-2 #8, 9). Forward-based AN/TPY-2 radars located near potential threats provide the BMDS early missile detection and tracking capability.

Upgraded Early Warning Radars (UEWRs) and COBRA DANE Upgrade (CDU) are large, fixed, phased-array surveillance radars used to detect, track, and classify individual targets early in their trajectory. The Thule upgraded Early Warning Radar (EWR) will be used to provide additional coverage in the midcourse phase of flight. Together with other BMDS sensors the upgrades will help enable continuous tracking and discrimination on ballistic missile threats and provide the BMDS with additional Engagement Sequence Group (ESG) possibilities.

The External Sensors Lab (ESL) provides a Research and Development test bed to integrate data from space assets into the BMDS. These External Sensors provide new opportunities for data fusion to improve tracking, cueing, discrimination and situational awareness. The External Sensor data enables new Engagement Sequence Groups (ESGs) to be implemented that have the potential to enhance BMDS performance. A major part of the successful integration of these space sensors is development and testing of new algorithms that can utilize the data for the Missile Defense Mission.

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The Adjunct Sensor will improve the forward-based AN/TPY-2's ability to adapt and to operate in a variety of geographical locations. Deploying an Adjunct Sensor in conjunction with a forward-based AN/TPY-2 will extend both the tracking and discrimination ranges and closes coverage gaps where needed. This results in continuous sensor coverage between the forward-based radar and other midcourse sensors.

Locating a high-resolution X-band sensor like the EMR in the European theater will provide discrimination coverage from Intercontinental Ballistic Missiles (ICBMs) in the midcourse phase of flight. This will increase the probability of engagement success.
The Sea-Based X-band radar (SBX) is a phased-array radar operating in the X-band which is mounted on a commercially designed, self-propelled, semi-submersible oil drilling platform. The vessel has a dynamic positioning capability to enable precision station keeping even in adverse sea states and weather conditions. The X-Band Radar (XBR) part of the SBX is the world's largest X-band radar built with leading edge technology. When fully integrated with the rest of the BMDS it will become the primary midcourse discrimination sensor for the system.

A.3 Major System Element Goals

The goals of MDA Sensors activities are to: 1) develop, upgrade, integrate, test, field, and verify sensors within the BMDS sensor network; 2) provide BMDS sensors sustainment and Warfighter (Combatant Commanders) support; and 3) enhance the performance of the BMDS by extending sensor coverage and accuracy provided by a network of layered sensors. The MDA transitioned to a new BMDS Block structure beginning with FY08.

Block 2006
- Manufactured and deployed AN/TPY-2 #2
- Delivered AN/TPY-2 #3

Block 2008
- Continued AN/TPY-2 #5 and #6 manufacture
- Began Thule radar upgrade to the UEWR configuration

Block 2010
- Integration of External Sensor data into the BMDS

The pertinent BMDS Radars FY08-13 goals in accordance with the new BMDS Block structure are as follows:
Block 1.0 (Defend U.S. from Limited North Korean Long-Range Threats)

- Provide commercial power to AN/TPY-2 #2 forward based radar site at Shariki, Japan

Block 2.0 (Defend Allies and Deployed Forces from Short-to-Medium-Range Threats in One Region/Theater)
- Complete AN/TPY-2 #5 Radar production with current plans to use to support THAAD Fire Unit #1
- Complete AN/TPY-2 #7 Radar production with current plans to use to support THAAD Fire Unit #2

Block 3.0 (Expand Defense of the U.S. to Include Iranian Long-Range Threats)
- Upgrade Thule to UEWR configuration
- Provide radar discrimination capability

Block 4.0 (Defend Allies & Deployed Forces in Europe from Limited Iranian Long-Range Threats, Expand Protection of U.S.)
- Complete European Midcourse Radar (EMR) upgrade and communications suite procurement
- Complete Southern Radar Site (AN/TPY-2 #6) radar production, deployment, and communications procurement

Block 5.0 (Expand Defense of Allies & Deployed Forces from Short-to-Intermediate-Range Threats in Two Regions/Theaters)
- Complete AN/TPY-2 #3 radar deployment, site construction, and communications suite procurement
- Manufacture and deploy communications suite for AN/TPY-2 forward based radars
- Complete radar production of AN/TPY-2 #8 & #9 currently planned for use in support of THAAD Fire Units #3 & #4
- Provide program management expertise across all blocks

BMDS Capability Development
- Integrate Clear and Cape Cod UEWRs
- Continue AN/TPY-2 Basic Program (S/W Enhancements, Modeling & Simulation)
- Perform Test & Evaluation for AN/TPY-2 and Adjunct Sensor
- Continue BMDS Sensors development
- Develop Adjunct Sensor

BMDS Sustainment
- Sustain deployed radars

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- Sustain BMDS Radars communications for deployed radars
- Provide BMDS Radars site security for deployed radars

A.4 Major Events Schedule and Description

Major Event	Project	Timeframe
Ground Test		
Testing Milestones		
EMR Integration with BMDS in Europe	WX11	1Q FY 2012 - 4Q FY 2012
Contract Activity		
Acquisition Milestones		
EMR Contract Award	DX11	2Q FY 2008
Studies & Analysis		
Perform Sensor Architecture Analysis	WX11	1Q FY 2008 - 4Q FY 2009
Delivery		
Development Milestones		
Manufacture AN/TPY-2 #3 Hardware Complete	0811	1Q FY 2007
Other		
Testing Milestones		
Thule Certification	CX11	4Q FY 2009
Program Milestones		
AN/TPY-2 #6 Operational	DX11	4Q FY 2011
EMR Operational	DX11	2Q FY 2013

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B. Program Change Summary	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008 PB)	514,129	778,163	984,963
Current President's Budget (FY 2009 PB)	514,989	586,121	1,076,983
Total Adjustments	860	-192,042	92,020
Congressional Specific Program Adjustments	0	-188,000	0
Congressional Undistributed Adjustments	0	-4,042	0
Reprogrammings	8,799	0	0
SBIR/STTR Transfer	-7,939	0	0
Adjustments to Budget Years	0	0	92,020

FY07 increase of $0.860 million includes SBIR/STTR transfer and MDA reprogrammings.

FY08 decrease of $192.042 million includes a Congressionally specific program decrease of $188 million and a portion of the MDA Congressional undistributed reduction.

FY09 increase of $92.020 million reflects MDA programmatic changes to support program requirements.

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COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0811 Ballistic Missile Defense Radars Block 2006	236,290	0	0	0	0	0	0
RDT&E Articles Qty	1	0	0	0	0	0	0

Note: The content previously planned in project 0811 for FY08-13 is now captured in projects AX11, EX11, WX11, and XX11 in accordance with the MDA revised Block structure.

RDT&E Test Article: Acquisition of AN/TPY-2 #3 was delivered in FY07.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Radars Block 2006 (Project 0811) effort was mainly focused on the development, manufacture, test, verification, and deployment of the Forward Based X-Band Radar-Transportable (AN/TPY-2). This radar provides a capability to detect ballistic missiles early in their flight and provide precise tracking information for use by the Ballistic Missile Defense System (BMDS). This provides overlapping sensor coverage and the potential for the BMDS weapons to extend their effective range beyond local sensors by using more sophisticated engagement strategies, which dramatically increases the probability of a successful intercept engagement. Additional Block 2006 efforts included the operation of the test bed asset, operations and sustainment activities, test and evaluation efforts, and Airborne Infrared Surveillance (AIRS).

Through FY07, Block 2006 funds primarily supported development and production of two (2) AN/TPY-2s.

The AN/TPY-2 is a high-resolution, X-band, phased array radar. It includes modified software algorithms for tracking and discrimination from a forward-based perspective. The radar will have a direct interface with the BMDS C2BMC. The radar will perform surveillance autonomously or as cued by other sensors. It will also acquire, track and discriminate threat missiles and missile components.

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AN/TPY-2s will be deployed as forward-based radars to protect the United States from ballistic missile threats. Other AN/TPY-2 Block 2006 efforts included completion of site construction for AN/TPY-2 #2, production of AN/TPY-2 #3, and software development of Capability Release 2 (CR-2).

Advanced capabilities will be added through upgrades and improvement programs via a series of spiral software enhancements. AN/TPY-2 software CR-2 forward-based discrimination enhancements will be added as part of the BMDS Test program.

The CLS contract is used to deploy, operate, and sustain the forward-based radars.

The Airborne Infrared Surveillance (AIRS) program received a Congressionally directed plus-up in FY07. The Electro-Optical/Infrared (EO/IR) sensors program evaluates the AIRS ability to operate as the primary sensor in an Engagement Sequence Group (ESG).

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
AN/TPY-2 Basic Program (includes AN/TPY-2 software)	104,346	0	0
RDT&E Articles (Quantity)	0	0	0

The Basic AN/TPY-2 program includes support for the first AN/TPY-2 software Capability Release 1 (CR-1) for search and track in a forward-based role. Capability Release 2 (CR-2) software development incorporates forward-based discrimination algorithms from project Hercules. This effort also provides the AN/TPY-2 program infrastructure, modeling and simulation capability, hardware-in-the-loop (HWIL) facilities, software upgrades, and systems engineering/management support for all radars. FY08 effort continues in Project WX11 under AN/TPY-2 Basic Program.

FY07 Accomplishments:

- Continued software development for AN/TPY-2
- Began BMDS integration testing with AN/TPY-2 CR-2 software
- Completed AN/TPY-2 #3 acceptance testing
- Maintained the HWIL facility to support test and modification activities
- Continued life cycle support for AN/TPY-2 software CR-1

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	FY 2007	FY 2008	FY 2009
AN/TPY-2 #3 Manufacture	3,949	0	0
RDT&E Articles (Quantity)	1	0	0

This effort included the material, labor, engineering and management support for manufacture and acceptance testing of AN/TPY-2 #3. Software development and system integration are covered under the Basic AN/TPY-2 program. This radar was delivered in FY07 and when deployed will provide the BMD System with a forward-based capability and extend the sensor coverage.

FY07 Accomplishments:
RDT&E Test Article: Acquisition of AN/TPY-2 #3 was delivered in FY07

- Completed AN/TPY-2 #3 factory integration and testing
- Delivered AN/TPY-2 #3 to Vandenberg AFB for BMDS testing with CR-1/CR-2

	FY 2007	FY 2008	FY 2009
Test & Evaluation	26,776	0	0
RDT&E Articles (Quantity)	0	0	0

The test program addresses the completion of radar element verification per radar and provides an understanding of AN/TPY-2 forward based radar capability contributions for the overall BMDS. Testing will demonstrate the ability to receive battle management direction from C2BMC and send the C2BMC messages with tracks and threat data. The test program uses deployable radar assets after they undergo high power element-level integration and verification. Targets of Opportunity (TOOs) launched from Vandenberg AFB, CA (VAFB) provide radar characterization opportunities and BMDS system test events. This effort encompasses funding for test and test operations including the conduct of flight tests, ground tests, and wargames to support warfighter concept of operations development. This includes planning, resourcing, test site management, test file creation, test execution, performance analysis, modeling and simulation development, verification, validation, accreditation, and reporting of test event data. FY08 effort continues in Project WX11 under Test & Evaluation.

FY07 Accomplishments:

- Began AN/TPY-2 CR-2 verification testing including integration with C2BMC at VAFB
- Planned and executed radar testing during TOO flight tests and Glory Trips
- Planned and conducted TOO flight tests with the External Sensors Lab (ESL)
- Planned and conducted TOO flight tests with Airborne Infrared Surveillance (AIRS)

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- Planned, prepared scenarios, conducted ground tests with AN/TPY-2 hardware in the loop (HWIL) to demonstrate BMDS forward-based sensor role with Block 2006 Threats
- Provided Test Site Support at Vandenberg AFB for AN/TPY-2 #3
- Began development, installation, and test of the Missile Defense System Exerciser (MDSE) node for AN/TPY-2 HWIL
- Began Concurrent Test, Training and Operations (CTTO) requirements development and demonstration planning and execution in conjunction with MDSE ground test integration efforts
- Continued BMDS SIM maturation of AN/TPY-2 element sensor representation for BMDS wargames, C2BMC cycle testing, and ICAR use

	FY 2007	FY 2008	FY 2009
Operations and Support (Sustainment)	65,491	0	0
RDT&E Articles (Quantity)	0	0	0

The Block 2006 effort included operation and sustainment (O&S) of AN/TPY-2 forward-based radars. This includes overseas O&S and depot level logistics support for AN/TPY-2 #2, and O&S for AN/TPY-2 #3 during testing at Vandenberg Air Force Base (VAFB), CA in FY07. These efforts also include AN/TPY-2 operational spares, repair, and replacement. The O&S efforts include radar operators/maintainers, site security, site security personnel, site maintenance, fuel, utility, and communications support costs. MDA will use Contractor Logistics Support (CLS) to operate and sustain the AN/TPY-2 radars.

