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Missile Defense Agency (MDA) Exhibit R-2 RDT&E Budget Item Justification						Date February 2007		
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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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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	284,297	514,129	778,163	984,963	939,417	791,701	723,843	603,585
0811 Ballistic Missile Defense Radars Block 2006	251,427	223,374	169,258	142,946	0	0	0	0
0911 Ballistic Missile Defense Radars Block 2008	27,568	274,913	543,680	506,892	160,553	195,337	0	0
0011 Ballistic Missile Defense Radars Block 2010	0	7,030	45,031	310,007	660,831	423,722	265,919	270,345
R111 Ballistic Missile Defense Radars Block 2012	0	0	0	0	91,144	154,476	440,827	317,219
0602 Program-Wide Support	5,302	8,812	20,194	25,118	26,889	18,166	17,097	16,021
Amount Included in PE 0904903D					-151,670	-111,212	-120,268	-131,192
Total PE Cost Reflected in R-1	284,297	514,129	778,163	984,963	787,747	680,489	603,575	472,393

Note: During FY06 the FBX-T and THAAD radars were officially assigned the military designation of AN/TPY-2. The new nomenclature is as follows: AN/TPY-2 #1 (THAAD Engineering Manufacturing Development (EMD) #1); AN/TPY-2 #2 (FBX-T #1); AN/TPY-2 #3 (FBX-T #2); AN/TPY-2 #4 (THAAD EMD #2); AN/TPY-2 #5 (FBX-T #3) to THAAD for THAAD use; and AN/TPY-2 #6 (FBX-T #4). THAAD is covered under Program Element (PE) 0603881C.

A. Mission Description and Budget Item Justification

A.1 System Element Description

The Ballistic Missile Defense System (BMDS) architectural objectives of the Sensors Directorate are to close existing sensor coverage gaps and expand the number of Engagement Sequence Groups (ESGs). 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. Fielding of these Sensors will occur in conjunction with the BMDS blocks: Block 2006 (Project 0811), Block 2008 (Project 0911), Block 2010 (Project 0011) and Block 2012 (Project R111).

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

- Development and delivery of forward-based AN/TPY-2s
- Upgrade to the Thule Early Warning Radar (EWR)
- Demonstrations and experiments with the External Sensors Laboratory (ESL) for forward-based radar
- Upgrade to the European Midcourse Radar (EMR), formerly known as the Ground Based Radar-Prototype (GBR-P)
- Development of the Adjunct Sensor
- Continuation of the Airborne Infrared Sensors (AIRS) program evaluating the military utility of AIRS to the BMDS

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 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. Adding Mechanical Steering Kits (MSKs) to these radars will enable them to slew and increase BMDS sensor coverage.

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. These upgrades include hardware and software modifications that enhance capabilities and integrate these UEWRs into the BMDS Sensors Architecture. The COBRA DANE radar located at Earekson AFS, Shemya, Alaska is completing its hardware and software upgrades to enhance performance and to integrate this radar into the BMDS. Only EWR and COBRA DANE work beyond FY07 is included in this project. Previous work was accomplished under the BMD Midcourse Defense program element (0603882C).

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<p>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.</p> <p>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.</p> <p>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 through FY09. 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.</p> <p>The Sensors PE was provided a Congressional increase in FY06 and FY07 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.</p> <p><u>A.2 System Element Budget Justification and Contribution to the Ballistic Missile Defense System (BMDS)</u></p> <p>The Ballistic Missile Defense System (BMDS) spiral 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.</p> <p>Four (4) forward-based AN/TPY-2 radars located near potential threats provides the BMDS early missile detection and tracking capability. Mechanical Steering Kits (MSKs) provide the radar a slewing capability to increase coverage and close sensor gaps. AN/TPY-2 radars are transportable, adding flexibility to respond to geographical changes in threats.</p> <p>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.</p>		

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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.

The Adjunct Sensor improves the AN/TPY-2's ability to adapt and to operate in a variety of geographical locations. Deploying an Adjunct Sensor in conjunction with an AN/TPY-2 extends 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. 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. Together with the other BMDS sensors the upgrades will help enable continuous tracking and discrimination of ballistic missile threats and provide BMDS with additional ESG possibilities.

A.3 Major System Element Goals

During FY06 the FBX-T and THAAD radars were officially assigned the military designation of AN/TPY-2. The new nomenclature is as follows:

- AN/TPY-2 #1 (THAAD Engineering Manufacturing Development (EMD) #1)
- AN/TPY-2 #2 (FBX-T #1)
- AN/TPY-2 #3 (FBX-T #2)
- AN/TPY-2 #4 (THAAD EMD #2)
- AN/TPY-2 #5 (FBX-T #3) for THAAD Fire Unit Radar (FUR) #1
- AN/TPY-2 #6 (FBX-T #4)

THAAD is covered under Program Element (PE) 0603881C.

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; 3) enhance the performance of the BMDS by extending sensor coverage and accuracy provided by a network of layered sensors.

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Block 2006

- Manufactured and deployed AN/TPY-2 #2 and communications suite
- Deliver AN/TPY-2 #3
- Sustain COBRA DANE
- Sustain Beale and Fylingdales Early Warning Radars (EWRs)

Block 2008

- Deliver AN/TPY-2 #5 and #6
- Upgrade Thule radar to the UEWR configuration
- Manufacture and deploy communications suite
- Upgrade COBRA DANE
- Upgrade Beale and Fylingdales Early Warning Radars (EWRs)

Block 2010

- Award EMR contract
- Integrate External Sensor data into the BMDS
- Procure EMR communications suite

Block 2012

- Develop and deploy an Adjunct Sensor
- Integrate Clear and Cape Cod UEWRs

A.4 Major Events Schedule and Description

Major Event	Project	Timeframe
Ground Test		
Testing Milestones		
EMR Integration with BMDS in Europe	0011	1Q FY 2012 - 4Q FY 2012
Contract Activity		
Studies & Analyses		
Perform Sensor Architecture Analysis	0811	1Q FY 2006
Perform Sensor Architecture Analysis	0811	4Q FY 2007

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Major Event	Project	Timeframe
Acquisition Milestones		
EMR Contract Award	0011	4Q FY 2007 - 1Q FY 2008
Thule Upgrade Contract Award	0911	3Q FY 2006
Other		
Program Milestones		
AN/TPY-2 #6 Operational	0011	4Q FY 2011
EMR Operational	0011	4Q FY 2012
AN/TPY-2 #2 Operational	0811	4Q FY 2006
AN/TPY-2 #3 Operational	0911	4Q FY 2008
Testing Milestones		
Thule Certification	0911	4Q FY 2009

B. Program Change Summary	FY 2006	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2007 PB)	278,168	514,510	589,395	647,382
Current President's Budget (FY 2008 PB)	284,297	514,129	778,163	984,963
Total Adjustments	6,129	-381	188,768	337,581
Congressional Specific Program Adjustments	0	1,800	0	0
Congressional Undistributed Adjustments	0	-2,181	0	0
Reprogrammings	9,580	0	0	0
SBIR/STTR Transfer	-3,451	0	0	0
Adjustments to Budget Years	0	0	188,768	337,581

FY06 increase of \$6.129 million includes SBIR/STTR transfer and MDA reprogrammings.

FY07 decrease of \$0.381 million includes a congressional specific program increase of \$1.800 million for AIRS and a portion of the MDA congressional undistributed reduction.

FY08 increase of \$188.768 million and FY09 increase of \$337.581 million are the results of MDA programmatic changes to support deployment of radars.

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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0811 Ballistic Missile Defense Radars Block 2006	251,427	223,374	169,258	142,946	0	0	0	0
RDT&E Articles Qty	0	2	0	0	0	0	0	0

Note: During FY06 the FBX-T and THAAD radars were officially assigned the military designation of AN/TPY-2. The new nomenclature is as follows: AN/TPY-2 #1 (THAAD Engineering Manufacturing Development (EMD) #1); AN/TPY-2 #2 (FBX-T #1); AN/TPY-2 #3 (FBX-T #2); AN/TPY-2 #4 (THAAD EMD #2); AN/TPY-2 #5 (FBX-T #3) to THAAD for THAAD use; and AN/TPY-2 #6 (FBX-T #4). THAAD is covered under Program Element (PE) 0603881C.

RDT&E Articles: AN/TPY-2 #3 acquisition was initiated in FY04 and will be delivered during FY07 (Block 2006). AN/TPY-2 Software Capability Release 2 (CR-2) forward-based functionality was initiated in FY03 and will be delivered for testing in the BMDS Test Bed in FY07.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Radars Block 2006 (Project 0811) effort is 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 include the operation of the test bed asset, operations and sustainment activities, test and evaluation efforts, and Airborne Infrared Surveillance (AIRS).

Block 2006 efforts include:

- Deployment of forward-based X-Band Radar (AN/TPY-2 #2) to Japan
- Production and deployment planning of AN/TPY-2 #3
- BMDS-level testing including flight tests, ground tests, wargames, and exercises
- Operation and sustainment of the deployed AN/TPY-2s via the Contractor Logistics Support (CLS) contract
- Install and integrate C2BMC hardware/software for deployed BMDS sensors

Through FY07, Block 2006 funds primarily support development and production of two (2) AN/TPY-2s. The out-year funds will provide CLS support to all AN/TPY-2s through FY09 with the increased funding in FY09 reflecting the acquisition of AN/TPY-2 depot spares.

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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.

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 include 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 in Block 2006 as part of the BMDS Test Bed.

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

The Electro-Optical/Infrared (EO/IR) sensors program evaluates the Airborne Infrared Surveillance (AIRS) ability to operate as the primary sensor in an Engagement Sequence Group (ESG). AIRS received a Congressionally directed plus-up in both FY06 and FY07.

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 UEWR upgrades add new capability to these legacy radars that improves detection, tracking, classification, and reliability/availability performance. Both Fylingdales and Beale UEWRs and the CDU will be sustained through FY08 via the existing development contract.

B. Accomplishments/Planned Program

	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 Basic Program (includes AN/TPY-2 software)	91,898	95,714	0	0
RDT&E Articles (Quantity)	0	1	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. AN/TPY-2 CR-2 provides the BMDS with a forward-based discrimination capability.

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<p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> • Completed AN/TPY-2 #2 CR-1 software verification • Developed tool for generation of operational mission plans and search profiles • Implemented Anti-Tamper program and completed security documentation (ECCM requirements) • Completed integration and test of C2BMC interface for AN/TPY-2 with CR-1 • Completed a Preliminary Critical Design Review for CR-2 • Developed models and simulations that were included in the BMDSIM for wargaming participation • Upgraded the HWIL facility with Radar Digital Signal Injection System (RDSIS) for discrimination testing • Began life cycle support for AN/TPY-2 <p>FY07 Planned Program:</p> <p>RDT&E Test Article: Develop and test AN/TPY-2 Capability Release 2 (CR-2) software with forward-based discrimination algorithms from Project Hercules</p> <ul style="list-style-type: none"> • Complete AN/TPY-2 CR-2 software development • Complete BMDS integration testing with AN/TPY-2 CR-2 software • Begin AN/TPY-2 software requirements development for CR-3 • Maintain the HWIL facility to support test and modification activities • Continue life cycle support for AN/TPY-2 • Complete AN/TPY-2 #3 acceptance testing • Deliver AN/TPY-2 #3 for system testing with Capability Release 2 (CR-2) 				
	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 #3 Manufacture	50,479	5,900	0	0
RDT&E Articles (Quantity)	0	1	0	0
<p>This effort includes 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 is scheduled for delivery in FY07 and provides the BMD System with a forward-based capability and extends the sensor coverage.</p> <p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> • Completed Near Field Range (NFR) Testing 				

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<ul style="list-style-type: none"> • Continue AN/TPY-2 #3 hardware production and integration • Completed assembly of Transmit/Receive Integrated Microwave Modules (TRIMMs) for AN/TPY-2 #2 <p>FY07 Planned Program: RDT&E Test Article: Acquisition of AN/TPY-2 #3 was initiated in FY04 for delivery in FY07</p> <ul style="list-style-type: none"> • Complete AN/TPY-2 #3 factory integration and testing 				
	FY 2006	FY 2007	FY 2008	FY 2009
Deployment/Site Prep and Activation	43,628	21,834	0	0
RDT&E Articles (Quantity)	0	0	0	0
<p>The AN/TPY-2 radars will be deployed to sites located near expected missile threats. The Block 2006 effort includes 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 includes planning and coordination with Host Nation and Combatant Commanders (COCOMs), radar site design, site construction, transport of the radar to the overseas site, radar setup, calibration, and activation. This effort also includes deployment preparations and site activation.</p> <p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> • Completed AN/TPY-2 #2 deployment site design • Transported and set-up AN/TPY-2 #2 radar overseas • Completed the installation and checkout of AN/TPY-2 #2 • Identified facility requirements for AN/TPY-2 #3 <p>FY07 Planned Program:</p> <ul style="list-style-type: none"> • Completed AN/TPY-2 #2 deployment construction • Complete Host Nation agreements for AN/TPY-2 #3 • Participate in site survey for AN/TPY-2 #3 overseas site • Participate in the initial site planning for AN/TPY-2 #3 				

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	FY 2006	FY 2007	FY 2008	FY 2009
Test & Evaluation	1,123	19,102	0	0
RDT&E Articles (Quantity)	0	0	0	0
<p>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 provides 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.</p> <p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> • Planned, developed Hardware-in-the-Loop (HWIL) ground test scenarios, and executed integrated ground tests • Planned, developed HWIL scenarios, and executed distributed ground tests with AN/TPY-2 #2 (with CR-1) in Japan to demonstrate GBI launch on/engage on AN/TPY-2 capabilities • Participated in flight test events with the External Sensor Lab (ESL) • Planned, participated, and collected data in flight test events with AIRS to support analysis of cues and tracks from an Airborne Sensor • Provided test site support at Vandenberg AFB, CA for AN/TPY-2 #2 • Developed BMDSIM radar model of AN/TPY-2 to support BMDS Wargames <p>FY07 Planned Program:</p> <ul style="list-style-type: none"> • Conduct AN/TPY-2 CR-2 verification testing including integration with C2BMC at Vandenberg AFB • Plan and execute radar testing during TOO flight tests and Glory Trips • Plan and conduct TOO flight tests with the ESL • Plan and conduct TOO flight tests with Airborne Infrared Surveillance (AIRS) • Plan, prepare scenarios, conduct ground tests with AN/TPY-2 HWIL to demonstrate BMDS forward-based sensor role with Block 2006 Threats • Provide Test Site Support at Vandenberg AFB for AN/TPY-2 #3 • Begin development, installation, and test of the Missile Defense System Exerciser node for AN/TPY-2 HWIL 				

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- Begin Concurrent Test, Training and Operations (CTTO) requirements development and demonstration planning and execution in conjunction with MDSE ground test integration efforts
- Continue BMDS SIM maturation of AN/TPY-2 element sensor representation for BMDS wargames, C2BMC cycle testing, and ICAR use

	FY 2006	FY 2007	FY 2008	FY 2009
Operations and Support (Sustainment)	36,782	79,024	169,258	142,946
RDT&E Articles (Quantity)	0	0	0	0

The Block 2006 effort includes operation and sustainment of AN/TPY-2 forward-based radars. The forward-based radar effort includes overseas Operation and Sustainment (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. This effort also includes O&S for AN/TPY-2 #5 & #6 while testing at VAFB in FY08 and FY09 respectively.

The European Midcourse Radar (EMR), formerly known as the Ground Based Radar-Prototype (GBR-P), 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.

MDA will sustain Beale and Fylingdales in FY08.

FY06 Accomplishments:

- Operated and sustained AN/TPY-2 #2
- Acquired spares to support AN/TPY-2 #3 overseas deployment
- Developed and updated mission profiles for AN/TPY-2
- Implemented Security contract and developed security plans for the AN/TPY-2 #2
- Warfighter capability demonstration/readiness demo for AN/TPY-2
- Maintained EMR in caretaker status at KMR prior to radar upgrade

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FY07 Planned Program:

- Operate and sustain AN/TPY-2 #2 in Japan
- Operate and sustain AN/TPY-2 #3 during VAFB testing phase
- Develop mission plans for AN/TPY-2 forward-based radars
- Maintain EMR in caretaker status prior to radar upgrade
- Ensure AN/TPY-2 #3 readiness for operational use and deployment

FY08 Planned Program:

- Operate and sustain AN/TPY-2 #2 in Japan and AN/TPY-2 #3 and AN/TPY-2 #5 at Vandenberg AFB during the testing phase
- Develop additional mission plans for AN/TPY-2 forward-based radars
- Maintain EMR in caretaker status during radar upgrade
- Sustain COBRA DANE Upgrade
- Provide CLS support for UEWR hardware and software to Beale and Fylingdales UEWRs
- Provide 24x7 sustainment for AN/TPY-2 #3 BMDS Communication Support Complex - Transportable, OCONUS

FY09 Planned Program:

- Operate and sustain AN/TPY2 forward-based radars overseas and at VAFB during the testing phase
- Develop mission plans for AN/TPY-2 radars
- Maintain EMR in caretaker status during radar upgrade
- Provide 24x7 sustainment for AN/TPY-2 #3 BMDS Communication Support Complex - Transportable, OCONUS

	FY 2006	FY 2007	FY 2008	FY 2009
EO/IR Sensors	4,777	1,800	0	0
RDT&E Articles (Quantity)	0	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.

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2007
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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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FY06 Accomplishments:

- Demonstrated AIRS ability to provide airborne infrared (IR) launch and engagement functionality on SERV-3 and other MDA flight test opportunities
- Demonstrated the AIRS search surveillance fence scan during flight test opportunities
- Communicated 3D state vectors with AIRS encrypted communications link from HALO II to a ground station with C2BMC interface
- Integrated and tested discrimination algorithms on AIRS processing equipment post-processed and also real-time onboard High Altitude Observatory (HALO) II

FY07 Planned Program

- Demonstrate AIRS ability to provide airborne IR launch and engagement functionality on flight tests, e.g., FTM-11, FTG-3, FTT-6, FTX-02, GT-194, FTM-12 and GT-195

	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 #5 Manufacture	6,794	0	0	0
RDT&E Articles (Quantity)	0	0	0	0

FY06 completes the purchase of long-lead material initiated in FY05. This radar provides the BMD System with a forward-based capability and extends the sensor coverage.

FY06 Accomplishments:

- Completed manufacture of Transmit/Receive Modules (TRMs) for AN/TPY-2 #5
- Manufacture effort continues in Block 2008

	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 #6 Manufacture	3,499	0	0	0
RDT&E Articles (Quantity)	0	0	0	0

FY06 completes the purchase of long-lead material initiated in FY05. This radar provides the BMD System with a forward based capability and extends the sensor coverage.

FY06 Accomplishments:

- Continued AN/TPY-2 #6 hardware production

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification			Date February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		R-1 NOMENCLATURE 0603884C Ballistic Missile Defense Sensors		
<ul style="list-style-type: none"> Completed the manufacturing of Monolithic Microwave Integrated Circuits (MMICs) for AN/TPY-2 #6 Began manufacturing of Transmit/Receive Integrated Microwave Modules (TRIMMs) for AN/TPY-2 #6 Manufacture effort continues in Block 2008 				
	FY 2006	FY 2007	FY 2008	FY 2009
External Sensors	2,430	0	0	0
RDT&E Articles (Quantity)	0	0	0	0
<p>Upgrade the External Sensors Lab (ESL) to allow for the fusion of data from multiple external Overhead Non-imaging Infrared (ONIR) 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.</p> <p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> Procured and installed ESL hardware upgrades Identified algorithms for evaluation regarding forward-based cueing External Sensors effort continues in Block 2010 				
	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 Risk Reduction Test-Bed (TPS-X)	10,017	0	0	0
RDT&E Articles (Quantity)	0	0	0	0
<p>TPS-X provided risk reduction for the AN/TPY-2 program by validating the forward-based algorithms that will be used in the Capability Release 2 (CR-2) software release for AN/TPY-2.</p> <p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> Completed testing and validation of forward-based algorithms with TPS-X at the Pacific Missile Range Facility, Kauai, HI Demonstrated the ability to accept and execute a cue/focus search plan from an overhead sensor Demonstrated administration resource management using radar tasking commands Conducted Targets of Opportunity (TOO) flight tests Critical Measurements and Countermeasures (CMCM-2) 				

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification							Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603175C Ballistic Missile Defense Technology	147,270	193,307	118,569	109,540	116,014	121,008	127,917	131,291	1,064,916
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,120,879	1,092,076	962,585	1,004,282	924,101	851,213	678,694	501,147	7,134,977
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,391,246	3,043,058	2,520,064	2,359,665	2,179,602	1,699,963	1,153,082	1,183,003	16,529,683
PE 0603883C Ballistic Missile Defense Boost Defense Segment	455,572	628,958	548,759	432,432	448,375	678,913	829,683	1,026,239	5,048,931
PE 0603886C Ballistic Missile Defense System Interceptors	200,446	356,004	227,499	393,317	522,388	730,236	836,029	570,206	3,836,125
PE 0603888C Ballistic Missile Defense Test and Targets	610,619	601,782	586,150	628,364	662,984	681,511	696,037	705,210	5,172,657
PE 0603889C Ballistic Missile Defense Products	387,402	0	0	0	0	0	0	0	387,402
PE 0603890C Ballistic Missile Defense System Core	409,993	429,420	482,016	511,147	558,746	579,571	579,316	588,481	4,138,690
PE 0603891C Special Programs - MDA	271,021	353,031	323,250	305,409	369,073	526,966	789,017	792,271	3,730,038
PE 0603892C Ballistic Missile Defense Aegis	893,040	1,122,669	1,059,103	1,129,425	1,221,650	1,067,587	1,054,753	1,089,078	8,637,305
PE 0603893C Space Tracking & Surveillance System	220,048	322,220	331,525	347,811	412,623	501,197	778,067	981,424	3,894,915
PE 0603894C Multiple Kill Vehicle	48,370	144,362	271,151	352,741	461,179	618,263	673,477	842,905	3,412,448
PE 0603895C BMD System Space Program	0	0	27,666	35,093	46,849	56,183	133,617	157,117	456,525
PE 0603896C BMD C2BMC	0	246,852	258,913	294,627	300,847	282,615	267,275	269,420	1,920,549
PE 0603897C BMD Hercules	0	49,674	53,658	54,264	54,405	55,142	53,355	54,198	374,696
PE 0603898C BMD Joint Warfighter Support	0	54,935	48,787	50,428	54,086	56,603	58,890	60,206	383,935
PE 0603904C BMD Joint National Integration Center (JNIC)	0	110,629	104,012	106,985	111,542	111,947	113,592	115,287	773,994
PE 0603905C BMD Concurrent Test and Operations	0	23,159	0	0	0	0	0	0	23,159
PE 0603906C Regarding Trench	0	0	2,000	3,000	5,000	5,000	9,000	9,000	33,000
PE 0605502C Small Business Innovative Research - MDA	133,105	0	0	0	0	0	0	0	133,105
PE 0901585C Pentagon Reservation	14,874	15,527	6,058	6,376	4,490	4,725	4,801	4,877	61,728
PE 0901598C Management Headquarters - MDA	98,609	87,059	85,906	86,453	70,355	69,855	69,855	69,855	637,947