The European Midcourse Radar (EMR) will be maintained in a caretaker status at Kwajalein Missile Range (KMR), Kwajalein Atoll prior to and during the radar upgrade period. Caretaker status includes maintaining, 1) the environmental controls for the antenna and radome, and 2) the radar electronics in warm standby to reduce radar degradation. FY08 effort continues in Project XX11 under BMDS radars.

FY07 Accomplishments:
- Operated and sustained AN/TPY-2 #2 in Japan
- Operated and sustained AN/TPY-2 #3 during VAFB testing phase
- Maintained EMR in caretaker status at KMR prior to the upgrade
- Ensured AN/TPY-2 #3 readiness for operational use and deployment

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	FY 2007	FY 2008	FY 2009
EO/IR Sensors	1,946	0	0
RDT&E Articles (Quantity)	0	0	0

The Airborne Infrared Surveillance (AIRS) program is a proof of concept program to demonstrate and evaluate the potential benefits of airborne infrared sensor systems to the Ballistic Missile Defense System (BMDS). This program evaluates the AIRS ability to operate as the primary sensor in an Engagement Sequence Group (ESG), i.e. use AIRS data to engage ballistic missile threats. The AIRS program was funded by a Congressional Add in FY07.

FY07 Accomplishments:

- Demonstrated AIRS ability to provide airborne IR launch and engagement functionality during flight tests, e.g., FTM-11, FTG-3, FTT-6, FTX-02, and FTM-12

	FY 2007	FY 2008	FY 2009
Deployment/Site Prep and Activation	33,782	0	0
RDT&E Articles (Quantity)	0	0	0

The AN/TPY-2 radars will be deployed to sites located near expected missile threats. The Block 2006 effort included deployment of AN/TPY-2 #2 and preliminary efforts to support deployment of AN/TPY-2 #3. AN/TPY-2 #2 was deployed to Japan to meet immediate missile threats. The Deployment/Site Preparation/Activation effort included planning and coordination with Host Nation and Combatant Commanders (COCOMs), radar site design, site construction at intermediate and objective sites (Shariki, Japan), radar setup, calibration, and activation. This effort also included site activation for AN/TPY-2#2 and deployment preparations for AN/TPY-2 #3. FY08 effort continues in Project AX11 under AN/TPY-2 #2 Commercial Power and in Project EX11 under AN/TPY-2 #3 Radar.

FY07 Accomplishments:

- Completed AN/TPY-2 #2 site activation in Shariki, Japan
- Began the initial site planning for AN/TPY-2 #3
- Participated in site surveys for AN/TPY-2 #3 overseas candidate sites

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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 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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

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: **0603884C Ballistic Missile Defense Sensors**

D. Acquisition Strategy

The AN/TPY-2 project uses an existing radar design to minimize development costs and schedule. Design enhancements focus on software changes for the forward-based algorithms and C2BMC connectivity. The AN-TPY-2 is a Cost Plus Award Fee (CPAF) contract.

A Contractor Logistics Support (CLS) contract was awarded in FY05 to operate and maintain the AN/TPY-2 radars. The CLS contract provides the operations and support activities required for site surveys, planning, relocation, depot maintenance, forward-based system operations, repair, and replacement. The contract is an Indefinite Delivery/Indefinite Quantity (IDIQ) task order contract.

A contract was awarded in FY06 to provide a security force for the AN/TPY-2 #2 forward based radar. This contract provides the personnel, security training, and materials needed to support site security. This IDIQ Task Order contract was awarded to an Alaskan Native American-owned company as a Small Business Award (SBA).

The AIRS program is executed under an existing MDA contract.

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: **0603884C Ballistic Missile Defense Sensors**

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
AN/TPY-2 Basic Program (includes AN/TPY-2 software)								
AN/TPY-2 Prime / CR-1 / CR-2 Software	SS/CPAF	Raytheon /MA	96,104	0	N/A	0	N/A	96,104
AN/TPY-2 #3 Manufacture								
AN/TPY-2 #3 Manufacture	SS/CPAF	Raytheon /MA	3,653	0	N/A	0	N/A	3,653
Operations and Support (Sustainment)								
Deployed Site Operations/Depot Support/ Spares	SS/CPAF	Raytheon /MA	46,041	0	N/A	0	N/A	46,041
Generator Fuel	MIPR	USA/PACOM /CA	750	0	N/A	0	N/A	750
Site Manpower	MIPR	US Army-Garrison /Japan	156	0	N/A	0	N/A	156
BMDSM Manager Support	MIPR	SMDC /AL	892	0	N/A	0	N/A	892
AN/TPY-2 #2 Security	C/CPFF	Chenega Blackwater / AK, NC, VA	12,745	0	N/A	0	N/A	12,745
EO/IR Sensors								
AIRS Prime Contractor	SS/CPFF	L3/Aeromet /OK	1,752	0	N/A	0	N/A	1,752
Analysis / Technical Engineering and Test Support	FFRDC	JHU-APL /MD	25	0	N/A	0	N/A	25
Technical Support	C/FFP	CSC /VA	23	0	N/A	0	N/A	23
Deployment/Site Prep and Activation								
Deployment/Site Prep/Activation	SS/CPAF	Raytheon /MA	30,266	0	N/A	0	N/A	30,266
Subtotal Product Development			192,407	0		0		192407

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
AN/TPY-2 Basic Program (includes AN/TPY-2 software)								
Civilian Salaries / Travel / Support		MDA /VA	245	0	N/A	0	N/A	245
Business Operations Support Services	C/FFP	Northrop Grumman /VA	1,723	0	N/A	0	N/A	1,723
Engineering Technical Support	C/FFP	CSC /VA	1,724	0	N/A	0	N/A	1,724
Sensors Technical Oversight / Performance Analysis	FFRDC	MIT-LL, MITRE, APL / MA, VA, MD	4,550	0	N/A	0	N/A	4,550
AN/TPY-2 #3 Manufacture								
Civilian Salaries / Travel / Support		MDA /VA	9	0	N/A	0	N/A	9
Technical / Business Operations Support Services	C/FFP	CSC, Northrop Grumman /VA	124	0	N/A	0	N/A	124
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA,MA, MD	163	0	N/A	0	N/A	163
Test & Evaluation								
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	2,016	0	N/A	0	N/A	2,016
Operations and Support (Sustainment)								
Civilian Salaries / Travel / Support		MDA /VA	146	0	N/A	0	N/A	146
Business Operations Support Services	C/FFP	Northrop Grumman, CSC / VA	2,052	0	N/A	0	N/A	2,052

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: **0603884C Ballistic Missile Defense Sensors**

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
Sensors Technical Oversight / Performance Analysis	FFRDC	MIT-LL, MITRE, JHU-APL / MA, VA, MD	2,709	0	N/A	0	N/A	2,709
EO/IR Sensors								
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	146	0	N/A	0	N/A	146
Deployment/Site Prep and Activation								
Civilian Salaries, Travel, Other Support		MDA /VA	105	0	N/A	0	N/A	105
Technical / Business Operations Support	C/FFP	CSC, Northrop Grumman /VA	1,470	0	N/A	0	N/A	1,470
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	1,941	0	N/A	0	N/A	1,941
Subtotal Support Costs			19,123	0		0		19123

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
Test & Evaluation								
Government Testing Oversight	MIPR	NSWC PHD, JHU-APL/CA, MD	10,300	0	N/A	0	N/A	10,300
Radar Testing	SS/CPAF	Raytheon /MA	14,317	0	N/A	0	N/A	14,317

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: 0603884C Ballistic Missile Defense Sensors

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
Testing Site Support and Certification	MIPR	VAFB/CA	143	0	N/A	0	N/A	143
	MIPR		0	0	N/A	0	N/A	
Subtotal Test and Evaluation			24,760	0		0		24760

Remarks

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			236,290	0		0		236,290

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
Acquisition Milestones																												
AN/TPY-2 #2 Site Construction			▲																									
Testing Milestones																												
AN/TPY-2 #3 Integration with BMDS at VAFB		▲	—	▲																								
FTG-03a				▲																								
Deployment/Site Prep/ Activation																												
Complete AN/TPY-2 #2 Checkout				▲																								
Development Milestones																												
Manufacture AN/TPY-2 #3 Hardware Complete	▲																											

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Acquisition Milestones							
AN/TPY-2 #2 Site Construction	3Q						
Studies & Analyses							
Perform Sensor Architecture Analysis	4Q						
Testing Milestones							
Integrated and Distributed Ground Testing	1Q-4Q						
AN/TPY-2 #3 Integration with BMDS at VAFB	2Q-4Q						
GT-193 AN/TPY-2 #3	2Q						
Missile Defense Integrated Exercises (MDIE)	4Q						
FTX-02	2Q						
FTG-03a	4Q						
Deployment/Site Prep/ Activation							
Complete AN/TPY-2 #2 Site Design	2Q						
Complete AN/TPY-2 #2 Checkout	4Q						
AN/TPY-2 #3 Site Construction	2Q-4Q						
Operation & Sustainment							
AN/TPY-2 #2 O&S	1Q-4Q						
AN/TPY-2 #3 O&S	3Q-4Q						
Development Milestones							
Manufacture AN/TPY-2 #3 Hardware Complete	1Q						

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0911 Ballistic Missile Defense Radars Block 2008	259,351	0	0	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: The content previously planned in project 0911 for FY08-13 is now captured in Projects BX11, CX11, DX11, EX11, and WX11 in accordance with the MDA revised Block structure.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Radar Block 2008 (Project 0911) continued the spiral development to enhance and expand on the sensor capabilities provided to the Ballistic Missile Defense System (BMDS) under Block 2006. The deployment and networking of additional sensors supports the Missile Defense Agency (MDA) goal of using a layered sensor architecture to provide a more robust BMDS. Expanding the layered sensor architecture improves the BMDS ability to detect, track and engage ballistic missiles in all phases of flight.

Under this prior Block description, Block 2008 was to include delivery of AN/TPY-2 #5 & #6. AN/TPY-2 #5 is currently planned for delivery to the THAAD for Fire Unit Radar #1. AN/TPY-2 #6 will be deployed overseas to expand the BMDS forward-based radar coverage. A AN/TPY-2 Mechanical Steering Kit (MSK) concept exploration study was initiated in FY07 to explore the costs and benefits of MSKs. BMDS-level testing includes flight tests, ground tests, and wargames. This effort also provides modeling and simulation capabilities and hardware in the loop (HWIL) facilities.

The Thule EWR upgrade will be completed in FY09 and will be like the upgrades at Beale AFB, CA and RAF Fylingdales, UK. The upgrade maintains a common configuration with the Beale and RAF Fylingdales upgrades.

Contractor Logistics Support (CLS) will be provided to deploy, operate, and sustain the AN/TPY-2 forward-based radars.

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: 0603884C Ballistic Missile Defense Sensors

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
AN/TPY-2 #5 Manufacture	73,429	0	0
RDT&E Articles (Quantity)	0	0	0

This effort includes the material, labor, engineering and management support for production of AN/TPY-2 #5. FY08 effort continues in Project BX11 under AN/TPY-2 #5 Radar.

FY07 Accomplishments:

- Completed production and assembly of Transmit/Receive Integrated Microwave Modules (TRIMMs) for AN/TPY-2 #5
- Completed Sub-array Modules (SAMs), ACDCs and SIAs production
- Completed AN/TPY-2 #5 Electronic Equipment Unit (EEU) integration & test
- Completed AN/TPY-2 #5 Antenna Equipment Unit (AEU) integration & test
- Began Near Field Range (NFR) testing of AN/TPY-2 #5

	FY 2007	FY 2008	FY 2009
AN/TPY-2 #6 Manufacture	47,851	0	0
RDT&E Articles (Quantity)	0	0	0

This effort includes the material, labor, engineering and management support for production of AN/TPY-2 #6. Acquisition of AN/TPY-2 #6 was initiated in FY05 for delivery in 1QFY10. FY08 effort continues in Project DX11 under AN/TPY-2 #6 Manufacture.