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2007
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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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D. Acquisition Strategy

The Forward-based Radar (AN/TPY-2) project follows the Missile Defense Agency's (MDA's) capability-based acquisition strategy that emphasizes testing, spiral development, and evolutionary acquisition through the use of two-year capability blocks. 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 Mechanical Steering Kit (MSK) is an enhancement to the AN/TPY-2 Basic program and is not a separate contract. 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 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. The contract is an IDIQ Task Order contract. The 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.

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis							Date February 2007			
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 2007 Cost	FY 2007 Award/ Oblg Date	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	84,690	86,864	1Q	0	N/A	0	N/A	171,554
AN/TPY-2 #3 Manufacture										
AN/TPY-2 #3 Manufacture	SS/CPAF	Raytheon /MA	46,519	5,355	1Q	0	N/A	0	N/A	51,874
Deployment/Site Prep and Activation										
Deployment/Site Prep/Activation	SS/CPAF	Raytheon /MA	16,951	17,716	1/2Q	0	N/A	0	N/A	34,667
Deployment Support/Transportation	MIPR	VAFB /CA	0	2,099	1Q	0	N/A	0	N/A	2,099
Communication Shelter for Radar	MIPR	DISA /VA	23,255	0	N/A	0	N/A	0	N/A	23,255
Operations and Support (Sustainment)										
Deployed Site Operations/Depot Support/ Spares	SS/CPAF	Raytheon /MA	33,157	50,315	1Q	70,603	1Q	63,924	1Q	217,999
Base Support Services	MIPR	US Military	0	540	1/3Q	1,084	1/2Q	1,110	1/2Q	2,734
Generator Fuel	MIPR	USAPACOM / CA	0	3,759	1Q	3,882	1Q	3,979	1Q	11,620
Warfighter Support	MIPR	TBD	0	0	N/A	1,084	2/3Q	2,221	1/2Q	3,305
International Transport	MIPR	TRANSOM /CA	0	1,017	N/A	2,168	1Q	1,222	1/2Q	4,407
BMSM Manager Support	MIPR	SMDC /AL	374	1,491	1Q	0	N/A	0	N/A	1,865
Electrical Power Grid Upgrade/ Comm Service		TBD	0	108	1/4Q	1,673	1Q	125	1/2Q	1,906
ESL Management / Equipment Installation at VAFB	MIPR	JNIC /CO	368	0	N/A	0	N/A	0	N/A	368

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis							Date February 2007			
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 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
AN/TPY-2 #2 Communications O&S		DISA / VA	0	0	N/A	8,529	1Q	16,600	1Q	25,129
UEWR/Cobra Dane Sustainment	SS/CPAF	Boeing / VA, AL, MA	0	0	N/A	44,900	1Q	0	N/A	44,900
AN/TPY-2 #2 Security	C/CPFF	Chenega-Blackwater / AK, NC, VA	0	14,488	N/A	12,478	1/2Q	12,365	1/3Q	39,331
AN/TPY-2 #3 Security		TBD	0	0	N/A	22,524	1/2Q	23,000	1/3Q	45,524
AN/TPY-2 #3 Security O&S		TBD	0	0	N/A	333	1/2Q	18,400	1/3Q	18,733
EO/IR Sensors										
AIRS Prime Contractor	SS/CPFF	L3/Aeromet / OK	3,388	1,365	1Q	0	N/A	0	N/A	4,753
Analysis / Technical Engineering and Testing Support	FFRDC	JHU-APL, MIT/LL / MD, MA	640	160	1Q	0	N/A	0	N/A	800
Mission Operations	MIPR	Kirtland AFB / NM	275	200	1Q	0	N/A	0	N/A	475
Technical Support	C/FFP	CSC /VA	474	75	1Q	0	N/A	0	N/A	549
AN/TPY-2 #5 Manufacture										
Long-lead Material	SS/CPAF	Raytheon /MA	6,261	0	N/A	0	N/A	0	N/A	6,261
AN/TPY-2 #6 Manufacture										
Long-lead Material	SS/CPAF	Raytheon /MA	3,224	0	N/A	0	N/A	0	N/A	3,224
External Sensors										
Live Test Support	MIPR	NASIC /OH	1,125	0	N/A	0	N/A	0	N/A	1,125
Analysis, Systems Engineering		JNIC, SMC-ISP, Aerospace Corp /CO, CA	1,114	0	N/A	0	N/A	0	N/A	1,114
AN/TPY-2 Risk Reduction Test-Bed (TPS-X)										

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date February 2007
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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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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
TPS-X Operations and Support	SS/CPAF	Raytheon /MA	4,356	0	N/A	0	N/A	0	N/A	4,356
TPS-X Testing and Evaluation Support	FFRDC	MIT-LL / MA	4,600	0	N/A	0	N/A	0	N/A	4,600
Range Support	MIPR	PMRF /HI	275	0	N/A	0	N/A	0	N/A	275
Subtotal Product Development			231,046	185,552		169,258		142,946		728,802

Remarks

II. Support Costs Cost (\$ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	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	909	2,057	1Q	0	N/A	0	N/A	2,966
Business Operations Support Services	C/FFP	Northrop Grumman /VA	1,153	1,295	1Q	0	N/A	0	N/A	2,448
Engineering Technical Support	C/FFP	CSC /VA	1,346	1,808	1Q	0	N/A	0	N/A	3,154
Sensors Technical Oversight / Performance Analysis	FFRDC	MIT-LL, MITRE, APL / MA, VA, MD	3,823	3,690	1Q	0	N/A	0	N/A	7,513
AN/TPY-2 #3 Manufacture										
Civilian Salaries / Travel / Support		MDA /VA	493	127	1Q	0	N/A	0	N/A	620
Technical / Business Operations Support Services	C/FFP	CSC, Northrop Grumman /VA	1,354	191	1Q	0	N/A	0	N/A	1,545
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA,MA, MD	2,073	227	1Q	0	N/A	0	N/A	2,300

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis							Date February 2007			
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 2007 Cost	FY 2007 Award/Oblg Date	FY 2008 Cost	FY 2008 Award/Oblg Date	FY 2009 Cost	FY 2009 Award/Oblg Date	Total Cost
Deployment/Site Prep and Activation										
Civilian Salaries, Travel, Other Support		MDA /VA	439	469	1Q	0	N/A	0	N/A	908
Technical / Business Operations Support	C/FFP	CSC, Northrop Grumman /VA	1,206	708	1Q	0	N/A	0	N/A	1,914
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	1,845	842	1Q	0	N/A	0	N/A	2,687
Test & Evaluation										
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	87	1,766	1Q	0	N/A	0	N/A	1,853
Operations and Support (Sustainment)										
Civilian Salaries / Travel / Support		MDA /VA	359	1,698	1Q	0	N/A	0	N/A	2,057
Business Operations Support Services	C/FFP	Northrop Grumman, CSC / VA	987	2,562	1Q	0	N/A	0	N/A	3,549
Sensors Technical Oversight / Performance Analysis	FFRDC	MIT-LL, MITRE, JHU-APL / MA, VA, MD	1,510	3,046	1Q	0	N/A	0	N/A	4,556
AN/TPY-2 #5 Manufacture										
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	528	0	N/A	0	N/A	0	N/A	528
AN/TPY-2 #6 Manufacture										

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date February 2007
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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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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	272	0	N/A	0	N/A	0	N/A	272
External Sensors										
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL, / VA, MA, MD	189	0	N/A	0	N/A	0	N/A	189
AN/TPY-2 Risk Reduction Test-Bed (TPS-X)										
Technical Oversight / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	778	0	N/A	0	N/A	0	N/A	778
Subtotal Support Costs			19,351	20,486		0		0		39,837

Remarks

III. Test and Evaluation Cost (\$ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	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 /CA	563	1,017	1/4Q	0	N/A	0	N/A	1,580
Radar Testing	SS/CPAF	Raytheon /MA	343	15,811	1Q	0	N/A	0	N/A	16,154
Testing Site Support and Certification	MIPR	VAFB/ CA	129	508	1/4Q	0	N/A	0	N/A	637
Subtotal Test and Evaluation			1,035	17,336		0		0		18,371

Remarks

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Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile	Date February 2007
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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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Fiscal Year	2006				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	1	2	3	4
Acquisition Milestones																																
AN/TPY-2 #2 Site Construction		▲					△																									
Studies & Analyses																																
Perform Sensor Architecture Analysis	▲							▲																								
Testing Milestones																																
AN/TPY-2 #3 Integration with BMDS at VAFB							△	△																								
Deployment/Site Prep/ Activation																																
Conduct Overseas Site Surveys for AN/TPY-2 #2	▲	▲	▲																													
Complete AN/TPY-2 #2 Checkout			▲				△																									
Program Milestones																																
AN/TPY-2 #2 Operational			▲																													
Studies & Analysis																																
Evaluate Forward-Based Algorithms (TPS-X)	▲	▲	▲																													

Legend	
▲	Significant Event (complete)
★	Milestone Decision (complete)
◆	Element Test (complete)
▼	System Level Test (complete)
▲▲	Complete Activity
▲	Significant Event (planned)
★	Milestone Decision (planned)
◆	Element Test (planned)
▼	System Level Test (planned)
▲▲	Planned Activity