FY07 Accomplishments:

- Completed manufacture of Transmit/Receive Integrated Microwave Modules (TRIMMs)
- Began hardware integration

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009
Thule Early Warning Radar	74,776	0	0
RDT&E Articles (Quantity)	0	0	0

In FY06 MDA initiated a program to upgrade the Early Warning Radar located at Thule Air Base, Greenland for incorporation into the Ballistic Missile Defense System (BMDS). The addition of the Thule Upgraded Early Warning Radar (UEWR) into the BMDS sensor architecture will improve BMDS sensor coverage and support Engagement Sequence Groups (ESGs).

The scope of the Thule UEWR program is similar to the ongoing upgrades to the Early Warning Radars at Beale Air Force Base, CA and RAF Fylingdales, United Kingdom, and will use the same baseline hardware and software configuration. It will entail site supporting activities, procuring hardware and software kits, modifying the Thule EWR facility, installation of the upgraded hardware and software kits, upgrade SATCOM, and integration of the Thule UEWR into the BMDS. The work also includes removal and decommissioning of the obsolete hardware upon successful completion of the upgrade. FY08 effort continues in Project CX11 under Thule Early Warning Radar Upgrade.

FY07 Accomplishments:
- Continued development of hardware and software upgrades
- Began modifications to Early Warning Radar facility
- Began upgrades to SATCOM system

	FY 2007	FY 2008	FY 2009
AN/TPY-2 Basic Program (Block 2008 Enhancements)	63,295	0	0
RDT&E Articles (Quantity)	0	0	0

The AN/TPY-2 Basic program includes software upgrades to support Block 2008 Engagement Sequence Groups (ESGs) and common software that will support both the AN/TPY-2 and the THAAD radar missions. This effort also includes funding for the AN/TPY-2 program infrastructure, modeling and simulation capability, hardware-in-the-loop (HWIL) facilities, software maintenance, and systems engineering/management support for all radars.

An AN/TPY-2 Mechanical Steering Kit (MSK) concept exploration study was initiated in FY07 to explore the costs and benefits of MSKs. Conceptual designs include a MSK to support and elevate the AN/TPY-2 Antenna Equipment and Electronic Equipment Units. MSK concepts

explored real time slewing in both azimuth and elevation which would significantly increase the radars real time performance capabilities. This task consisted of MSK conceptual/tradeoff studies and motion compensation software.

FY08 effort continues in Project WX11 under AN/TPY-2 Basic Program.
FY07 Accomplishments:

- Continued CR-2 Development
- Completed Software Requirements Review (SRR) of 4th software build for AN/TPY-2 CR-2
- Began AN/TPY-2 software requirements development for Capability Release 3 (CR-3)
- Completed AN/TPY-2 CR-3 Software Requirements Review (SRR)
- Completed MSK study and initiated motion Compensation Software development

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 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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
PE 0603896C BMD C2BMC	249,179	447,616	289,277	287,194	270,762	256,767	259,159	2,059,954

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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

D. Acquisition Strategy

The BMDS radar (AN/TPY-2) project used an existing radar design to minimize development costs and schedule. Design enhancements focus on software changes for the forward based algorithms and C2BMC connectivity.

A sole source contract was awarded for the procurement and installation of the Thule Early Warning Radar hardware and software upgrade kits. The contract has Firm Fixed Price (FFP) and a Cost Plus Award Fee (CPAF) CLINs.

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: **0603884C Ballistic Missile Defense Sensors**

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
AN/TPY-2 #5 Manufacture								
AN/TPY-2 #5 Manufacture	SS/CPAF	Raytheon /MA	71,684	0	N/A	0	N/A	71,684
AN/TPY-2 #6 Manufacture								
AN/TPY-2 #6 Manufacture	SS/CPAF	Raytheon /MA	46,715	0	N/A	0	N/A	46,715
Thule Early Warning Radar								
Prime Contractor	SS/CPAF	Raytheon /MA	45,470	0	N/A	0	N/A	45,470
Survivable SATCOM	MIPR	DISA	7,380	0	N/A	0	N/A	7,380
Site Activation	MIPR	MDA-DFW /AL	2,142	0	N/A	0	N/A	2,142
Embedded Test, Engineering Services, GCN Connectivity, SSCO, Lab Upgrades	SS/CPAF	Boeing / CA, AL	7,000	0	N/A	0	N/A	7,000
Engineering Support, Beem Steering Circuit Cards	MIPR	OGA	350	0	N/A	0	N/A	350
Integration / Support	MIPR	850th ELSG /MA	1,912	0	N/A	0	N/A	1,912
RDT&E Construction	SS/CPAF	Raytheon /MA	8,746	0	N/A	0	N/A	8,746
AN/TPY-2 Basic Program (Block 2008 Enhancements)								
Software Enhancements	SS/CPAF	Raytheon /MA	61,792	0	N/A	0	N/A	61,792
Subtotal Product Development			253,191	0		0		253191

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
AN/TPY-2 #5 Manufacture								
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	1,745	0	N/A	0	N/A	1,745
AN/TPY-2 #6 Manufacture								
Civilian Salaries / Travel / Support		MDA /VA	748	0	N/A	0	N/A	748
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	388	0	N/A	0	N/A	388
Thule Early Warning Radar								
Civilian Salaries / Travel / Other Support		MDA /VA	1,169	0	N/A	0	N/A	1,169
Technical Oversight / Performance Analysis	FFRDC	MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	607	0	N/A	0	N/A	607
AN/TPY-2 Basic Program (Block 2008 Enhancements)								
Civilian Salaries / Travel / Other Support		MDA /VA	989	0	N/A	0	N/A	989
Sensors Technical Oversight / Performance Analysis	FFRDC	MIT-LL, MITRE, JHU-APL / MA, VA, MD	514	0	N/A	0	N/A	514
Subtotal Support Costs			6,160	0		0		6160

Remarks

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: 0603884C Ballistic Missile Defense Sensors

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

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			259,351	0		0		259,351

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
Development Milestones																												
Thule Facility Design Complete			▲																									

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Studies & Analysis							
Perform Sensor Architecture Analysis	1Q-4Q						
MSK Concept Studies	3Q-4Q						
Development Milestones							
Thule Facility Design Complete	3Q						

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0011 Ballistic Missile Defense Radars Block 2010	6,638	0	0	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: The content previously planned in project 0011 for FY08-13 is now captured in Project WX11 in accordance with the MDA revised Block structure.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Radar Block 2010 (Project 0011) continues the spiral development to enhance and expand on the sensor capabilities provided to the Ballistic Missile Defense System (BMDS) under Block 2008. This increased sensor coverage will give BMDS more opportunities to engage ballistic missile threats, which improves the probability of successfully destroying the target. The deployment and networking of additional sensors supports the MDA goal of using a layered sensor architecture to provide a more robust BMDS.

Expanding the layered sensor architecture improves the BMDS ability to detect, track and engage ballistic missiles in all phases of flight. In addition to expanding sensor coverage, the External Sensors enhances the BMDS discrimination capabilities to address changing threats. The External Sensors Laboratory (ESL) is used to collect and fuse the external sensors data into useful track and discrimination data. The ESL has been interfaced with the C2BMC to demonstrate/provide capabilities to the BMDS including situational awareness and additional Engagement Sequence Strategies.

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: 0603884C Ballistic Missile Defense Sensors

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
External Sensors	6,638	0	0
RDT&E Articles (Quantity)	0	0	0

Upgrading the External Sensors Lab (ESL) will allow for the fusion of data from multiple external Overhead Non-imaging Infrared (ONIR) sensors providing earlier and more accurate target detection capabilities to the BMDS. This capability will significantly decrease radar resource use, which increases the sensor performance capabilities. FY08 effort continues in Project WX11 under BMDS Radars Sensor Development.

FY07 Accomplishments:

- Evaluated algorithms for operational utility to the BMDS
- Investigated new sensor techniques and developed algorithms to utilize capability in the BMDS
- Demonstrated utility of cueing forward-based radar and providing information to C2BMC
- Provided support and maintenance for ESL operations
- Developed algorithm to improve performance in all phase of flight
- Supported the Missile Defense Integration and Operations Center (MDIOC) and lab accreditation

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 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

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

D. Acquisition Strategy

An External Sensors capabilities acquisition strategy will be developed for capabilities ready to transition from Research and Development to Operations. It is expected to be a competitive procurement involving software development, testing, site selection, and staffing.

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: 0603884C Ballistic Missile Defense Sensors

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
External Sensors								
Prime Contractor	SS/CPAF	Northrop Grumman / CA	3,533	0	N/A	0	N/A	3,533
Systems Engineering/Aerospace Analysis	FFRDC	MITRE / VA	817	0	N/A	0	N/A	817
Live Test Support / Algorithm Development & Analysis	MIPR	NASIC / OH	409	0	N/A	0	N/A	409
Analysis, Test Support, Aegis Support	MIPR	NSWC-DD / VA	508	0	N/A	0	N/A	508
External Sensor Lab Development, Integration, and Accreditation		Aero. Corp, JHU-APL, MDIOC, Raytheon, SMC-ISPB / CA, MD, CO, MA	1,371	0	N/A	0	N/A	1,371
Subtotal Product Development			6,638	0		0		6638

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

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: 0603884C Ballistic Missile Defense Sensors

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

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			6,638	0		0		6,638

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
Development Milestones																												
External Sensor Lab Upgrade of Hardware		▲																										

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Development Milestones							
External Sensor Lab Upgrade of Hardware	2Q						
External Sensors Lab - Cueing Experiments	2Q-4Q						
Studies & Analysis							
External Sensors Lab - Eval Advanced Algorithms	2Q-4Q						

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
AX11 Ballistic Missile Defense Radars Block 1.0	0	5,569	5,723	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: The content in AX11 is a continuation of the efforts reported in 0811 and was explained in that project in PB08.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Radars (BMDS) Block 1.0 (Project AX11) defends the U.S. from limited North Korean long-range threats. This effort funds the Commercial Power Project supporting AN/TPY-2 #2 in Shariki, Japan. It will make commercial power the primary power source for radar operations and site facilities.

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
AN/TPY-2 #2 Commercial Power	0	5,569	5,723
RDT&E Articles (Quantity)	0	0	0

The Commercial Power Project supporting AN/TPY-2 #2 in Shariki, Japan will make commercial power the primary power source for radar operations and site facilities.

FY07 Accomplishments:

- See Project 0811, Deployment/Site Prep and Activation

FY08 Planned Program

- Complete Design of Commercial Power upgrades

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: **0603884C Ballistic Missile Defense Sensors**

FY09 Planned Program

- Complete Commercial Power installation and checkout

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 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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0901598C Management Headquarters - MDA	93,350	80,392	86,453	70,355	69,855	69,855	69,855	540,115

D. Acquisition Strategy

A Contractor Logistics Support (CLS) contract was awarded in FY05 to operate and maintain the AN/TPY-2 radars. The CLS contract provides the operations and support activities required for site surveys, planning, relocation, depot maintenance, forward-based system operations, repair, and replacement. The contract is an Indefinite Delivery/Indefinite Quantity (IDIQ) task order contract.

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: **0603884C Ballistic Missile Defense Sensors**

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
AN/TPY-2 #2 Commercial Power								
AN/TPY-2 #2 - Commercial Power	SS/CPAF	Raytheon / MA	0	5,569	2Q	5,723	1/2Q	11,292
Subtotal Product Development			0	5,569		5,723		11292

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

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: **0603884C Ballistic Missile Defense Sensors**

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	5,569		5,723		11,292

Remarks

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
0603884C Ballistic Missile Defense Sensors

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
Deployment/Site Prep/ Activation																												
Complete Power Upgrade for AN/TPY-2 #2												△																

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Deployment/Site Prep/ Activation							
Complete Power Upgrade for AN/TPY-2 #2			4Q				

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
BX11 Ballistic Missile Defense Radars Block 2.0	0	28,821	101,879	2,979	0	0	0
RDT&E Articles Qty	0	1	0	1	0	0	0

Note: RDT&E Articles: AN/TPY-2 #5 radar production began in FY05 and will be delivered to MDA in FY08.