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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Acquisition Milestones								
AN/TPY-2 #2 Site Construction	2Q	3Q						
Studies & Analyses								
Evaluate Forward-Based Algorithms (TPS-X)	1Q-4Q							
Perform Sensor Architecture Analysis	1Q	4Q						
Development Milestones								
Develop Op Mission Plan & Search Profile Tool	1Q-4Q							
Manufacture AN/TPY-2 #3 Hardware	1Q-4Q	1Q						
Testing Milestones								
GT 04-1a AN/TPY-2 #2	1Q							
GT 04-2a (Phase 1) AN/TPY-2 #2	1Q							
Integrated and Distributed Ground Testing	1Q-4Q	1Q-4Q						
GT04 -2a (Phase 2) AN/TPY-2 #2	2Q							
AN/TPY-2 #3 Integration with BMDS at VAFB		2Q-4Q						
GT-193 AN/TPY-2 #3		2Q						
GT-194 AN/TPY-2 #3		3Q						
GT-195 AN/TPY-2 #3		4Q						
Missile Defense Integrated Exercises (MDIE)		4Q						
GT 04-2a (Phase 3)	2Q-3Q							
GT 04-2a (Phase 4)	3Q-4Q							
GTI-01	3Q-4Q							
GTD-01	4Q	1Q						
FTX-02		2Q						
Deployment/Site Prep/ Activation								
AN/TPY-2 #2 Site Construction	1Q-3Q							
Conduct Overseas Site Surveys for AN/TPY-2 #2	1Q-3Q							
Complete AN/TPY-2 #2 Site Design	1Q	2Q						
Complete AN/TPY-2 #2 Checkout	4Q	4Q						
AN/TPY-2 #3 Site Construction		2Q-4Q						
Operation & Sustainment								
AN/TPY-2 #2 O&S	4Q	1Q-4Q	1Q-4Q	1Q-4Q				

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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
AN/TPY-2 #3 O&S		4Q	1Q-4Q	1Q-4Q				
AN/TPY-2 #5 O&S			4Q	1Q-4Q				
AN/TPY-2 #6 O&S				3Q-4Q				
Program Milestones								
AN/TPY-2 #2 Operational	4Q							
Studies & Analysis								
Evaluate Forward-Based Algorithms (TPS-X)	1Q-4Q							

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0911 Ballistic Missile Defense Radars Block 2008	27,568	274,913	543,680	506,892	160,553	195,337	0	0
RDT&E Articles Qty	0	0	0	2	0	0	0	0
<p><i>Note: During FY06 the FBX-T and THAAD radars were officially assigned the military designation of AN/TPY-2. The new nomenclature is as follows: AN/TPY-2 #1 (THAAD Engineering Manufacturing Development (EMD) #1); AN/TPY-2 #2 (FBX-T #1); AN/TPY-2 #3 (FBX-T #2); AN/TPY-2 #4 (THAAD EMD #2); AN/TPY-2 #5 (FBX-T #3) to THAAD for THAAD use; and AN/TPY-2 #6 (FBX-T #4). THAAD is covered under Program Element (PE) 0603881C.</i></p> <p><u>A. Mission Description and Budget Item Justification</u></p> <p>The Ballistic Missile Defense Radar Block 2008 (Project 0911) will continue 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 will improve the BMDS ability to detect, track and engage ballistic missiles in all phases of flight.</p> <p>FY08 Block 2008 funding reflects the continued hardware production efforts of AN/TPY-2 #5 & #6, forward-based radar software enhancements, Mechanical Steering Kit (MSK) development, and the Thule Early Warning Radar (EWR) upgrade.</p> <p>Block 2008 includes delivery of AN/TPY-2 #5 & #6. AN/TPY-2 #5 is planned for delivery to the THAAD Program for their use. AN/TPY-2 #6 will be deployed overseas to expand the BMDS forward-based radar coverage. Development of MSKs will extend the AN/TPY-2's tracking and discrimination coverage, decrease the sensor gaps, and enhance the BMDS performance by adding slewing capability. The MSKs will allow retrofitting with any AN/TPY-2 radar. BMDS-level testing includes flight tests, ground tests, and wargames. This effort also provides for modeling and simulation capabilities and hardware in the loop (HWIL) facilities.</p> <p>The Thule EWR upgrade will be completed in FY09 and will be identical to the upgrades at Beale AFB, CA and RAF Fylingdales, UK. The upgrade maintains a common configuration with the Beale and RAF Fylingdales upgrades.</p> <p>Contractor Logistics Support (CLS) will be provided to deploy, operate, and sustain the AN/TPY-2 forward-based radars.</p>								

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2007
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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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The Beale and Fylingdales EWRs located at Beale Air Force Base (AFB) and RAF Fylingdales, UK respectively, will complete their upgrades to the UEWR configuration in FY08. These upgrades include hardware and software modifications that enhance capabilities and integrate these UEWRs into the BMDS Sensors Architecture. Effort prior to FY08 was accomplished under the BMD Midcourse Defense program element (0603882C).

B. Accomplishments/Planned Program

	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 Basic Program (Block 2008 Enhancements)	6,066	41,554	169,747	148,366
RDT&E Articles (Quantity)	0	0	0	0

The AN/TPY-2 Basic program includes software upgrades to support Block 2008 Engagement Sequence Groups (ESGs) and common software (FY07-FY09) that will support both the AN/TPY-2 and the THAAD radar missions. This effort also includes FY08 thru FY09 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.

The Mechanical Steering Kit (MSK) is designed to support and elevate the AN/TPY-2 Antenna Equipment and Electronic Equipment Units. The MSK provides the AN/TPY-2 with real-time slewing in both azimuth and elevation, and significantly increases the radar's real-time performance capabilities. This task consists of the MSK design, fabrication, assembly, test, software development and test, and integration and deployment with the AN/TPY-2.

FY06 Accomplishments:

- MSK concept development
- MSK requirements review

FY07 Planned Program:

- Continue CR-2 Development
- Begin AN/TPY-2 software Capability Release 3 (CR-3) development
- Complete AN/TPY-2 CR-3 Software Requirements Review (SRR)
- Conduct MSK hardware and software design reviews

FY08 Planned Program:

- Complete AN/TPY-2 software Capability Release 2 (CR-2) Acceptance testing

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification			Date February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		R-1 NOMENCLATURE 0603884C Ballistic Missile Defense Sensors		
<ul style="list-style-type: none"> • Integrate CR-2 software into fielded radars • Complete CR-3 Critical Design Review (CDR) • Continue software CR-3 development • Begin MSK hardware fabrication • Continue MSK software development • Complete site integration and testing with BMDS at Vandenberg AFB, CA <p>FY09 Planned Program:</p> <ul style="list-style-type: none"> • Deliver MSK for system test and integration with AN/TPY-2 forward-based radar • Provide CR-3 software and engineering support during BMDS system integration and testing • Complete AN/TPY-2 software CR-3 Qualifications Testing 				
	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 #5 Manufacture	11,348	87,711	11,270	3,230
RDT&E Articles (Quantity)	0	0	0	1
<p>This effort includes the material, labor, engineering and management support for production of AN/TPY-2 #5. This radar provides the BMD System with a forward-based capability and extends the sensor coverage.</p> <p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> • Completed manufacture of Transmit/Receive Modules (TRMs) for AN/TPY-2 #5 • Additional manufacture effort captured in Block 2006 <p>FY07 Planned Program:</p> <ul style="list-style-type: none"> • Complete production and assembly of Transmit/Receive Integrated Microwave Modules (TRIMMs) for AN/TPY-2 #5 • Continue AN/TPY-2 #5 hardware production and integration • Begin Near Field Range (NFR) testing of AN/TPY-2 #5 <p>FY08 Planned Program:</p> <ul style="list-style-type: none"> • Complete NFR testing of AN/TPY-2 #5 				

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification			Date February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		R-1 NOMENCLATURE 0603884C Ballistic Missile Defense Sensors		
<ul style="list-style-type: none"> • Complete factory integration and testing <p>FY09 Planned Program: RDT&E Article: Acquisition of AN/TPY-2 #5 initiated in FY05 for delivery in FY09</p> <ul style="list-style-type: none"> • Transfer AN/TPY-2 #5 to THAAD for THAAD use 				
	FY 2006	FY 2007	FY 2008	FY 2009
Deployment / Site Preparation / Activation	0	0	64,407	44,679
RDT&E Articles (Quantity)	0	0	0	0
<p>The AN/TPY-2 radar will be deployed to a site located near expected missile threats. The Block 2008 effort includes deployment of AN/TPY-2 #3 (manufactured in Block 2006) and preliminary deployment planning for AN/TPY-2 #6. The Deployment/Site Preparation/Activation effort includes planning and coordination with Host Nation and Combatant Commanders (COCOMs), radar site design, site construction, transport of the radar to the overseas site, radar setup, calibration, and activation. This effort also includes deployment preparations and site activation.</p> <p>FY08 Planned Program:</p> <ul style="list-style-type: none"> • Complete AN/TPY-2 #3 site design • Initiate AN/TPY-2 #3 site construction • Deploy AN/TPY-2 #3 forward-based radar overseas • Begin setup and checkout of AN/TPY-2 #3 along with C2BMC communications equipment • Begin initial site planning and develop facility requirements for AN/TPY-2 #6 • Conduct site surveys for AN/TPY-2 #6 overseas site • Develop and generate operational mission plans and search profiles for AN/TPY-2 #3 deployed site • Sustain operations at VAFB to include: training Contractor Logistics Support (CLS) team, and preparation for AN/TPY-2 #6 deployment <p>FY09 Planned Program:</p> <ul style="list-style-type: none"> • Complete operational checkout of AN/TPY-2 #3 with the BMDS • Complete AN/TPY-2 #3 site construction • Conduct site surveys for AN/TPY-2 #6 overseas site • Begin AN/TPY-2 #6 site design 				

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APPROPRIATION/BUDGET ACTIVITY		R-1 NOMENCLATURE		
RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		0603884C Ballistic Missile Defense Sensors		
	FY 2006	FY 2007	FY 2008	FY 2009
Test & Evaluation	0	0	45,805	82,225
RDT&E Articles (Quantity)	0	0	0	0
<p>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.</p> <p>FY08 Planned Program:</p> <ul style="list-style-type: none"> • Conduct AN/TPY-2 CR verification testing at VAFB, including integration with C2BMC • 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 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 #4 • Complete development, installation, and testing the Missile Defense System Exerciser 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 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 <p>FY09 Planned Program:</p> <ul style="list-style-type: none"> • Plan and execute radar testing, including test site support, during TOO flight tests • Plan and conduct TOO flight tests with the ESL 				

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APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		R-1 NOMENCLATURE 0603884C Ballistic Missile Defense Sensors		
<ul style="list-style-type: none"> • 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 #4 and the Mechanical Steering Kit • 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 UEWB for BMDS wargames, and C2BMC cycle testing 				
	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 #6 Manufacture	4,602	69,561	49,339	28,548
RDT&E Articles (Quantity)	0	0	0	0
<p>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. This radar provides the BMD System with a forward based capability and extends the sensor coverage.</p> <p>FY06 Accomplishments:</p> <ul style="list-style-type: none"> • Continued AN/TPY-2 #6 hardware production • Completed the manufacturing of Monolithic Microwave Integrated Circuits (MMICs) for AN/TPY-2 #6 • Began manufacturing of Transmit/Receive Integrated Microwave Modules (TRIMMs) for AN/TPY-2 #6 • Additional FY06 effort is captured in Block 2006 <p>FY07 Planned Program:</p> <ul style="list-style-type: none"> • Continue AN/TPY-2 #6 hardware production • Complete manufacture of Transmit/Receive Integrated Microwave Modules (TRIMMs) for AN/TPY-2 #6 • Begin hardware integration for AN/TPY-2 #6 <p>FY08 Planned Program:</p> <ul style="list-style-type: none"> • Complete production and assembly of Transmit/Receive Integrated Modules (TRIMMs) for AN/TPY-2 #6 • Continue AN/TPY-2 #6 hardware production and integration • Begin Near Field Range (NFR) testing of AN/TPY-2 #6 				

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FY09 Planned Program:

- Complete AN/TPY-2 #6 factory integration and testing
- Deliver AN/TPY-2 #6 radar to Vandenberg AFB for system integration and testing with the BMDS

	FY 2006	FY 2007	FY 2008	FY 2009
Thule Early Warning Radar	150	76,087	77,267	79,164
RDT&E Articles (Quantity)	0	0	0	1

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.

FY06 Accomplishments:

- Program transferred from BMD Midcourse Defense (PE 0603882C) to BMD Sensors (0603884C)
- Approved Acquisition Plan
- Awarded Thule Upgrade contract to Raytheon
- Initiated Boeing contract mod for integration into BMDS

FY07 Planned Program:

- Continue development of hardware and software upgrade
- Begin modifications to Early Warning Radar facility
- Begin upgrades to SATCOM system

FY08 Planned Program:

- Complete UEWR Facility modifications

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- Begin hardware and software installation
- Initiate BMDS Communications Room upgrade

FY09 Planned Program:

- Conduct BMDS Integration testing
- Complete hardware and software installations
- Complete Thule UEWR development test and evaluation
- Conduct Force Developers Evaluation

	FY 2006	FY 2007	FY 2008	FY 2009
Operations and Support (Sustainment)	5,402	0	0	0
RDT&E Articles (Quantity)	0	0	0	0

MDA uses the Contractor Logistics Support (CLS) for the overseas operation/sustainment and depot level logistics support for AN/TPY-2 #2. 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. Provides 24x7 sustainment for AN/TPY-2 #3 BMDS Communication Support Complex - Transportable, OCONUS beginning in FY10. Provides forty (40) hour per week sustainment of the European Midcourse Radar (EMR) in EUCOM Area of Responsibility (AOR) beginning in FY11.

FY06 Accomplishments:

- Provided support to AN/TPY-2 #2 in Japan via the CLS
- Additional sustainment effort is captured in Block 2006

	FY 2006	FY 2007	FY 2008	FY 2009
Sensor Communications	0	0	101,763	120,680
RDT&E Articles (Quantity)	0	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 AN-TPY-2 #2, 3, and 6 sites. 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

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(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.

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

	FY 2006	FY 2007	FY 2008	FY 2009
Upgraded Early Warning Radar (UEWR)/Cobra Dane	0	0	24,082	0
RDT&E Articles (Quantity)	0	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. For UEWR, this program provides for hardware replacement of 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. Efforts prior to FY08 were accomplished under the BMD Midcourse Defense program element (0603882C).

FY08 Planned Program:

- Support COBRA DANE BMDS ground and flight tests
- Complete UEWR testing
- Complete UEWR Correction of Operator Identified Discrepancies

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- Complete UEWR Certification for Legacy Mission
- Support UEWR BMDS ground and flight testing

C. Other Program Funding Summary

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603175C Ballistic Missile Defense Technology	147,270	193,307	118,569	109,540	116,014	121,008	127,917	131,291	1,064,916
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,120,879	1,092,076	962,585	1,004,282	924,101	851,213	678,694	501,147	7,134,977
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,391,246	3,043,058	2,520,064	2,359,665	2,179,602	1,699,963	1,153,082	1,183,003	16,529,683
PE 0603883C Ballistic Missile Defense Boost Defense Segment	455,572	628,958	548,759	432,432	448,375	678,913	829,683	1,026,239	5,048,931
PE 0603886C Ballistic Missile Defense System Interceptors	200,446	356,004	227,499	393,317	522,388	730,236	836,029	570,206	3,836,125
PE 0603888C Ballistic Missile Defense Test and Targets	610,619	601,782	586,150	628,364	662,984	681,511	696,037	705,210	5,172,657
PE 0603889C Ballistic Missile Defense Products	387,402	0	0	0	0	0	0	0	387,402
PE 0603890C Ballistic Missile Defense System Core	409,993	429,420	482,016	511,147	558,746	579,571	579,316	588,481	4,138,690
PE 0603891C Special Programs - MDA	271,021	353,031	323,250	305,409	369,073	526,966	789,017	792,271	3,730,038
PE 0603892C Ballistic Missile Defense Aegis	893,040	1,122,669	1,059,103	1,129,425	1,221,650	1,067,587	1,054,753	1,089,078	8,637,305
PE 0603893C Space Tracking & Surveillance System	220,048	322,220	331,525	347,811	412,623	501,197	778,067	981,424	3,894,915
PE 0603894C Multiple Kill Vehicle	48,370	144,362	271,151	352,741	461,179	618,263	673,477	842,905	3,412,448
PE 0603895C BMD System Space Program	0	0	27,666	35,093	46,849	56,183	133,617	157,117	456,525
PE 0603896C BMD C2BMC	0	246,852	258,913	294,627	300,847	282,615	267,275	269,420	1,920,549
PE 0603897C BMD Hercules	0	49,674	53,658	54,264	54,405	55,142	53,355	54,198	374,696
PE 0603898C BMD Joint Warfighter Support	0	54,935	48,787	50,428	54,086	56,603	58,890	60,206	383,935
PE 0603904C BMD Joint National Integration Center (JNIC)	0	110,629	104,012	106,985	111,542	111,947	113,592	115,287	773,994
PE 0603905C BMD Concurrent Test and Operations	0	23,159	0	0	0	0	0	0	23,159
PE 0603906C Regarding Trench	0	0	2,000	3,000	5,000	5,000	9,000	9,000	33,000
PE 0605502C Small Business Innovative Research - MDA	133,105	0	0	0	0	0	0	0	133,105
PE 0901585C Pentagon Reservation	14,874	15,527	6,058	6,376	4,490	4,725	4,801	4,877	61,728
PE 0901598C Management Headquarters - MDA	98,609	87,059	85,906	86,453	70,355	69,855	69,855	69,855	637,947

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D. Acquisition Strategy

The Forward X-Band Radar-Transportable (AN/TPY-2) radar project will follow the Missile Defense Agency's (MDA's) capability-based acquisition strategy that emphasizes testing, spiral development, and evolutionary acquisition through the use of two-year capability blocks. 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 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.

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.

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

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.

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis							Date February 2007			
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 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
AN/TPY-2 Basic Program (Block 2008 Enhancements)										
Software Enhancements	SS/CPAF	Raytheon /MA	6,066	40,409	1Q	160,030	1Q	137,572	1Q	344,077
AN/TPY-2 #5 Manufacture										
AN/TPY-2 #3 Manufacture	SS/CPAF	Raytheon /MA	11,348	85,294	1Q	10,622	1Q	2,995	1Q	110,259
Deployment / Site Preparation / Activation										
AN/TPY-2 #5, 6 VAFB Operations and Support	SS/CPAF	Raytheon /MA	0	0	N/A	12,381	1Q	21,081	1Q	33,462
AN/TPY-2 #6 Fuel at VAFB and Maintain Site 460 at VAFB	MIPR	VAFB /CA	0	0	N/A	1,819	1Q	3,703	1Q	5,522
AN/TPY-2 #6 International Transport	MIPR	TRANSCOM / CA	0	0	N/A	0	N/A	3,483	1/2Q	3,483
AN/TPY-2 #6 Communications, and Electrical Power Installation	MIPR	US Military / TBD	0	0	N/A	0	N/A	4,936	1/2Q	4,936
AN/TPY-2 #3 Site Activation/Power	MIPR	MDA-DFW / AL	0	0	N/A	22,103	1Q	4,025	1Q	26,128
AN/TPY-2 #3 RDT&E Construction	MIPR	MDA-DFW / AL	0	0	N/A	24,400	1/2Q	4,200	1/2Q	28,600
AN/TPY-2 #6 Manufacture										
AN/TPY-2 #6 Manufacture	SS/CPAF	Raytheon /MA	4,602	67,644	1Q	46,502	1Q	26,471	1Q	145,219
Thule Early Warning Radar										
Prime Contractor	SS/CPAF	Raytheon /MA	150	43,270	2Q	32,177	1Q	28,502	1Q	104,099
Survivable SATCOM	MIPR	DISA	0	7,380	1Q	9,571	1Q	16,172	1Q	33,123
Site Activation	MIPR	MDA-DFW /AL	0	2,140	1Q	3,297	1Q	4,609	1Q	10,046
Embedded Test, Engineering Services, GCN Connectivity, SSCO, Lab Upgrades	SS/CPAF	Boeing / CA, AL	0	7,000	1Q	9,956	1Q	10,938	1Q	27,894

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis							Date February 2007			
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 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Engineering Support, Beam Steering Circuit Cards	MIPR	OGA	0	3,666	1Q	9,997	1Q	10,685	1Q	24,348
Integration / Support	MIPR	850th ELSG / MA	0	1,844	1Q	1,724	1Q	2,498	1Q	6,066
RDT&E Construction	SS/CPAF	Raytheon /MA	0	8,746	1Q	6,102	1Q	0	N/A	14,848
Operations and Support (Sustainment)										
AN/TPY-2 Support	SS/CPAF	Raytheon /MA	5,402	0	N/A	0	N/A	0	N/A	5,402
Sensor Communications										
AN/TPY-2 #2 Communications	MIPR	DISA / VA	0	0	N/A	28,018	1/4Q	45,523	1/4Q	73,541
Thule - Super Communications Room Addition	MIPR	DISA /VA	0	0	N/A	3,296	1/2Q	2,100	1/2Q	5,396
AN/TPY-2 #3 Deploy/Act/Checkout PCCS-T	MIPR	PM DCATS / VA	0	0	N/A	7,900	1Q	7,550	1Q	15,450
AN/TPY-2 #3 Deploy/Act/Checkout SATCOM	MIPR	PM DCATS / VA	0	0	N/A	17,050	1Q	10,400	1Q	27,450
AN/TPY-2 #3 Deploy/Act/Checkout Fiber Optics	SS/FP	DISA / VA	0	0	N/A	7,000	1Q	4,000	1Q	11,000
AN/TPY-2 #3 Deploy/Act/Checkout Power	MIPR	NAVSEA / VA	0	0	N/A	4,960	1Q	4,300	1Q	9,260
AN/TPY-2 #3 Deploy/Act/Checkout US Comms	MIPR	PM DCATS / VA	0	0	N/A	9,690	1Q	9,250	1Q	18,940
AN/TPY-2 #3 Deploy/Act/Checkout Support	MIPR	DISA / VA	0	0	N/A	350	1Q	1,950	1Q	2,300
AN/TPY-2 #3 Deploy/Act/Checkout Support (MDNTB)	MIPR	MDA / VA	0	0	N/A	8,275	1Q	8,250	1Q	16,525