The AN/TPY-2 #7 production effort was initiated in FY07 under the Ballistic Missile Defense Terminal Defense Program Element (PE)(0603881C), jointly funded between the Terminal and Radars PEs in FY08, and transferred entirely to the BMDS Radars Program Element starting in FY09. AN/TPY-2 #7 will be delivered to MDA in FY10.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

A. Mission Description and Budget Item Justification

The Sensors contribution to Block 2.0 is the production of two AN/TPY-2 radars to currently planned to support the Terminal High Altitude Area Defense (THAAD) Fire Units #1 and #2. Block 2.0 goals are to manufacture, test, and deliver AN/TPY-2 #5 and AN/TPY-2 #7.

The AN/TPY-2 radar is a solid state, phased array radar capable of tracking multiple threats and multiple interceptors during engagements. Configured as a Fire Unit Radar (FUR), the AN/TPY-2 uses fence, volume, and cued search modes, and provides surveillance, acquisition, track, discrimination, interceptor communications, and hit assessment data collection for the fire control. The FURs are an integral component the THAAD Fire Units that will be used to defend our allies and deployed forces from short-to-medium-range threats in one region or theater.

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: 0603884C Ballistic Missile Defense Sensors

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
AN/TPY-2 #5 Radar	0	9,361	3,193
RDT&E Articles (Quantity)	0	1	0

This effort includes the material, labor, engineering and management support for production of AN/TPY-2 #5. This radar may provide the BMD System with a forward-based capability to extend the sensor coverage or be configured to operate as a THAAD Fire Unit Radar.

FY07 Accomplishments:
- See Project 0911, AN/TPY-2 #5 Manufacture

FY08 Planned Program:
RDT&E Articles: AN/TPY-2 #5 radar production began in FY05 and will be delivered to MDA in FY08.
- Complete Near Field Range (NFR) testing of AN/TPY-2 #5
- Complete factory integration and testing
- Radar system integration at VAFB
- Currently planned for transfer to THAAD for use as Fire Unit Radar (FUR) #1

FY09 Planned Program:
- Field RADAR FUR #1

	FY 2007	FY 2008	FY 2009
AN/TPY-2 #7 Fire Unit Radar	0	19,460	98,686
RDT&E Articles (Quantity)	0	0	0

The AN/TPY-2 Radar is a solid state, phased array radar capable of tracking multiple threats and multiple interceptors during engagements. The AN/TPY-2 Radar uses fence, volume, and cued search modes, and provides surveillance, acquisition, track, discrimination, interceptor communications, and hit assessment data collection for the fire control. The AN/TPY-2 Radar hardware is a transportable system composed of the antenna equipment unit, electronics equipment unit, cooling equipment unit, and the prime power unit. In FY07, the production effort was initiated in the Terminal Program Element (PE) (0603881C). In FY08, it is funded jointly out of the Terminal and BMDS Radars PE and in FY09 it transfers completely to the BMDS Radars PE. This effort also includes integration of Fire Unit Radar (FUR) Software Build 4.2 with AN/TPY-2 radars used with the Terminal High Altitude Area Defense (THAAD) Fire Units.

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: **0603884C Ballistic Missile Defense Sensors**

FY07 Accomplishments:

- See the Ballistic Missile Defense Terminal Defense Program Element (0603881C)

FY08 Planned Program:

- Complete design changes for obsolescence and Unique Identification (UID) marking
- Conduct performance analysis for design changes
- Begin manufacturing of Antenna Subassemblies (TRIMM, AC/DC, SAM)
- Initiate subcontracts and begin manufacturing of other Radar Components (Cooling Unit (CEU), Electronics Unit (EEU) and Prime Power Unit (PPU))
- Additional effort is funded in the Ballistic Missile Defense Terminal Defense Program Element (0603881C)

FY09 Planned Program:

- Continue manufacturing and integration of Radar Antenna
- Continue manufacturing of other Radar Components (EEU, CEU, and PPU)

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 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

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603894C Multiple Kill Vehicle	133,615	229,943	354,455	488,294	649,632	708,582	879,385	3,443,906
PE 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

D. Acquisition Strategy

The AN/TPY-2 project uses an existing radar design to minimize development costs and schedule. This contract supports production of AN/TPY-2 radars for use as BMDS forward-based radars or as THAAD Fire Unit Radars (FURs). Design enhancements focus on software changes for the forward-based algorithms and C2BMC connectivity. Also included is the manufacture of Prime Power Unites (PPUs) for use with the THAAD FURs. The AN-TPY-2 is a Cost Plus Award Fee (CPAF) contract. AN/TPY-2 #7 radar manufacturing is being done on a Cost Plus Incentive Fee (CPIF) CLIN.

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: **0603884C Ballistic Missile Defense Sensors**

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
AN/TPY-2 #5 Radar								
AN/TPY-2 #5 Manufacture	SS/CPAF	Raytheon / MA	0	9,361	2Q	3,193	1Q	12,554
AN/TPY-2 #7 Fire Unit Radar								
AN/TPY-2 #7 Manufacture	SS/CPAF	Raytheon / MA	0	19,460	1Q	98,686	1Q	118,146
Subtotal Product Development			0	28,821		101,879		130700

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

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 **0603884C Ballistic Missile Defense Sensors**

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	28,821		101,879		130,700

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
Testing Milestones																												
AN/TPY-2 #5 Integration with BMDS at VAFB					△			△																				
Development Milestones																												
Manufacture AN/TPY-2 #5 Hardware Complete							△																					
Complete AN/TPY-2 #5 Acceptance Testing											△																	
Complete Manufacture of AN/TPY-2 #7															△													

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Testing Milestones							
AN/TPY-2 #5 Integration with BMDS at VAFB		1Q-4Q					
Development Milestones							
Manufacture AN/TPY-2 #5 Hardware Complete		3Q					
Complete AN/TPY-2 #5 Acceptance Testing			3Q				
Complete Manufacture of AN/TPY-2 #7				3Q			

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
CX11 Ballistic Missile Defense Radars Block 3.0	0	97,183	96,191	21,842	18,694	19,814	14,888
RDT&E Articles Qty	0	0	1	0	0	0	0

Note: RDT&E Article: The Thule Upgraded Early Warning Radar (UEWR) will be completed in FY09 (with removal of old equipment in FY10).

The content in CX11 is a continuation of the efforts reported in 0911 and was explained in that project in PB08.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense (BMD) Radars Block 3.0 (Project CX11) effort expands defense of the U.S. to include limited Iranian long-range threats.

The Thule EWR upgrade will be completed in FY09 and will maintain a common configuration with the Beale, CA and RAF Fylingdales, UK upgrades. These upgrades include hardware and software modifications that enhance capabilities and integrate these UEWRs into the BMDS Sensors Architecture.

The discrimination efforts provide for the integration and verification of near-term discrimination. These efforts ensure that AN/TPY-2 discrimination results pass through the system to the kill vehicle. Beyond the near-term discrimination are the assessment of discrimination techniques for integration into BMDS radars.

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: 0603884C Ballistic Missile Defense Sensors

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
Thule Early Warning Radar Upgrade	0	73,403	78,920
RDT&E Articles (Quantity)	0	0	1

The addition of the Thule Upgraded Early Warning Radar (UEWR) into the BMDS sensor architecture will improve BMDS sensor coverage and support Engagement Sequence Groups (ESGs).

The scope of the Thule UEWR program is similar to the ongoing upgrades to the Early Warning Radars at Beale Air Force Base, CA and RAF Fylingdales, United Kingdom, and will use the same baseline hardware and software configuration. It includes site supporting activities, procuring hardware and software kits, modifying the Thule EWR facility, installation of the upgraded hardware and software kits, upgraded SATCOM, and integration of the Thule UEWR into the BMDS. The work also includes removal and decommissioning of the obsolete hardware upon successful completion of the upgrade.

FY07 Accomplishments:
- See Project 0911, Thule Early Warning Radar

FY08 Planned Program:
- Complete UEWR Facility modifications
- Begin hardware and software installation
- Initiate BMDS Communications Room upgrade

FY09 Planned Program:
RDT&E Article: The upgraded Thule Early Warning Radar (EWR) will be completed in FY09 (with removal of old equipment in FY10).
- Conduct BMDS Integration testing
- Complete hardware and software installations
- Complete Thule UEWR development test and evaluation
- Conduct Force Developers Evaluation

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009
Radar Discrimination Capability	0	23,780	17,271
RDT&E Articles (Quantity)	0	0	0

The discrimination efforts provide for the integration and verification of near-term discrimination. These efforts ensure that AN/TPY-2 discrimination results pass through the system to the kill vehicle. Beyond the near-term discrimination are the assessment of discrimination techniques for integration into BMDS radars. Selected discrimination algorithms will complete formal design, development, integration, and verification into radar software. The advanced algorithms will increase the ability of the radars to correctly discriminate complex threats and will address multiple classes of countermeasures.

FY08 Planned Program:

- Implement near term discrimination capability (CR-2.4)
- Deliver tapes for near term discrimination system testing (3Q FY08)

FY09 Planned Program:

- Participate in integrated testing of near term discrimination capability
- Continue development of CR-3 discrimination 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 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

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

D. Acquisition Strategy

A sole source contract was awarded for the procurement and installation of the Thule Early Warning Radar hardware and software upgrade kits. The contract has Firm Fixed Price (FFP) and a Cost Plus Award Fee (CPAF) CLINs.

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: 0603884C Ballistic Missile Defense Sensors

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
Thule Early Warning Radar Upgrade								
Prime Contractor	SS/CPAF	Raytheon / MA	0	32,236	1Q	29,087	1Q	61,323
Site Activation	MIPR	MDA-DFW / AL	0	3,275	1Q	4,576	1Q	7,851
Embedded Test, Engineering Services, GCN Connectivity, SSCO, Lab Upgrades	SS/CPAF	Boeing / CA, AL	0	9,969	1/2Q	10,937	1/2Q	20,906
Integration / Support	MIPR	850 ELSG / MA	0	1,521	1Q	2,498	1Q	4,019
RDT&E Construction	SS/CPAF	Raytheon / MA	0	6,102	N/A	0	4Q	6,102
Survivable SATCOM	MIPR	DISA / VA	0	9,584	1Q	16,172	1Q	25,756
Engineering Support, Beem Steering Circuit Cards	MIPR	OGA	0	10,216	1Q	10,165	1Q	20,381
Thule BMDS Test Integration	SS/CPAF	Raytheon / MA	0	500	1Q	3,400	1Q	3,900
Thule UEWR - Super Communications Room Addition	MIPR	DISA / VA	0	0	N/A	2,085	1Q	2,085
Radar Discrimination Capability								
Near/Far Term Discrimination Efforts	C/CPAF	Raytheon / MA	0	23,780	1Q	17,271	1Q	41,051
Subtotal Product Development			0	97,183		96,191		193374

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

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: **0603884C Ballistic Missile Defense Sensors**

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

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	97,183		96,191		193,374

Remarks

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
0603884C Ballistic Missile Defense Sensors

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
Testing Milestones																												
Thule DT&E																												
Thule Certification																												

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Testing Milestones							
Thule DT&E			2Q-4Q				
Thule Certification			4Q				
Development Milestones							
Thule Hardware & Software Installation		2Q-4Q					
Software							
Near-Term Discrimination (CR-2)		1Q-4Q	1Q-2Q				
Discrimination (CR-3)		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q		

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
DX11 Ballistic Missile Defense Radars Block 4.0	0	100,223	150,505	239,713	137,808	1,220	7,926
RDT&E Articles Qty	0	0	1	0	0	0	2

Note: RDT&E Articles: AN/TPY-2 #6 forward-based radar production began in FY07 and will be delivered to MDA in FY09 and is planned for future deployment to a European Southern Radar Site. The upgraded and deployment of European Midcourse Radar (EMR) will begin in FY08 and be operational in FY13. Adjunct Sensor development will begin in FY10 and be delivered to MDA in FY13 for integration into the BMDS testbed.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

The content in DX11 is a continuation of the efforts reported in 0911 and was explained in that project in PB08.

A. Mission Description and Budget Item Justification

BMDS Block 4.0 defends allies and deployed forces in Europe from limited Iranian long-range threats; and continues to expand protection in the U.S. Major efforts include:

- Upgrade and deployment of the European Midcourse Radar (EMR) to Europe
- Complete AN/TPY-2 #6 manufacture with current plans to deploy to a forward-based radar site in southern Europe

This increased sensor coverage will give BMDS more opportunities to engage ballistic missile threats which improves the probability of successfully destroying the target. The deployment and networking of additional sensors supports the MDA goal of using a layered sensor architecture to provide a more robust BMDS. Expanding the layered sensor architecture will improve BMDS ability to detect, track and engage ballistic missiles in all phases of their flight. Enhancement of the existing sensor architecture will be based on continued sensor coverage gap analysis.

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: 0603884C Ballistic Missile Defense Sensors

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
European Midcourse Radar (EMR) Upgrade	0	28,483	72,320
RDT&E Articles (Quantity)	0	0	0

The European Midcourse Radar (EMR) Upgrade is a large, steerable, X-band phased array radar currently located at Kwajalein Missile Range (KMR), Kwajalein Atoll. EMR is being maintained in caretaker status (warm stand-by) at Kwajalein through FY09. Starting in FY08, the EMR back-end hardware (signal and data processing equipment, etc.) will be upgraded and the radar will be deployed to a European location to provide the BMDS midcourse discrimination capability in defense of the United States and Europe. Locating a high-resolution X-band sensor like the EMR in the European theater will provide search, track, and discrimination of Intercontinental Ballistic Missiles (ICBMs) in the midcourse phase of flight. This data will be forwarded via communications links to the BMDS. Deployment/Site Preparation/Activation efforts begin in FY08 and includes all radar upgrade work, communications equipment and site design. Actual site construction is being funded with MILCON.

FY08 Planned Program:

- Define requirements for the EMR upgrade and the site
- Develop hardware and software upgrade plans
- Initiate acquisition of long-lead hardware items
- Begin initial site planning and develop facility requirements
- Conduct site surveys and perform Environmental Analysis

FY09 Planned Program:

- Continue hardware upgrade build
- Complete site selection activities
- Develop and generate operational mission plans and search profiles for deployed site

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009
Southern Radar Site (AN/TPY-2 #6) Radar Manufacture	0	46,838	38,813
RDT&E Articles (Quantity)	0	0	1

This effort includes the material, labor, engineering and management support for production of AN/TPY-2 #6. Acquisition of AN/TPY-2 #6 was initiated in FY07 for delivery in FY09. This radar provides the BMD System with a forward based capability and extends the sensor coverage. The radar deployment and activation effort includes planning and coordination with Host Nation and Combatant Commanders (COCOMs), supporting radar site design efforts, package and transport of the radar to the overseas site, radar setup, calibration, and activation. This effort also includes deployment preparations at Vandenberg AFB and radar activation in Europe.

FY07 Accomplishments:

- See Project 0911, AN/TPY-2 #6 Manufacture

FY08 Planned Program:

- Complete production and assembly of Transmit/Receive Integrated Modules (TRIMMs)
- Continue hardware production and integration
- Begin Near Field Range (NFR) testing
- Begin initial site planning and develop facility requirements
- Support site surveys for overseas site
- Sustain operations at VAFB to include: training Contractor Logistics Support (CLS) team, and preparation for deployment

FY09 Planned Program:

RDT&E Articles: AN/TPY-2 #6 Forward based radar production began in FY07 and will be delivered to MDA in FY09 and is currently planned for future deployment to a European Southern Radar Site.

- Complete factory integration and testing
- Deliver radar to Vandenberg AFB for system integration and testing with the BMDS
- Support site selection
- Support site surveys for overseas site
- Support site design

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009
Sensor Communications (EMR and AN/TPY-2 #6)	0	0	39,372
RDT&E Articles (Quantity)	0	0	0

The BMDS Communication System Complex (BCSC) is a standardized communications capability to support MDA fixed locations. The size of the communications facilities to support BCSC will vary by location, functionality, and defined communication capabilities. The BCSC is required to support the European Midcourse Radar (EMR).

The BMDS Communication System Complex - Transportable (BCSC-T) is the transportable version of the fixed site BCSC. The BCSC-T consists of three components the Protected Communication Control System -Transportable (PCCS-T), the SATCOM system, and the backup power system. The PCCS-T is an integrated approach to the Engineering Development Models (EDMs) referred to as the Auxiliary Communications Shelter (ACS) and BMDS Communications Network (BCN) Gateway with a number of additional capabilities and planned future expansions. The BSCS-T is required to support AN/TPY-2 #6.

FY08 Planned Program:
- See C2BMC Program element (0603896C)

FY09 Planned Program:
- PCCS-T Acquisition
- SATCOM X/Ka/mm-Band Acquisition
- Power Backup Acquisition

	FY 2007	FY 2008	FY 2009
Program Management Support Across All Blocks	0	24,902	0
RDT&E Articles (Quantity)	0	0	0

This effort provides Program Management support across all BMDS Radars Blocks where sensors work is performed. It provides for civilian salaries and travel. In addition, it provides other technical and business operations support services, technical oversight, and performance analysis provided by FFRDCs, UARCs, and Advisory & Assistance Services. FY09 effort continues in Project EX11.

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: 0603884C Ballistic Missile Defense Sensors

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 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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

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: **0603884C Ballistic Missile Defense Sensors**

D. Acquisition Strategy

The AN/TPY-2 project uses an existing radar design to minimize development costs and schedule. Design enhancements focus on software changes for the forward-based algorithms and C2BMC connectivity. The AN-TPY-2 is a Cost Plus Award Fee (CPAF) contract.

The European Midcourse Radar (EMR) acquisition approach supports the development and continuous building on capabilities to advance the BMD System. A sole source contract will be developed for the original equipment manufacturer.

The BCSC-T Program Plan addresses the design, development, acquisition, testing, integration, activation, and fielding. The overall executing agent is the Defense Information Systems Agency (DISA) via an existing Memorandum of Agreement (MOA) with MDA.

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: **0603884C Ballistic Missile Defense Sensors**

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
European Midcourse Radar (EMR) Upgrade								
Upgrade		TBD	0	14,000	4Q	56,478	1/2Q	70,478
Site Activation	MIPR	MDA-DFW / AL	0	14,483	1/2Q	15,842	1/2Q	30,325
Southern Radar Site (AN/TPY-2 #6) Radar Manufacture								
Manufacture	SS/BPA	Raytheon / MA	0	46,838	1Q	37,742	1Q	84,580
Deploy/Site Preparation (Generators, Comms Install, Power)	Various	Raytheon, ACE / MA, AL	0	0	N/A	1,071	1Q	1,071
Sensor Communications (EMR and AN/TPY-2 #6)								
EMR - PCCS	MIPR	PM DCATS / VA	0	0	N/A	9,189	1Q	9,189
EMR - SATCOM	MIPR	PM DCATS / VA	0	0	N/A	10,603	1Q	10,603
EMR - Comms Power	MIPR	NAVSEA/ VA	0	0	N/A	2,042	1Q	2,042
EMR - Comms Support	MIPR	DISA/ VA	0	0	N/A	306	1Q	306
AN/TPY-2 #6 - PCCT-T	MIPR	PM DCATS / VA	0	0	N/A	3,904	1Q	3,904
AN/TPY-2 #6 - SATCOM	MIPR	PM DCATS / VA	0	0	N/A	6,611	1Q	6,611
AN/TPY-2 #6 - Power	MIPR	NAVSEA / VA	0	0	N/A	2,554	1Q	2,554
AN/TPY-2 #6 - Support	MIPR	DISA / VA	0	0	N/A	1,153	1Q	1,153
AN/TPY-2 #6 - Support (MDNTB)	MIPR	MDA / VA	0	0	N/A	3,010	1Q	3,010
Program Management Support Across All Blocks								
Civilian Salaries / Travel / Other Support	MIPR	MDA/VA, MA, AL	0	5,477	1/4Q	0	N/A	5,477
Technical / Business Operations Support	C/CPFF	CSC, NGC / VA	0	8,775	1/2Q	0	N/A	8,775

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: 0603884C Ballistic Missile Defense Sensors

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
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	0	10,650	1Q	0	N/A	10,650
Subtotal Product Development			0	100,223		150,505		250728

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

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: **0603884C Ballistic Missile Defense Sensors**

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	100,223		150,505		250,728

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
Testing Milestones																												
AN/TPY-2 #6 Integration with BMDS										△																		△
Acquisition Milestones																												
EMR Contract Award						△																						
Program Milestones																												
AN/TPY-2 #6 Operational																				△								
EMR Operational																										△		
Development Milestones																												
Manufacture AN/TPY-2 #6 Hardware Complete										△																		

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Testing Milestones							
AN/TPY-2 #6 Integration with BMDS			2Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Complete AN/TPY-2 #6 Software Testing				2Q			
Acquisition Milestones							
EMR Contract Award		2Q					
Program Milestones							
AN/TPY-2 #6 Operational					4Q		
EMR Operational							2Q
Development Milestones							
AN/TPY-2 #6 HW Integration and Test Complete			1Q				
Manufacture AN/TPY-2 #6 Hardware Complete			2Q				
Deployment/Site Prep/ Activation							
AN/TPY-2 #6 Comms Integration and Test				3Q-4Q	1Q-4Q		
AN/TPY-2 #6 Comms Power			1Q-2Q				
AN/TPY-2 #6 PCCS-T			1Q-2Q				
AN/TPY-2 #6 Deployment Planning		1Q-4Q	1Q-2Q				
AN/TPY-2 #6 SATCOM			1Q-4Q	1Q-4Q	1Q-2Q		
AN/TPY-2 #6 Site Design			1Q-4Q				
EMR Comms Fiber Optics			4Q	1Q-4Q	1Q-2Q		
EMR Comms Integration and Test				3Q-4Q	1Q-4Q		
EMR Comms Power			1Q-4Q	1Q-4Q	1Q-2Q		
EMR PCCS			1Q-4Q	1Q-4Q	1Q		
EMR SATCOM			1Q-4Q	1Q-4Q	1Q-2Q		

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
EX11 Ballistic Missile Defense Radars Block 5.0	0	15,802	144,042	226,844	193,327	187,228	115,679
RDT&E Articles Qty	0	0	0	0	0	1	1

Note: The content in EX11 is a continuation of the efforts reported in 0811 and 0911 was explained in those projects in PB08.

RDT&E Test Articles: Manufacture of AN/TPY-2 #8 and #9 will be initiated in FY10/11 with delivery in FY12 and FY13.

The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

A. Mission Description and Budget Item Justification

BMDS Block 5.0 efforts expand defense of allies and deployed forces from short-to-Intermediate-range threats in two regions/theaters. Specifically the BMD Radars Block 5.0 (Project EX11) effort provides for:

- Deployment and site activation for AN/TPY-2 #3 forward-based radar
- Manufacture communications suite for AN/TPY-2 #3 forward-based radar site
- Continued production of additional C2BMC Communications Shelters to support deployment of AN/TPY-2 forward-based radar sites
- Manufacture of AN/TPY-2 #8 & #9

This increased sensor coverage will give BMDS more opportunities to engage ballistic missile threats which improves the probability of successfully destroying the target. The deployment and networking of additional sensors supports the MDA goal of using a layered sensor architecture to provide a more robust BMDS. Expanding the layered sensor architecture will improve BMDS ability to detect, track and engage ballistic missiles in all phases of their flight. Enhancement of the existing sensor architecture will be based on continued sensor coverage gap analysis.

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: **0603884C Ballistic Missile Defense Sensors**

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
AN/TPY-2 #3 Radar Deployment, and Site Activation	0	15,802	26,472
RDT&E Articles (Quantity)	0	0	0

AN/TPY-2 #3 will be deployed to a site located near expected missile threats. The Deployment/Site Preparation/Activation effort includes planning and coordination with Host Nation and Combatant Commanders (COCOMs), radar site design, site construction support (actual construction funded under MILCON), transport of the radar to the overseas site, radar setup, calibration, and activation.