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date February 2007
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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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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
AN/TPY-2 #6 PCCS-T	MIPR	PM DCATS	0	0	N/A	4,492	1Q	6,095	1Q	10,587
AN/TPY-2 #6 SATCOM	MIPR	PM DCATS	0	0	N/A	5,717	1Q	10,615	N/A	16,332
AN/TPY-2 #6 Power	MIPR	NAVSEA	0	0	N/A	4,799	1Q	4,084	1Q	8,883
AN/TPY-2 #6 Support	MIPR	DISA	0	0	N/A	103	1Q	1,818	1Q	1,921
AN/TPY-2 #6 Support (MDNTB)	MIPR	MDA	0	0	N/A	113	1Q	4,745	1Q	4,858
Upgraded Early Warning Radar (UEWR)/Cobra Dane										
UEWR Development	SS/CPAF	Boeing / AL, AK, AZ, CA, CO, TX, VA	0	0	N/A	22,698	1Q	0	N/A	22,698
Subtotal Product Development			27,568	267,393		475,142		402,550		1,172,653

Remarks

II. Support Costs Cost (\$ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
AN/TPY-2 Basic Program (Block 2008 Enhancements)										
Civilian Salaries / Travel / Other Support		MDA /VA	0	266	1Q	2,080	1Q	2,237	1Q	4,583
Business Operations Support Services	C/FFP	Northrop Grumman /VA	0	168	1Q	1,418	1Q	1,557	1Q	3,143
Engineering Technical Support	C/FFP	CSC /VA	0	234	1Q	2,032	1Q	2,255	1Q	4,521
Sensors Technical Oversight / Performance Analysis	FFRDC	MIT-LL, MITRE, JHU-APL / MA, VA, MD	0	477	1Q	4,187	1Q	4,745	1Q	9,409

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis							Date February 2007			
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 2007 Cost	FY 2007 Award/ Oblg Date	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	0	2,417	1/2Q	648	1/2Q	235	1/2Q	3,300
Deployment / Site Preparation / Activation										
Civilian Salaries / Travel / Other Support		MDA / VA	0	0	N/A	793	1Q	674	1Q	1,467
Technical / Business Operations Support Services	C/FFP	CSC, NG / VA	0	0	N/A	1,315	1Q	1,148	1Q	2,463
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	0	0	N/A	1,596	1Q	1,429	1Q	3,025
Test & Evaluation										
Civilian Salaries / Travel / Other Support		MDA / VA	0	0	N/A	564	1Q	1,240	1Q	1,804
Technical / Business Operations Support Services	C/FFP	CSC, NG / VA	0	0	N/A	935	1Q	2,113	1Q	3,048
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	0	0	N/A	1,135	1Q	2,630	1Q	3,765
AN/TPY-2 #6 Manufacture										
Civilian Salaries / Travel / Support		MDA / VA	0	445	1Q	607	1Q	430	1Q	1,482
Technical / Business Operations Support	C/FFP	CSC, NG / VA	0	672	1Q	1,007	1Q	734	4Q	2,413
Technical Oversight / Performance Analysis	FFRDC	MITRE, MIT-LL, JHU-APL / VA, MA, MD	0	800	1Q	1,223	1Q	913	1Q	2,936

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date February 2007
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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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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Thule Early Warning Radar										
Civilian Salaries / Travel / Other Support		MDA / VA	0	474	1Q	951	1Q	1,194	1Q	2,619
Technical / Business Operations Support Services	C/FFP	CSC, NG / VA	0	716	1Q	1,577	1Q	2,034	1Q	4,327
Technical Oversight / Performance Analysis	FFRDC	MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	0	851	1Q	1,915	1Q	2,532	1Q	5,298
Upgraded Early Warning Radar (UEWR)/Cobra Dane										
Technical Support / Oversight / Analysis Support		MDA, NG, CSC, MITRE, MIT-LL, JHU-APL / VA, MA, MD	0	0	N/A	1,384	1Q	0	N/A	1,384
Subtotal Support Costs			0	7,520		25,367		28,100		60,987

Remarks

III. Test and Evaluation Cost (\$ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Test & Evaluation										
Radar Test Planning / Preparation	SS/CPAF	Raytheon, MDA/ MA, VA	0	0	N/A	37,563	1/3Q	70,469	1/3Q	108,032
Qualification Demonstration, Sustain Dual Role for THAAD	SS/CPAF	Lockheed Martin/AL, CA	0	0	N/A	1,937	1/4Q	1,965	1/4Q	3,902

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date February 2007
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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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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
FBX-T Host Tenant Agreement	MIPR	VAFB /CA	0	0	N/A	524	1Q	544	1Q	1,068
Operational Test Agency Support	MIPR	OTA / CA, AL	0	0	N/A	2,098	1Q	2,176	1Q	4,274
Government Testing Oversight	MIPR	NSWC-PHD / CA	0	0	N/A	1,049	1Q	1,088	1Q	2,137
Subtotal Test and Evaluation			0	0		43,171		76,242		119,413

Remarks

IV. Management Services Cost (\$ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	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			27,568	274,913		543,680		506,892		1,353,053
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Remarks

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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Acquisition Milestones								
Thule Upgrade Contract Award	3Q							
Studies & Analysis								
Perform Sensor Architecture Analysis	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q				
Evaluate Advanced Algorithms			1Q-4Q	1Q-4Q				
Integrate Adv Algorithms			1Q-4Q	1Q-4Q				
Development Milestones								
Manufacture AN/TPY-2 #5 Hardware	1Q		1Q					
Manufacture AN/TPY-2 #6 Hardware	1Q			1Q				
Thule Facility Design Complete		3Q						
Develop MSK		3Q-4Q	1Q-4Q	1Q-3Q				
AN/TPY2 Hardware Integration & Test Complete			1Q					
Deliver AN/TPY2 Blk 08 Software for System Test			1Q					
Upgrade AN/TPY 2 HWIL Facility (Blk 08 Capability)			1Q-4Q					
Develop Models & Simulations for RDSIS			1Q-4Q					
Manufacture MSK			1Q-4Q	1Q-4Q				
Thule Hardware & Software Installation			2Q-4Q					
Complete AN/TPY-2 #5 Acceptance Testing			4Q					
AN/TPY-2 #6 HW Integration & Test Complete				1Q				
Testing Milestones								
AN/TPY-2 #5 Integration with BMDS at VAFB			1Q-4Q					
Integration & Distrib Ground Test AN/TPY-2 #5			1Q-4Q					
TOO Flight Test AN/TPY-2 #5			1Q-4Q					
AN/TPY-2 #6 Integration with BMDS				1Q-4Q				
Integration & Distrib Ground Test AN/TPY-2 #6				1Q-4Q				
TOO Flight Testing AN/TPY-2 #6				1Q-4Q				
Thule DT&E				2Q-4Q				
MSK Integration into AN/TPY-2 and BMDS				3Q-4Q				
Missile Defense Integration Exercise				3Q-4Q				
Thule Certification				4Q				

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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Integ & Distrib Ground Test MSK				3Q-4Q				
TOO Flight Testing MSK				3Q-4Q				
Deployment/Site Prep/ Activation								
Conduct Overseas Site Activation for AN/TPY-2 #3			1Q-4Q	1Q-2Q				
AN/TPY-2 #3 Site Design & Construction			1Q-4Q	1Q-4Q				
AN/TPY-2 #6 Deployment Planning			1Q-4Q	1Q-2Q				
AN/TPY-2 #6 Site Design & Construction				1Q-4Q				
AN/TPY-2 #3 Comms Fiber Optics		4Q	1Q-4Q	1Q-4Q				
AN/TPY-2 #3 Comms Power		4Q	1Q-4Q	1Q-4Q				
AN/TPY-2 #3 PCCS-T		4Q	1Q-4Q	1Q-4Q				
AN/TPY-2 #3 SATCOM		3Q-4Q	1Q-4Q	1Q-3Q				
AN/TPY-2 #3 US Comms		4Q	1Q-4Q	1Q-4Q				
AN/TPY-2 #6 Comms Power		4Q	1Q-4Q	1Q-2Q				
AN/TPY-2 #6 PCCS-T		4Q	1Q-4Q	1Q				
AN/TPY-2 #6 SATCOM		4Q	1Q-4Q	1Q-2Q				
Operation & Sustainment								
AN/TPY-2 #2 O&S					1Q-4Q	1Q-4Q		
AN/TPY-2 #3 O&S					1Q-4Q	1Q-4Q		
AN/TPY-2 #6 O&S					1Q-4Q	1Q-4Q		
Program Milestones								
AN/TPY-2 #3 Operational			4Q	2Q				

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification						Date February 2007		
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APPROPRIATION/BUDGET ACTIVITY				R-1 NOMENCLATURE				
RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)				0603884C Ballistic Missile Defense Sensors				

COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0011 Ballistic Missile Defense Radars Block 2010	0	7,030	45,031	310,007	660,831	423,722	265,919	270,345
RDT&E Articles Qty	0	0	0	0	0	0	0	0

Note: During FY06 the FBX-T and THAAD radars were officially assigned the military designation of AN/TPY-2. The new nomenclature is as follows: AN/TPY-2 #1 (THAAD Engineering Manufacturing Development (EMD) #1); AN/TPY-2 #2 (FBX-T #1); AN/TPY-2 #3 (FBX-T #2); AN/TPY-2 #4 (THAAD EMD #2); AN/TPY-2 #5 (FBX-T #3) to THAAD for THAAD use; and AN/TPY-2 #6 (FBX-T #4). THAAD is covered under Program Element (PE) 0603881C.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Radar Block 2010 (Project 0011) will continue the spiral development to enhance and expand on the sensor capabilities provided 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 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.

The Sensor PE in Block 2010 provides for the production and fielding of additional Mechanical Steering Kits (MSKs) to enhance AN/TPY-2 performance. It also provides for the upgrade and deployment of the European Midcourse Radar (EMR), formerly known as the Ground Based Radar-Prototype (GBR-P), to Europe.

Expanding the layered sensor architecture will improve 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 Sensor Program Element (PE) uses an External Sensors Laboratory (ESL) 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.

This effort provides for modeling and simulation capabilities and hardware-in-the-loop (HWIL) facilities. BMDS-level testing including flight tests, ground tests and wargames.