FY07 Accomplishments:
- See Project 0811, Deployment/Site Preparations/Activation

FY08 Planned Program:
- Continue radar operations at VAFB
- Conduct site surveys

FY09 Planned Program:
- Continue radar operations at VAFB
- Complete AN/TPY-2 #3 site design
- Conduct environmental impact studies
- Provide radar subject matter experts to support site engineering/construction

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009
AN/TPY-2 Communications Fielding	0	0	61,073
RDT&E Articles (Quantity)	0	0	0

The BMDS Communication System Complex - Transportable (BCSC-T) is the transportable version of the fixed-site BCSC. The BSCS-T is required to support the deployed AN-TPY-2s. The BCSC-T consists of three components the Protected Communication Control System - Transportable (PCCS-T), the SATCOM system, and the backup power system. The PCCS-T is an integrated approach to the Engineering Development Models (EDMs) referred to as the Auxiliary Communications Shelter (ACS) and BMDS Communications Network (BCN) Gateway with a number of additional capabilities and planned future expansions.

FY07 Accomplishments:

- See Project 0911, Sensor Communications

FY08 Planned Program:

- Protected Communication Control System -Transportable (PCCS-T) Acquisition
- SATCOM X/Ka-Band/UHF Acquisition
- Power Backup Acquisition

FY09 Planned Program:

- Protected Communication Control System - Transportable (PCCS-T) Acquisition
- SATCOM X/Ka/mm-Band Acquisition
- Power Backup Acquisition
- U.S. Communications Support Acquisition

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009
Program Management Support Across All Blocks	0	0	56,497
RDT&E Articles (Quantity)	0	0	0

This effort provides Program Management support across all BMDS Radars Blocks where sensors work is performed. It provides for civilian salaries and travel. In addition, it provides other technical and business operations support services, technical oversight, and performance analysis provided by FFRDCs, UARCs, and Advisory & Assistance Services. FY09 is a continuation of effort from Project DX11 in FY08.

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 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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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

D. Acquisition Strategy

The AN/TPY-2 project uses an existing radar design to minimize development costs and schedule. Design enhancements focus on software changes for the forward-based algorithms and C2BMC connectivity. The AN-TPY-2 is a Cost Plus Award Fee (CPAF) contract.

The BCSC-T Program Plan addresses the design, development, acquisition, testing, integration, activation, and fielding. The overall executing agent is the Defense Information Systems Agency (DISA) via an existing Memorandum of Agreement (MOA) with MDA.

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: 0603884C Ballistic Missile Defense Sensors

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
AN/TPY-2 #3 Radar Deployment, and Site Activation								
AN/TPY-2 #3 - Site Activation/Power	MIPR	MDA-DFW / AL	0	0	N/A	10,629	1Q	10,629
AN/TPY-2 #3 - Site Design, Power, Disassemble	SS/CPAF	Raytheon / MA	0	9,755	1Q	15,843	N/A	25,598
AN/TPY-2 #3 - VAFB Operations and Support	MIPR	VAFB / CA	0	895	1/2Q	0	N/A	895
AN/TPY-2 #3 - Transportation, Comms Installation, Government Support	MIPR	TRANSCOM, ACE	0	3,393	N/A	0	4Q	3,393
AN/TPY-2 #5 - Deployment/Site Activation	CPAF	Raytheon / MA	0	1,759	1Q	0	N/A	1,759
AN/TPY-2 Communications Fielding								
AN/TPY-2 #3 - PCCS-T	MIPR	PM DCATS / VA	0	0	N/A	7,550	1Q	7,550
AN/TPY-2 #3 - SATCOM	MIPR	PM DCATS / VA	0	0	N/A	19,957	1Q	19,957
AN/TPY-2 #3 - Fiber Optics	MIPR	DISA / VA	0	0	N/A	4,000	1Q	4,000
AN/TPY-2 #3 - Power	MIPR	NAVSEA / VA	0	0	N/A	4,300	1Q	4,300
AN/TPY-2 #3 - US Comms	MIPR	PM DCATS / VA	0	0	N/A	9,250	1Q	9,250
AN/TPY-2 #3 - Support	MIPR	DISA / VA	0	0	N/A	1,950	1Q	1,950
AN/TPY-2 #3 - Support (MDNTB)	MIPR	MDA / VA	0	0	N/A	8,250	1Q	8,250
AN/TPY-2 Comms Fielding	MIPR	DISA / VA	0	0	N/A	5,816	1Q	5,816
Program Management Support Across All Blocks								
Civilian Salaries / Travel / Other Support	MIPR	MDA / VA, MA, AL	0	0	N/A	15,892	1Q	15,892
Technical / Business Operations Support	C/CPFF	CSC, NGC /VA	0	0	N/A	16,887	1Q	16,887

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: 0603884C Ballistic Missile Defense Sensors

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
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	0	0	N/A	23,718	1Q	23,718
Subtotal Product Development			0	15,802		144,042		159844

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

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: 0603884C Ballistic Missile Defense Sensors

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	15,802		144,042		159,844

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
Development Milestones																												
Complete Manufacture of AN/TPY-2 #8																							△					
Complete Manufacture of AN/TPY-2 #9																											△	
Deployment/Site Prep/ Activation																												
AN/TPY-2 #3 Site Design									△							△												

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Development Milestones							
Complete Manufacture of AN/TPY-2 #8						3Q	
Complete Manufacture of AN/TPY-2 #9							3Q
Deployment/Site Prep/ Activation							
AN/TPY-2 #3 Comms Fiber Optics		1Q-4Q	1Q-4Q				
AN/TPY-2 #3 Comms Power		1Q-4Q	1Q-4Q				
AN/TPY-2 #3 PCCS-T		1Q-4Q	1Q-4Q				
AN/TPY-2 #3 SATCOM		1Q-4Q	1Q-3Q				
AN/TPY-2 #3 US Comms		1Q-4Q	1Q-4Q				
AN/TPY-2 #3 Site Design			1Q-4Q	1Q-4Q			
AN/TPY-2 #3 Deployment Comms Integration and Test				1Q-4Q	1Q-2Q		
AN/TPY-2 #3 Deployment Comms Power				1Q-3Q			
AN/TPY-2 #3 Deployment Fiber Optics				1Q-2Q			
AN/TPY-2 #3 Deployment PCCS-T				1Q-3Q			
AN/TPY-2 #3 Deployment SATCOM				1Q-3Q			
AN/TPY-2 #3 Deployment US Comms				1Q-4Q	1Q-2Q		

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
WX11 Ballistic Missile Defense Radars Capability Development	0	170,826	257,646	221,330	300,079	427,821	253,664
RDT&E Articles Qty	0	0	1	0	1	0	0

Note: RDT&E Articles: Capability Release 2 (CR-2) will be delivered to MDA in FY09 and CR-3 in FY11.
The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

The content in WX11 is a continuation of the efforts reported in 0811 and 0011 was explained in those projects in PB08.

A. Mission Description and Budget Item Justification

This effort includes the AN/TPY-2 Basic Program, BMDS Radars Test & Evaluation, Clear and Cape Cod BMDS Integration, Sensor Development, and Adjunct Sensor Development. This basic program effort includes, 1) AN/TPY-2 software upgrades; and 2) Modeling and simulation capabilities and hardware-in-the-loop (HWIL) facilities. The T&E effort covers BMDS-level testing including flight tests, ground tests and wargames. Integration of Clear and Cape Cod Upgraded Early Warning Radars (UEWRs) with C2BMC/GFCC provides continuous sensor coverage against ballistic missile threats (Clear and Cape Code EWR upgrades are being performed by Air Force Space Command). The addition of these UEWRs and integration with C2BMC will improve BMDS tracking and discrimination through sensor netting, sensor coordination, and track data fusion.

External Sensors will be added to enhance BMDS discrimination and support continuous sensor coverage. This Program Element (PE) uses an External Sensors Lab (ESL) to collect and fuse external sensor data into useful track and discrimination data.

The Sensors Directorate will initiate mission analysis, site, and facilities studies to support the possible future upgrading an inactive PAVE PAWS early warning radar to the AN/FPS 132 UEWR configuration and relocating it to an alternative location for support of the BMDS.

The Airborne Infrared Surveillance (AIRS) program is a proof of concept program to demonstrate and evaluate the potential benefits of airborne infrared sensor systems to the Ballistic Missile Defense System (BMDS). The AIRS program was funded by a Congressional Add in FY08.

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: 0603884C Ballistic Missile Defense Sensors

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
AN/TPY-2 Basic Program	0	110,152	143,507
RDT&E Articles (Quantity)	0	0	1

This effort includes software upgrades to support Engagement Sequence Groups (ESGs) and common software that will support both the AN/TPY-2 and the THAAD radar missions. Software efforts include completion of Capability Release 2 (CR-2) providing discrimination algorithms (Hercules Suite 1) and CR-3. This effort also includes AN/TPY-2 program infrastructure, modeling and simulation capability, hardware-in-the-loop (HWIL) facilities, software maintenance, and systems engineering/management support for all AN/TPY-2 radars.

FY07 Accomplishments:
- See Project 0811, AN/TPY-2 Basic Program

FY08 Planned Program:
- Complete AN/TPY-2 software CR-2 Acceptance testing at Vandenberg AFB, CA
- Complete CR-3 System Design Review (SDR)
- Begin CR-3 software development

FY09 Planned Program:
RDT&E Articles: Capability Release 2 (CR-2) will be delivered to MDA in FY09.
- Begin CR-3 Integration & Test/Independent Verification at VAFB
- Provide CR-3 software and engineering support during BMDS system integration and testing

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009
BMDS Radars Sensor Development	0	7,840	28,137
RDT&E Articles (Quantity)	0	0	0

Upgrading the External Sensors Lab (ESL) will allow for the fusion of data from multiple external Overhead Non-imaging Infrared (ONIR) sensors providing earlier and more accurate target detection capabilities to the BMDS. This capability will significantly decrease radar resource use, which increases the sensor performance capabilities.

FY07 Accomplishments:

- See Project 0011, External Sensors

FY08 Planned Program:

- Develop acquisition strategy for operationalizing forward-based cueing capability
- Integrate new data feeds to ESL for new ONIR sensors

FY09 Planned Program:

- Continue testing and demonstration of External Sensor capabilities
- Continue External Sensor operations at the JNIC lab
- Develop software code for operational site
- Initiate acquisition of hardware equipment and software for operational site
- Conduct sophisticated sensor/algorithm/CONOPs experiment
- Initiate acquisition for hardware upgrade for the Missile Defense Integration and Operations Center Lab

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009
BMDS Radars Test & Evaluation	0	43,234	75,692
RDT&E Articles (Quantity)	0	0	0

The test program addresses the completion of radar element verification per radar and provides an understanding of sensor capability contributions for the overall BMDS. Testing will demonstrate ability to receive battle management direction from C2BMC and send the C2BMC messages with tracks and threat data. Targets of Opportunity (TOOs) provide radar characterization opportunities and BMDS system test events. This effort encompasses funding for test operations including the conduct of flight and ground tests and supports wargames (which are used to support warfighter concept of operations development). This effort's tasks include planning, resourcing, test site management, test file creation, test execution, performance analysis, modeling and simulation development, verification, validation, accreditation, and reporting of test event data.

FY07 Accomplishments:

- See Project 0811, Test & Evaluation

FY08 Planned Program:

- Conduct AN/TPY-2 CR-2 verification testing at VAFB, including integration with C2BMC
- Plan and execute radar testing, including test site support during TOO flight tests
- Plan and conduct targets of opportunity (TOO) flight tests with the External Sensors Lab (ESL)
- Plan and conduct TOO flight tests with AIRS
- Plan and conduct BMDS ground testing with Thule Upgraded Early Warning Radar (UEWR)
- Complete support of BMDS Ground Test (GT)-2 Campaign including GTD-2
- Plan, prepare scenarios, and conduct ground tests with the AN/TPY-2 HWIL to demonstrate BMDS forward-based sensor role with Block 2008 Threats in support of the BMDS GT-3 campaign
- Provide Test Site Support at VAFB for AN/TPY-2 #5
- Complete development, installation, and testing the Missile Defense System Exerciser node for AN/TPY-2 HWIL
- Continue concurrent test, training, and operations (CTTO) development and demonstration planning and execution in conjunction with MDSE ground test integration efforts
- Continue BMDS SIM maturation of AN/TPY-2 for BMDS wargames, C2BMC cycle testing, and ICAR use
- Develop the Thule UEWR element sensor representation for BMDS wargames, C2BMC cycle testing, and ICAR use

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: **0603884C Ballistic Missile Defense Sensors**

FY09 Planned Program:

- Plan and execute radar testing, including test site support, during TOO flight tests
- Plan and conduct TOO flight tests with the External Sensors Lab (ESL)
- Plan and conduct TOO flight tests with AIRS
- Plan, prepare scenarios, and conduct ground tests with the AN/TPY-2 HWIL to demonstrate BMDS forward based sensor role with Block 2008 Threats in support of the BMDS Ground Test (GT) -4 campaign
- Provide Test Site Support at VAFB for AN/TPY-2 #6
- Complete development, installation, and test and Missile Defense System Exerciser (MDSE) node for AN/TPY-2 HWIL
- Continue CTTO development and demonstration planning and execution in conjunction with MDSE ground test integration efforts
- Continue BMDS SIM maturation of AN/TPY-2 and Thule UEWR for BMDS wargames, and C2BMC cycle testing

	FY 2007	FY 2008	FY 2009
Warner Robbins Early Warning Radar (EWR)	0	7,600	0
RDT&E Articles (Quantity)	0	0	0

There is an inactive PAVE PAWs early warning radar in storage at Warner Robins AFB. The Sensors Directorate will initiate mission analysis, site, and facilities studies to support the possible future upgrading of this radar to the AN/FPS 132 UEWR configuration and relocating it to an alternative location for support of the BMDS.

FY08 Planned Program

- Initiate mission analysis, site, and facilities studies

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009
EO/IR Sensors	0	2,000	0
RDT&E Articles (Quantity)	0	0	0

The Airborne Infrared Surveillance (AIRS) program is a proof of concept program to demonstrate and evaluate the potential benefits of airborne infrared sensor systems to the Ballistic Missile Defense System (BMDS). This program evaluates the AIRS ability to operate as the primary sensor in an Engagement Sequence Group (ESG), i.e. use AIRS data to engage ballistic missile threats. The AIRS program was funded by a Congressional Add in FY08.

FY08 Planned Program:

- Demonstrate AIRS ability to provide airborne IR launch and engagement functionality during flight tests

	FY 2007	FY 2008	FY 2009
Operations and Maintenance of Core IT Services	0	0	10,310
RDT&E Articles (Quantity)	0	0	0

Project funds also support dedicated Information Technology services for mission specific research and test efforts to include classified and unclassified networks, software licenses, sustainment and information assurance certification.

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 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

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

D. Acquisition Strategy

The BMDS radar (AN/TPY-2) project used an existing radar design to minimize development costs and schedule. Design enhancements focus on software changes for the forward based algorithms and C2BMC connectivity.

An External Sensors capabilities acquisition strategy will be developed for capabilities ready to transition from Research and Development to Operations. It is expected to be a competitive procurement involving software development, testing, site selection, and staffing.

An RFP will be issued in FY09 with an expected award in FY10 to build an Adjunct Sensor. An acquisition strategy will be developed in FY09 to operate and sustain the Adjunct Sensor.

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: 0603884C Ballistic Missile Defense Sensors

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
AN/TPY-2 Basic Program								
AN/TPY-2 - Basic Program (includes AN/TPY-2 software)	SS/CPAF	Raytheon / MA	0	110,152	1Q	143,507	1Q	253,659
BMDS Radars Sensor Development								
External Sensors - Prime Contractor	SS/CPAF	Northrop Grumman / CA	0	2,174	1Q	5,115	1Q	7,289
External Sensors - Systems Engineering/Aerospace Analysis	FFRDC	MITRE / VA	0	840	1Q	885	1Q	1,725
External Sensors - Live Test Support / Algorithm Development & Analysis	MIPR	NASIC / OH	0	621	1/2Q	491	1/2Q	1,112
External Sensors - Analysis, Test Support, Aegis Support	MIPR	NSWC-DD / VA	0	521	1Q	488	1Q	1,009
External Sensors - Lab Development, Integration, and Accreditation	Various	Aero. Corp, JHU-APL, MDIOC, Raytheon, SMC-ISPB / CA, MD, CO, MA	0	1,774	1Q	864	1Q	2,638
External Sensors - Accreditation	MIPR	JNIC/CO	0	1,698	1Q	28	1Q	1,726
Sensor Architecture - Ops Migration		TBD	0	212	N/A	13,287	1/2Q	13,499
Sensor Architecture - Advanced Sensor Tech Demonstration			0	0	N/A	6,979	1/2Q	6,979
Warner Robbins Early Warning Radar (EWR)								
Warner Robbins EWR			0	7,600	1/3Q	0	N/A	7,600
EO/IR Sensors								

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: **0603884C Ballistic Missile Defense Sensors**

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
AIRS Prime Contractor	SS/CPFF	LS / Aeromet/ OK	0	1,970	1/2Q	0	N/A	1,970
Analysis / Technical Engineering and Test Support	FFRDC	JHU-APL / MD	0	30	1/2Q	0	N/A	30
Subtotal Product Development			0	127,592		171,644		299236

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
Operations and Maintenance of Core IT Services								
O&M of Core IT Services		TBD	0	0	N/A	10,310	1Q	10,310
Subtotal Support Costs			0	0		10,310		10310

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
BMDS Radars Test & Evaluation								
Radar Test Planning / Preparation	SS/CPAF	Raytheon, MDA / MA, VA	0	37,626	1/3Q	69,919	1/3Q	107,545
Qualification Demonstration, Sustain Dual Role for THAAD	SS/CPAF	Lockheed Martin / AL, CA	0	1,937	1/4Q	1,965	1/4Q	3,902
AN/TPY-2 Host Tenant Agreement	MIPR	VAFB /CA	0	524	1Q	544	1Q	1,068

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: 0603884C Ballistic Missile Defense Sensors

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
Operational Test Agency Support	MIPR	OTA /CA, AL	0	2,098	1Q	2,176	1Q	4,274
Government Testing Oversight	MIPR	NSWC-PHD /CA	0	1,049	1Q	1,088	1Q	2,137
Subtotal Test and Evaluation			0	43,234		75,692		118926

Remarks

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	170,826		257,646		428,472

Remarks

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: **0603884C Ballistic Missile Defense Sensors**

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
Testing Milestones																												
EMR Integration with BMDS in Europe																					△	—	—	△				
Development Milestones																												
Complete AN/TPY-2 Acceptance Testing																				△								
Studies & Analysis																												
Evaluate Advanced Algorithms					△	—	—	—	—	—	—	△																

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Testing Milestones							
TOO Flight Test AN/TPY-2 #5		1Q-4Q					
Integration & Distrib Ground Test AN/TPY-2 #6			1Q-4Q				
Missile Defense Integration Exercise			3Q-4Q				
TOO Flight Testing AN/TPY-2 #6			1Q-4Q				
EMR Integration with BMDS in Europe						1Q-4Q	
Development Milestones							
Develop Models & Simulations for RDSIS		1Q-4Q					
Integration & Distrib Ground Test AN/TPY-2 #5		1Q-4Q					
Deliver AN/TPY-2 Software for System Test		1Q	1Q				
External Sensors Lab - Cueing Experiments		1Q-4Q	1Q-4Q	1Q			
Upgrade AN/TPY-2 HWIL Facility				1Q-4Q			
Complete AN/TPY-2 Acceptance Testing					4Q		
Adjunct Sensor Development				1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Studies & Analysis							
Evaluate Advanced Algorithms		1Q-4Q	1Q-4Q				
External Sensors Lab - Eval Advanced Algorithms		1Q-4Q	1Q-3Q				
Integrate Advanced Algorithms		1Q-4Q	1Q-4Q				
Perform Sensor Architecture Analysis		1Q-4Q	1Q-4Q				

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
XX11 Ballistic Missile Defense Radars Sustainment	0	154,568	296,472	360,520	418,280	412,143	406,860
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: The planned utilization of the AN/TPY-2 radars (with the Program Element (PE) funding source) are as follows: AN/TPY-2 #1 - THAAD System Development (funded in Terminal PE); AN/TPY-2 #2 - deployed to Shariki, Japan (BMD Sensors PE); AN/TPY-2 #3 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #4 - THAAD Development Environmental Qualification (Terminal PE); AN/TPY-2 #5 - THAAD Fire Unit #1 (BMD Sensors PE), AN/TPY-2 #6 - Forward Based Sensor (BMD Sensors PE); AN/TPY-2 #7 - THAAD Fire Unit #2 (Terminal PE in FY07, jointly funded in Terminal/BMD Radars PE in FY08, BMD Radars PE starting in FY09); AN/TPY-2 #8 - THAAD Fire Unit #3 (BMD Radars PE); and AN/TPY-2 #9 - THAAD Fire Unit #4 (BMD Radars PE).

The content in XX11 is a continuation of the efforts reported in project 0811, project 0908 (Midcourse - PE 0603882C) and project XX46 (SBX - PE 0603907C).

A. Mission Description and Budget Item Justification

Provides for the operation and support of BMD Radars until transferred to a Service component. This includes:

- AN/TPY-2s
- European Midcourse Radar (EMR) caretaker through FY09, O&S FY10-13
- Thule Upgraded Early Warning Radar (UEWR)
- COBRA DANE radar
- Beale and Fylingdales UEWRs
- Sea-Based X-Band Radar

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: **0603884C Ballistic Missile Defense Sensors**

B. Accomplishments/Planned Program

	FY 2007	FY 2008	FY 2009
BMDS Radars (Sustainment)	0	75,375	74,569
RDT&E Articles (Quantity)	0	0	0

The forward-based radar effort includes:

- Depot level logistics support
- O&S during testing at Vandenberg Air Force Base (VAFB), CA
- Operational spares, repair, and replacement
- Radar operators/maintainers, site maintenance, fuel, utility, and communications support costs

MDA will use Contractor Logistics Support (CLS) to operate and sustain the AN/TPY-2 radars. The European Midcourse Radar (EMR) will be maintained in a caretaker status at Kwajalein Missile Range (KMR), Kwajalein Atoll prior to and during the radar upgrade period.

FY07 Accomplishments:

- See Project 0811, Operations & Support

FY08 Planned Program:

- Operate and sustain AN/TPY-2 #2 in Japan and AN/TPY-2 #3 and AN/TPY-2 #5 at VAFB during testing
- Develop additional mission plans for AN/TPY-2 forward-based radars
- Maintain EMR in caretaker status during radar upgrade

FY09 Planned Program:

- Operate and sustain AN/TPY-2 forward-based radars overseas and at VAFB during testing
- Develop mission plans for AN/TPY-2 radars
- Maintain EMR in caretaker status during radar upgrade

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: 0603884C Ballistic Missile Defense Sensors

	FY 2007	FY 2008	FY 2009
BMDS Radars Communications (Sustainment)	0	0	18,813
RDT&E Articles (Quantity)	0	0	0

This Communications suites O&S effort supports AN/TPY-2s, EMR, SBX, and Thule. It includes communications suite operational spares, repair, and replacement; communications operators/maintainers; and communications support costs

FY08 Planned Program:
- See BMD C2BMC Program Element 0603896C

FY09 Planned Program:
- Provide 24/7 sustainment for AN/TPY-2 #3 BMDS Communication Support Complex - Transportable, OCONUS

	FY 2007	FY 2008	FY 2009
Radar Site Security	0	12,593	30,543
RDT&E Articles (Quantity)	0	0	0

The Radars Site Security effort includes personnel, training, and lodging to provide site security 24 Hours per day, 7 days a week during site construction, activation and operations. This includes Site Security for AN/TPY-2 forward-based radars and the European Midcourse Radar (EMR) Upgrade.