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification			Date February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		R-1 NOMENCLATURE 0603884C Ballistic Missile Defense Sensors		
<u>B. Accomplishments/Planned Program</u>				
	FY 2006	FY 2007	FY 2008	FY 2009
AN/TPY-2 Basic Program (Block 2010 Enhancements)	0	0	14,449	64,247
RDT&E Articles (Quantity)	0	0	0	0
<p>The AN/TPY-2 Basic program includes software upgrades to support Block 2010 Engagement Sequence Groups (ESGs), discrimination database enhancements, and common software that will support both the AN/TPY-2 forward-based radar and the THAAD radar missions. This software Capability Release (CR) will be delivered prior to the end of Block 2010. FY08 thru FY09 funding supports software requirements definition and development of Block 2010 enhancements. This effort also supports Block 2010 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.</p> <p>The AN/TPY-2 Basic Program for Block 2010 also includes the acquisition of Mechanical Steering Kits (MSKs). The MSK is designed to support and elevate the AN/TPY-2 Antenna Equipment and Electronic Equipment Units. The MSK provides the AN/TPY-2 with real-time slewing in both azimuth and elevation, and significantly increases the radar's real-time performance capabilities. MSK can be retrofitted onto any AN/TPY-2 radar.</p> <p>FY08 Planned Program:</p> <ul style="list-style-type: none"> • Begin AN/TPY-2 Block 2010 software development • Complete Block 2010 AN/TPY-2 software Preliminary Design Review (PDR) <p>FY09 Planned Program:</p> <ul style="list-style-type: none"> • Begin Block 2010 MSK production efforts • Continue Block 2010 software development 				
	FY 2006	FY 2007	FY 2008	FY 2009
Deployment / Site Preparation / Activation	0	0	0	12,671
RDT&E Articles (Quantity)	0	0	0	0
<p>The Block 2010 Deployment/Site Preparation/Activation effort is a continuation of Block 2008 preliminary efforts for AN/TPY-2 #6 forward-based radar. This includes planning and coordination with host nation and Combatant Commanders (COCOMs), site surveys, radar site design, site construction, transfer of the radar and communications equipment to overseas site, radar calibration and activation, and radar integration with C2BMC.</p>				

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification			Date February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		R-1 NOMENCLATURE 0603884C Ballistic Missile Defense Sensors		
<p>FY09 Planned Program:</p> <ul style="list-style-type: none"> • Complete AN/TPY-2 #6 site selection • Begin AN/TPY-2 #6 site design 				
	FY 2006	FY 2007	FY 2008	FY 2009
External Sensors	0	7,030	7,821	22,113
RDT&E Articles (Quantity)	0	0	0	0
<p>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.</p> <p>FY07 Planned Program:</p> <ul style="list-style-type: none"> • Evaluate algorithms for operational utility to the BMDS • Investigate new sensor techniques and develop algorithms to utilize capability in the BMDS • Demonstrate utility of cueing forward-based radar and providing information to C2BMC • Provide support and maintenance for the ESL operations • Develop algorithm to improve performance in all phase of flight • Support Joint National Integration Center (JNIC) and lab accreditation <p>FY08 Planned Program:</p> <ul style="list-style-type: none"> • Develop acquisition strategy for operationalizing forward-based cueing capability • Develop new data feeds to ESL for new ONIR sensors <p>FY09 Planned Program:</p> <ul style="list-style-type: none"> • Begin Operationalization of External Sensors Capability • Continue 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 				

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification			Date February 2007	
APPROPRIATION/BUDGET ACTIVITY		R-1 NOMENCLATURE		
RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)		0603884C Ballistic Missile Defense Sensors		
<ul style="list-style-type: none"> Initiate acquisition for hardware upgrade for JNIC lab 				
	FY 2006	FY 2007	FY 2008	FY 2009
European Midcourse Radar (EMR) Upgrade	0	0	14,562	188,616
RDT&E Articles (Quantity)	0	0	0	0
<p>European Midcourse Radar (EMR), formerly known as the Ground Based Radar-Prototype (GBR-P), is a large, steerable, X-band phased array radar currently located at Kwajalein Missile Range (KMR), Kwajalein Atoll. EMR will be 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. The Deployment/Site Preparation/Activation efforts begin in FY08. Site construction includes permanent radar facilities, communications facilities, power facilities, security infrastructure, and personnel support facilities.</p> <p>FY08 Planned Program:</p> <ul style="list-style-type: none"> 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 <p>FY09 Planned Program:</p> <ul style="list-style-type: none"> Complete hardware upgrade build Test in-plant upgrade equipment Disassemble radar at KMR and ship upgrade equipment to site Reassemble radar and install hardware upgrade Award construction contract and initiate site construction Complete site selection Develop and generate operational mission plans and search profiles for deployed site 				

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2007
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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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	FY 2006	FY 2007	FY 2008	FY 2009
Sensor Communications	0	0	8,199	22,360
RDT&E Articles (Quantity)	0	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 BSCS is required to support the European Midcourse Radar (EMR).

FY08 Planned Program:

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

FY09 Planned Program:

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

C. Other Program Funding Summary

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603175C Ballistic Missile Defense Technology	147,270	193,307	118,569	109,540	116,014	121,008	127,917	131,291	1,064,916
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,120,879	1,092,076	962,585	1,004,282	924,101	851,213	678,694	501,147	7,134,977
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,391,246	3,043,058	2,520,064	2,359,665	2,179,602	1,699,963	1,153,082	1,183,003	16,529,683
PE 0603883C Ballistic Missile Defense Boost Defense Segment	455,572	628,958	548,759	432,432	448,375	678,913	829,683	1,026,239	5,048,931
PE 0603886C Ballistic Missile Defense System Interceptors	200,446	356,004	227,499	393,317	522,388	730,236	836,029	570,206	3,836,125
PE 0603888C Ballistic Missile Defense Test and Targets	610,619	601,782	586,150	628,364	662,984	681,511	696,037	705,210	5,172,657
PE 0603889C Ballistic Missile Defense Products	387,402	0	0	0	0	0	0	0	387,402

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2007
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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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	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603890C Ballistic Missile Defense System Core	409,993	429,420	482,016	511,147	558,746	579,571	579,316	588,481	4,138,690
PE 0603891C Special Programs - MDA	271,021	353,031	323,250	305,409	369,073	526,966	789,017	792,271	3,730,038
PE 0603892C Ballistic Missile Defense Aegis	893,040	1,122,669	1,059,103	1,129,425	1,221,650	1,067,587	1,054,753	1,089,078	8,637,305
PE 0603893C Space Tracking & Surveillance System	220,048	322,220	331,525	347,811	412,623	501,197	778,067	981,424	3,894,915
PE 0603894C Multiple Kill Vehicle	48,370	144,362	271,151	352,741	461,179	618,263	673,477	842,905	3,412,448
PE 0603895C BMD System Space Program	0	0	27,666	35,093	46,849	56,183	133,617	157,117	456,525
PE 0603896C BMD C2BMC	0	246,852	258,913	294,627	300,847	282,615	267,275	269,420	1,920,549
PE 0603897C BMD Hercules	0	49,674	53,658	54,264	54,405	55,142	53,355	54,198	374,696
PE 0603898C BMD Joint Warfighter Support	0	54,935	48,787	50,428	54,086	56,603	58,890	60,206	383,935
PE 0603904C BMD Joint National Integration Center (JNIC)	0	110,629	104,012	106,985	111,542	111,947	113,592	115,287	773,994
PE 0603905C BMD Concurrent Test and Operations	0	23,159	0	0	0	0	0	0	23,159
PE 0603906C Regarding Trench	0	0	2,000	3,000	5,000	5,000	9,000	9,000	33,000
PE 0605502C Small Business Innovative Research - MDA	133,105	0	0	0	0	0	0	0	133,105
PE 0901585C Pentagon Reservation	14,874	15,527	6,058	6,376	4,490	4,725	4,801	4,877	61,728
PE 0901598C Management Headquarters - MDA	98,609	87,059	85,906	86,453	70,355	69,855	69,855	69,855	637,947

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.

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 and an additional strategy will be developed for site construction efforts.

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.

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis								Date February 2007		
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 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
AN/TPY-2 Basic Program (Block 2010 Enhancements)										
AN/TPY-2 Basic Program Continuation	SS/CPAF	Raytheon / MA	0	0	N/A	14,449	1Q	62,058	1Q	76,507
Deployment / Site Preparation / Activation										
AN/TPY-2 #6 Site Activation		MDA-DFW / VA, AL	0	0	N/A	0	N/A	12,240	1/4Q	12,240
External Sensors										
Prime Contractor	SS/CPAF	Northrop Grumman / CA	0	3,741	1Q	3,943	1Q	5,115	1Q	12,799
Systems Engineering/Aerospace Analysis	FFRDC	MITRE / VA	0	865	1Q	861	1Q	885	1Q	2,611
Live Test Support / Algorithm Development & Analysis	MIPR	NASIC / OH	0	433	1/2Q	637	1/2Q	491	1/2Q	1,561
Analysis, Test Support, Aegis Support	MIPR	NSWC-DD / VA	0	538	1Q	534	1Q	488	1Q	1,560
External Sensor Lab Development, Integration, and Accreditation		Aerospace Corp, JHU-APL, JNIC, Raytheon, SMC-ISP/CA, MD, CO, MA	0	1,453	1Q	1,846	1Q	14,381	1Q	17,680
European Midcourse Radar (EMR) Upgrade										
EMR Upgrade		TBD	0	0	N/A	0	N/A	56,891	1/2Q	56,891
Site Activation		MDA-DFW / AL	0	0	N/A	14,562	1/4Q	10,306	1/2Q	24,868
RDT&E Construction		MDA-DFW /AL	0	0	N/A	0	N/A	115,000	1/2Q	115,000

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis	Date February 2007
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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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Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Sensor Communications										
EMR PCCS	MIPR	PM DCATS /VA	0	0	N/A	510	1Q	9,189	1Q	9,699
EMR SATCOM	MIPR	PM DCATS /VA	0	0	N/A	7,025	1Q	10,823	1Q	17,848
EMR Comms Fiber Optics	MIPR	DISA /VA	0	0	N/A	0	1Q	0	1Q	
EMR Comms Power	MIPR	NAVSEA /VA	0	0	N/A	511	1Q	2,042	1Q	2,553
EMR Comms Support	MIPR	DISA /VA	0	0	N/A	153	1Q	306	1Q	459
EMR Comms Support (MDNTB)	MIPR	MDA / VA	0	0	N/A	0	1Q	0	1Q	
Subtotal Product Development			0	7,030		45,031		300,215		352,276

Remarks

II. Support Costs Cost (\$ in Thousands)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
AN/TPY-2 Basic Program (Block 2010 Enhancements)										
Program Office Relocation		OGA/TBD	0	0	N/A	0	N/A	2,189	N/A	2,189
Deployment / Site Preparation / Activation										
Program Office Relocation		OGA/TBD	0	0	N/A	0	N/A	431	N/A	431
External Sensors										
Program Office Relocation		OGA/TBD	0	0	N/A	0	N/A	753	N/A	753

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis								Date February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)					R-1 NOMENCLATURE 0603884C Ballistic Missile Defense Sensors					
European Midcourse Radar (EMR) Upgrade										
Program Office Relocation		OGA/ TBD	0	0	N/A	0	N/A	6,419	N/A	6,419
Subtotal Support Costs			0	0		0		9,792		9,792
Remarks										
III. Test and Evaluation Cost (\$ in Thousands)										
Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	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 2007 Cost	FY 2007 Award/ Oblg Date	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	7,030		45,031		310,007		362,068

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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Acquisition Milestones								
EMR Contract Award		4Q	1Q					
Award AN/TPY-2 #6 Site Construction Contract				2Q				
Development Milestones								
External Sensor Lab Upgrade of Hardware		2Q						
External Sensors Lab - Cueing Experiments		2Q-4Q	1Q-4Q	1Q-4Q	1Q			
Develop Models & Simulations for RDSIS			1Q-4Q					
Deliver AN/TPY-2 Block 10 Software for System Test				1Q				
MSK Manufacture				1Q-4Q	1Q-4Q	1Q-4Q		
Upgrade AN/TPY2 HWIL Facility(Block 10 Capability)					1Q-4Q			
Complete AN/TPY-2 Block 10 Acceptance Testing						4Q		
Testing Milestones								
EMR Integration with BMDS in Europe							1Q-4Q	
Program Milestones								
AN/TPY-2 #6 Operational						4Q		
EMR Operational							4Q	
Deployment/Site Prep/ Activation								
EMR Comms Power			1Q-4Q	1Q-4Q	1Q-4Q	1Q-2Q		
EMR PCCS			1Q-4Q	1Q-4Q	1Q-4Q	1Q		
EMR SATCOM			1Q-4Q	1Q-4Q	1Q-4Q	1Q-2Q		
AN/TPY-2 #6 SATCOM				1Q-4Q	1Q-4Q	1Q-2Q		
EMR Comms Fiber Optics				4Q	1Q-4Q	1Q-2Q		
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		