FY07 Accomplishments:
- See Project 0811, Operations and Support

FY08 Planned Program:
- Provide site security for the AN/TPY-2 #2 deployed site at Shariki

FY09 Planned Program:
- Provide site security for the AN/TPY-2 #2 deployed site at Shariki
- Provide site security for AN/TPY-2 #3 at deployed location

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009
Sea-Based X-Band Radar	0	0	147,429
RDT&E Articles (Quantity)	0	0	0

The Sea-Based X-band radar (SBX) is a phased-array radar operating in the X-band which is mounted on a commercially designed, self-propelled, semi-submersible oil drilling platform. The vessel has a dynamic positioning capability to enable precision station keeping even in adverse sea states and weather conditions. The X-Band Radar (XBR) part of the SBX is the world's largest X-band radar built with leading edge technology. When fully integrated with the rest of the BMDS it will become the primary midcourse discrimination sensor for the system.
X-band technology provides this midcourse sensor with the ability to perform high resolution cued search, acquisition, tracking, and target discrimination to support the GMD element. To perform this effort, highly sophisticated algorithms are designed to enhance target acquisition and discrimination of more complex threat sets and targets which are off-nominal in behavior. Material and electronic component enhancements to improve power output and sensitivity are also developed and integrated into the SBX operating software. This effort includes management, systems engineering and integration support; and the completion of XBR software build 2.2.

This includes SBX participation in the MDA ground and flight test program, data reduction and analysis; and Vessel certification, maintenance and mooring studies. This includes Government and contractor Project Office support for the SBX development and sustainment efforts

FY07 Accomplishments:
- See Ground-Based Midcourse Defense Program Element (0603882C)

FY08 Planned Program:
- See Sea-Based X-Band Radar Program Element (0603907C)

FY09 Planned Program:
- Continue incorporation of the SBX into the BMDS through participation in System Ground and Flight tests
- Maintain current SBX software
- Begin development of ``Spiral 2`` (further implementation of discrimination) SBX software
- Operate and maintain the SBX
- Procure long lead repair/replacement parts in preparation of vessel certification shipyard period

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: **0603884C Ballistic Missile Defense Sensors**

	FY 2007	FY 2008	FY 2009
Upgraded Early Warning Radars (Beale, Fylingdales, COBRA DANE)	0	66,600	25,118
RDT&E Articles (Quantity)	0	0	0

Upgraded Early Warning Radars (UEWRs) and COBRA DANE Upgrade (CDU) are large, fixed, phased-array surveillance radars used to detect, track, and classify individual targets early in their trajectory. These are multi-mission radars that, in addition to Missile Defense, support other forward users (e.g., other UEWR missions include Missile Warning and Space Surveillance). The UEWR upgrades add new capability to these legacy radars that improves detection, tracking, classification, and reliability/availability performance. These upgrades provide precise tracking early enough to significantly expand the battlespace for the ground-based interceptors. While the UEWRs and CDU, on their own, can provide sufficient data to generate a weapons task plan, they can also cue the X-Band radars to the location and trajectory of incoming targets. For UEWR, this program provides for hardware replacement of decades old processing technology and new communications equipment, and the development of new software that supports each mission. For CDU, the program provides for minor changes to existing hardware and new communications equipment, and the development of missile defense software integrated into the existing legacy software.

FY07 Accomplishments:
- See Ground-Based Midcourse Defense Program Element (0603882C)

FY08 Planned Program:
- Achieve STRATCOM Certification for all missions at Fylingdales and enter BMDS Operational Baseline
- Transfer COBRA DANE to USAF
- Complete Early Warning Radar (EWR) equipment removal and facility reconfiguration at Fylingdales
- Achieve STRATCOM Certification for all missions at Beale
- Complete EWR equipment removal and phase 2 construction at Beale

FY09 Planned Program:
- Transfer Beale and Fylingdales radars to USAF
- Provide sustainment transition support to the USAF for Beale and Fylingdales
- Provide maintenance of the System Programming Agency (SPA) sustainment string
- Plan for missile defense mission-specific UEWR software enhancements
- Provide sustainment of the upgraded COBRA DANE radar

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: 0603884C Ballistic Missile Defense Sensors

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 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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

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: **0603884C Ballistic Missile Defense Sensors**

D. Acquisition Strategy

A Contractor Logistics Support (CLS) contract was awarded to operate and maintain the AN/TPY-2 radars. This is a Indefinite Delivery Indefinite Quantity (IDIQ) task order contract.

An acquisition strategy is being developed for Beale and Fylingdales UEWR development and sustainment.

A Security Contract was awarded in FY06 to provide a security force for the AN/TPY-2 #2 site in Japan. The contract provides the personnel, security training, and materials needed to support site security. This IDIQ contract was awarded to Chenega Blackwater, an Alaskan Native American-owned company, as a Small Business Award (SBA).

The BCSC-T Program Plan addresses the design, development, acquisition, testing, integration, activation, and fielding. The overall executing agent is the Defense Information Systems Agency (DISA) via an existing Memorandum of Agreement (MOA) with MDA.

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: **0603884C Ballistic Missile Defense Sensors**

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
BMDS Radars (Sustainment)								
AN/TPY-2 #2 - Radar Manning, Depot Support, Site Maintenance, Superdome Maintenance, Training	SS/CPAF	Raytheon / MA	0	31,722	1Q	30,202	1Q	61,924
AN/TPY-2 #2 - Replenishment Spares; Repair and Replace	SS/CPAF	Raytheon / MA	0	4,829	1Q	6,654	1Q	11,483
AN/TPY-2 #2 - Site Facility Maintenance, Base Support Services, Comm Service	MIPR	U.S. Military or Host Nation	0	1,698	1Q	1,706	1Q	3,404
AN/TPY-2 #2 - Fuel for Generators, Vehicles, and Security Equipment		TBD	0	1,810	1Q	1,818	1Q	3,628
AN/TPY-2 #2 - Warfighter Support	MIPR	SMDC / AL	0	1,102	1Q	1,107	1Q	2,209
AN/TPY-2 #2 - International Transport	MIPR	TRANSCOM / CA	0	344	1/2Q	345	1/2Q	689
AN-TPY-2 #3 - Radar Manning, Depot Support, Site Maintenance, Superdome Maintenance, Training	SS/CPAF	Raytheon / MA	0	15,062	1Q	17,441	1Q	32,503
AN-TPY-2 #3 - Replenishment Spares; Repair and Replace, Site Depot Spares	SS/CPAF	Raytheon / MA	0	3,286	1Q	3,190	1Q	6,476
AN-TPY-2 #3 - Site Facility Maintenance, Base Support Services, Comm Service	MIPR	U.S. Military or Host Nation	0	3,824	1/2Q	4,031	1/2Q	7,855
AN-TPY-2 #3 - Warfighter Support	MIPR	SMDC / AL	0	1,102	1/2Q	1,107	1/3Q	2,209
AN-TPY-2 #3 - International Transportation	MIPR	TRANSCOM / CA	0	86	1Q	345	1Q	431

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: **0603884C Ballistic Missile Defense Sensors**

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
AN-TPY-2 #3 - Fuel (Generator, Vehicles, Security Equipment) Other Support		TBD	0	508	1/3Q	1,929	1/3Q	2,437
AN-TPY-2 #5 - Depot Support at VAFB	SS/CPAF	Raytheon / MA	0	851	N/A	0	N/A	851
AN-TPY-2 #5 - Repair and Replace Spares at VAFB	SS/CPAF	Raytheon / MA	0	762	N/A	0	N/A	762
AN-TPY-2 #6 - Spares	SS/CPAF	Raytheon / MA	0	4,024	1Q	305	1Q	4,329
EMR - Caretaker at Kwajelein		Raytheon, SMDC / MA, AL	0	3,335	1Q	3,301	1Q	6,636
BMDSM Manager Support	MIPR	SMDC / AL	0	1,030	1/2Q	1,088	1/2Q	2,118
BMDS Radars Communications (Sustainment)								
AN/TPY-2 #3 - Communications O&S	MIPR	DISA / VA	0	0	N/A	18,813	1Q	18,813
Radar Site Security								
AN/TPY-2 #2 - Site Security	C/CPFF	Chenega Blackwater / AK, NC, VA	0	12,271	1Q	12,276	1Q	24,547
AN/TPY-2 #3 - Site Security		TBD	0	322	1Q	18,267	1Q	18,589
Sea-Based X-Band Radar								
SBX and XBR Development	SS/CPAF	Boeing / AL /AK /AZ /CA /CO /HI /MA /TX /VA	0	0	N/A	23,000	2/3Q	23,000
SBX Systems Integration	SS/CPAF	Boeing/ AL /AK /AZ /CA /CO /HI /MA /TX /VA	0	0	N/A	27,829	2/3Q	27,829

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: **0603884C Ballistic Missile Defense Sensors**

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
Upgraded Early Warning Radars (Beale, Fylingdales, COBRA DANE)								
Beale UEWR Development	SS/CPAF	Boeing /AL	0	10,200	1Q	0	1Q	10,200
Fylingdales UEWR Development	SS/CPAF	Boeing /AL	0	8,500	1Q	0	1Q	8,500
Common UEWR Sustainment	SS/CPAF	Boeing /AL	0	31,400	1Q	8,803	1Q	40,203
Common SPA Sustainment	SS/CPAF	Raytheon /AL	0	0	N/A	3,120	1Q	3,120
Common Mission Software Sustainment	MIPR	MDA/SNU / MA	0	0	N/A	2,080	1Q	2,080
COBRA DANE Sustainment	SS/CPAF	Boeing/Raytheon / AL, VA	0	7,400	1Q	7,904	1Q	15,304
Government Support	MIPR	MDA/SNU /MA	0	9,100	1Q	3,211	1Q	12,311
Subtotal Product Development			0	154,568		199,872		354440

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
Sea-Based X-Band Radar								
Systems Force Protection	SS/CPFF	ALUTIIA / AK/ VA	0	0	N/A	10,400	3Q	10,400
SBX Operations and Support (Vessel)	SS/CPAF	Boeing / AL/ AK/ AZ/ CA/ CO/ HI/ MA/ TX/ VA	0	0	N/A	54,900	2/3Q	54,900

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: 0603884C Ballistic Missile Defense Sensors

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
XBR Operations and Support	SS/CPIF	Raytheon / AL /AK /HI	0	0	N/A	31,300	3/4Q	31,300
Subtotal Support Costs			0	0		96,600		96600

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

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	154,568		296,472		451,040

Remarks

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
0603884C Ballistic Missile Defense Sensors

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
Operation & Sustainment																												
Transfer COBRA DANE to USAF							△																					
Transfer Beale & Fylingdales Radars to USAF									△																			

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: February 2008
APPROPRIATION/BUDGET ACTIVITY: **RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)**	R-1 NOMENCLATURE: **0603884C Ballistic Missile Defense Sensors**

Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Flight Tests							
FTG-06			2Q				
FTG-07			4Q				
Operation & Sustainment							
AN/TPY-2 #2 O&S		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
AN/TPY-2 #3 O&S		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
AN/TPY-2 #5 O&S		4Q	1Q-4Q				
AN/TPY-2 #6 O&S			3Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
EMR O&S				1Q-4Q			
Thule O&S						1Q-4Q	1Q-4Q
Achieve STRATCOM Certification -Fylingdales		2Q					
Achieve STRATCOM Certification - Beale		3Q					
Transfer COBRA DANE to USAF		3Q					
Beale and Fylingdales Software Maintenance		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
COBRA DANE Software Maintenance		1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Transfer Beale & Fylingdales Radars to USAF			1Q				

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0602 Program-Wide Support	12,710	0	0	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0

Note: Efforts within this project continue in FY 2008 under 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	12,710	0	0
RDT&E Articles (Quantity)	0	0	0

See Section A: Mission Description and Budget Item Justification

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603884C Ballistic Missile Defense Sensors

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 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 0603895C BMD System Space Program	0	16,552	29,771	41,638	56,199	133,915	157,548	435,623
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

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: **0603884C Ballistic Missile Defense Sensors**

COST ($ in Thousands)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
ZX40 Program-Wide Support	0	13,129	24,525	43,512	31,461	29,406	24,566
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	13,129	24,525
RDT&E Articles (Quantity)	0	0	0

See Section A: Mission Description and Budget Item Justification

Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date: February 2008
APPROPRIATION/BUDGET ACTIVITY: RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE: 0603884C Ballistic Missile Defense Sensors

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
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
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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: 0603884C Ballistic Missile Defense Sensors

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