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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
AN/TPY-2 #6 Comms Power					1Q-4Q	1Q-2Q		
AN/TPY-2 #6 PCCS-T					1Q-4Q	1Q		
AN/TPY-2 #6 Comms Integration and Test					3Q-4Q	1Q-4Q		
EMR Comms Integration and Test					3Q-4Q	1Q-4Q		
Studies & Analysis								
External Sensors Lab - Eval Advanced Algorithms		2Q-4Q	1Q-4Q	1Q-3Q				
Operation & Sustainment								
AN/TPY-2 O&S					1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
EMR O&S					1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Thule O&S							1Q-4Q	1Q-4Q

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2007
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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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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
R111 Ballistic Missile Defense Radars Block 2012	0	0	0	0	91,144	154,476	440,827	317,219
RDT&E Articles Qty	0	0	0	0	0	0	0	0

Note: During FY06 the FBX-T and THAAD radars were officially assigned the military designation of AN/TPY-2. The new nomenclature is as follows: AN/TPY-2 #1 (THAAD Engineering Manufacturing Development (EMD) #1); AN/TPY-2 #2 (FBX-T #1); AN/TPY-2 #3 (FBX-T #2); AN/TPY-2 #4 (THAAD EMD #2); AN/TPY-2 #5 (FBX-T #3) to THAAD for THAAD use; and AN/TPY-2 #6 (FBX-T #4). THAAD is covered under Program Element (PE) 0603881C.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Radar Block 2012 (Project 0012) will continue the spiral development to enhance and expand on the sensor capabilities provided to the Ballistic Missile Defense System (BMDS) under Block 2010. This increased sensor coverage will give the BMDS more opportunities to engage ballistic missile threats, which improves the probability of successfully destroying the target. The testing, 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 will improve BMDS ability to detect, track and engage ballistic missiles in all phases of flight.

Block 2012 efforts include development of an Adjunct Sensor to use with AN/TPY-2 forward-based radar. The forward-based radar will hand off tracks to the Adjunct Sensor thereby extending the tracking and discrimination range and expanding resource capability between forward-based radar and the BMDS midcourse sensor. The Block 2012 efforts also include integration of Clear and Cape Cod Upgraded Early Warning Radars (UEWRs) with C2BMC/GFCC supporting the objective of providing continuous sensor coverage against ballistic missile threats (Clear and Cape Code EWR upgrades are being performed by Air Force Space Command). The addition of Block 2012 sensors will improve C2BMC tracking and discrimination through sensor netting, sensor coordination, and track data fusion.

This effort provides for modeling and simulation capabilities and hardware-in-the-loop (HWIL) facilities. BMDS-level testing includes flight tests, ground tests, and wargames.

C. Other Program Funding Summary

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603175C Ballistic Missile Defense Technology	147,270	193,307	118,569	109,540	116,014	121,008	127,917	131,291	1,064,916
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,120,879	1,092,076	962,585	1,004,282	924,101	851,213	678,694	501,147	7,134,977

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification							Date February 2007		
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APPROPRIATION/BUDGET ACTIVITY					R-1 NOMENCLATURE				
RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)					0603884C Ballistic Missile Defense Sensors				

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,391,246	3,043,058	2,520,064	2,359,665	2,179,602	1,699,963	1,153,082	1,183,003	16,529,683
PE 0603883C Ballistic Missile Defense Boost Defense Segment	455,572	628,958	548,759	432,432	448,375	678,913	829,683	1,026,239	5,048,931
PE 0603886C Ballistic Missile Defense System Interceptors	200,446	356,004	227,499	393,317	522,388	730,236	836,029	570,206	3,836,125
PE 0603888C Ballistic Missile Defense Test and Targets	610,619	601,782	586,150	628,364	662,984	681,511	696,037	705,210	5,172,657
PE 0603889C Ballistic Missile Defense Products	387,402	0	0	0	0	0	0	0	387,402
PE 0603890C Ballistic Missile Defense System Core	409,993	429,420	482,016	511,147	558,746	579,571	579,316	588,481	4,138,690
PE 0603891C Special Programs - MDA	271,021	353,031	323,250	305,409	369,073	526,966	789,017	792,271	3,730,038
PE 0603892C Ballistic Missile Defense Aegis	893,040	1,122,669	1,059,103	1,129,425	1,221,650	1,067,587	1,054,753	1,089,078	8,637,305
PE 0603893C Space Tracking & Surveillance System	220,048	322,220	331,525	347,811	412,623	501,197	778,067	981,424	3,894,915
PE 0603894C Multiple Kill Vehicle	48,370	144,362	271,151	352,741	461,179	618,263	673,477	842,905	3,412,448
PE 0603895C BMD System Space Program	0	0	27,666	35,093	46,849	56,183	133,617	157,117	456,525
PE 0603896C BMD C2BMC	0	246,852	258,913	294,627	300,847	282,615	267,275	269,420	1,920,549
PE 0603897C BMD Hercules	0	49,674	53,658	54,264	54,405	55,142	53,355	54,198	374,696
PE 0603898C BMD Joint Warfighter Support	0	54,935	48,787	50,428	54,086	56,603	58,890	60,206	383,935
PE 0603904C BMD Joint National Integration Center (JNIC)	0	110,629	104,012	106,985	111,542	111,947	113,592	115,287	773,994
PE 0603905C BMD Concurrent Test and Operations	0	23,159	0	0	0	0	0	0	23,159
PE 0603906C Regarding Trench	0	0	2,000	3,000	5,000	5,000	9,000	9,000	33,000
PE 0605502C Small Business Innovative Research - MDA	133,105	0	0	0	0	0	0	0	133,105
PE 0901585C Pentagon Reservation	14,874	15,527	6,058	6,376	4,490	4,725	4,801	4,877	61,728
PE 0901598C Management Headquarters - MDA	98,609	87,059	85,906	86,453	70,355	69,855	69,855	69,855	637,947

D. Acquisition Strategy

An RFP will be issued in FY09 with an expected award in FY10 to build an Adjunct Sensor (Block 2012 capability). An acquisition strategy will be developed in FY09 to operate and sustain the Adjunct Sensor.

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis								Date February 2007		
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 2007 Cost	FY 2007 Award/ Oblg Date	FY 2008 Cost	FY 2008 Award/ Oblg Date	FY 2009 Cost	FY 2009 Award/ Oblg Date	Total Cost
Subtotal Product Development										
Remarks										
II. Support Costs Cost (\$ in Thousands)										
Cost Categories:	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 2007 Cost	FY 2007 Award/ Oblg Date	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 2007 Cost	FY 2007 Award/ Oblg Date	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 2007 Cost	FY 2007 Award/ Oblg Date	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										
Remarks										

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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Development Milestones								
Adjunct Sensor Development					1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Begin Cape Cod UEWR Integration							1Q-4Q	1Q-4Q
Begin Clear UEWR Integration							1Q-4Q	1Q-4Q
Operation & Sustainment								
AN/TPY-2 O&S							1Q-4Q	1Q-4Q

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date February 2007
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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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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0602 Program-Wide Support	5,302	8,812	20,194	25,118	26,889	18,166	17,097	16,021
RDT&E Articles Qty	0	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification

Program-Wide Support provides funding for common non-headquarters support functions across the entire program 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 2006	FY 2007	FY 2008	FY 2009
Civilian Salaries and Support	5,302	8,812	20,194	25,118
RDT&E Articles (Quantity)	0	0	0	0

See Section A: Mission Description and Budget Item Justification

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification							Date February 2007		
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
PE 0603175C Ballistic Missile Defense Technology	147,270	193,307	118,569	109,540	116,014	121,008	127,917	131,291	1,064,916
PE 0603881C Ballistic Missile Defense Terminal Defense Segment	1,120,879	1,092,076	962,585	1,004,282	924,101	851,213	678,694	501,147	7,134,977
PE 0603882C Ballistic Missile Defense Midcourse Defense Segment	2,391,246	3,043,058	2,520,064	2,359,665	2,179,602	1,699,963	1,153,082	1,183,003	16,529,683
PE 0603883C Ballistic Missile Defense Boost Defense Segment	455,572	628,958	548,759	432,432	448,375	678,913	829,683	1,026,239	5,048,931
PE 0603886C Ballistic Missile Defense System Interceptors	200,446	356,004	227,499	393,317	522,388	730,236	836,029	570,206	3,836,125
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PE 0603889C Ballistic Missile Defense Products	387,402	0	0	0	0	0	0	0	387,402
PE 0603890C Ballistic Missile Defense System Core	409,993	429,420	482,016	511,147	558,746	579,571	579,316	588,481	4,138,690
PE 0603891C Special Programs - MDA	271,021	353,031	323,250	305,409	369,073	526,966	789,017	792,271	3,730,038
PE 0603892C Ballistic Missile Defense Aegis	893,040	1,122,669	1,059,103	1,129,425	1,221,650	1,067,587	1,054,753	1,089,078	8,637,305
PE 0603893C Space Tracking & Surveillance System	220,048	322,220	331,525	347,811	412,623	501,197	778,067	981,424	3,894,915
PE 0603894C Multiple Kill Vehicle	48,370	144,362	271,151	352,741	461,179	618,263	673,477	842,905	3,412,448
PE 0603895C BMD System Space Program	0	0	27,666	35,093	46,849	56,183	133,617	157,117	456,525
PE 0603896C BMD C2BMC	0	246,852	258,913	294,627	300,847	282,615	267,275	269,420	1,920,549
PE 0603897C BMD Hercules	0	49,674	53,658	54,264	54,405	55,142	53,355	54,198	374,696
PE 0603898C BMD Joint Warfighter Support	0	54,935	48,787	50,428	54,086	56,603	58,890	60,206	383,935
PE 0603904C BMD Joint National Integration Center (JNIC)	0	110,629	104,012	106,985	111,542	111,947	113,592	115,287	773,994
PE 0603905C BMD Concurrent Test and Operations	0	23,159	0	0	0	0	0	0	23,159
PE 0603906C Regarding Trench	0	0	2,000	3,000	5,000	5,000	9,000	9,000	33,000
PE 0605502C Small Business Innovative Research - MDA	133,105	0	0	0	0	0	0	0	133,105
PE 0901585C Pentagon Reservation	14,874	15,527	6,058	6,376	4,490	4,725	4,801	4,877	61,728
PE 0901598C Management Headquarters - MDA	98,609	87,059	85,906	86,453	70,355	69,855	69,855	69,855	637,947