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<b>Missile Defense Agency (MDA) Exhibit R-2 RDT&amp;E Budget Item Justification</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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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	0	246,852	258,913	294,627	300,847	282,615	267,275	269,420
0701 Command and Control, Battle Management and Communications (C2BMC) Block 2004	0	54,968	0	0	0	0	0	0
0801 Command and Control, Battle Management and Communications (C2BMC) Block 2006	0	166,374	173,137	61,109	0	0	0	0
0901 Command and Control, Battle Management and Communications (C2BMC) Block 2008	0	16,520	73,688	209,068	179,982	72,967	0	0
0001 Command and Control, Battle Management and Communications (C2BMC) Block 2010	0	0	1,111	8,417	99,174	183,481	98,362	56,456
R101 Command and Control, Battle Management and Communications (C2BMC) Block 2012	0	0	0	0	0	8,536	152,815	196,866
0602 Program-Wide Support	0	8,990	10,977	16,033	21,691	17,631	16,098	16,098

*Note: For FY06 and prior the Command and Control, Battle Management, and Communications (C2BMC) element was previously described as part of the BMD Products Program Element (PE #0603889C).*

**A. Mission Description and Budget Item Justification**

**A.1 System Element Description**

Intelligence sources predict an increasing ballistic missile threat with respect to numbers of missiles and launchers, more complex delivery boosters to include countermeasures, and more lethal warheads. Potential adversaries can employ a coordinated attack of short-, medium-, and intermediate-range ballistic missiles (SRBMs, MRBMs, and IRBMs) as well as intercontinental ballistic missiles (ICBMs) to confound our defenses, create a situation of confusion, and paralyze legacy command and control systems. To protect U.S. cities, population, and territory, as well as our deployed forces and other critical assets from this growing threat requires an integrated, layered defense. The ballistic missile defense Command and Control, Battle Management, and Communications (C2BMC) Program is the centerpiece of an integrated, layered missile defense. The C2BMC Program puts the “System” in the Ballistic Missile Defense System (BMDS). It is the force multiplier--the elements reach their full potential and the BMDS becomes greater than the sum of its parts, with the capability to deliver an integrated, layered defense against any ballistic missile, at any range, from any direction. Without a central C2BMC system there is no BMDS or layered defense.

BMD C2BMC Program efforts enable coordinated, real-time, decision-making by warfighters and leaders across the globe, up to and including the Secretary of Defense and the President of the United States. Specifically, the mission of C2BMC is to provide a Combatant Command decision aid to integrate and globally synchronize missile defense systems and operations to provide optimized layered missile defense against all ranges of threat, in

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all phases of flight. The result is an extended network of defensive sensors, shooters, battle managers, and intelligence assets. The global C2BMC system spans the existing U.S. Combatant Command structure allowing the warfighter to orchestrate and optimize U.S. ballistic missile defense response on a worldwide level. Without the C2BMC Program, the Ballistic Missile Defense System would require many more sensors and interceptors to achieve equivalent protection from ballistic missile threats to our homeland, friends, and allies.

The C2BMC Program uses spiral development (i.e., incremental development, test, and fielding) to produce the hardware, software, network connectivity, and fielded support required to provide a system-wide, integrated ballistic missile defense capability. As C2BMC products mature they are engineered and integrated into fielded spirals. The average timeframe to develop and field a spiral is 18-24 months (depending on requirements and funding stability), with a new spiral fielded every year. Therefore multiple spirals are in staggered stages of development at any time.

Capabilities are integrated and evolve through four C2BMC product lines: BMD Planner, Combatant Command and Control (COCOM C2), Global Integrated Fire Control (GIFC), and BMD Network. (Note: In Block 04, the four C2BMC product lines are BMD Planner, Situation Awareness, Battle Management, and BMD Network.) At the completion of Block 04, the C2BMC Program has integrated 5 of the 9 BMDS elements; is in 21 locations with 12 customers; has deployed over 450 pieces of equipment and 2 SATCOM links, has stood up over 70 crew positions; has trained over 1000 users, and supports over 48,000 miles of DISA communication lines. These numbers will continue to grow with each Block. Delivered spirals enable progressively increased abilities to plan ballistic missile defense, see the battle unfold on common situational awareness displays, control sensors worldwide, and optimally pair them with BMD weapons systems (such as Ground Based Missile Defense, Theater High Altitude Air Defense, Patriot, and Aegis BMD) across a global-grid communications network to defeat an adversary's attack.

The C2BMC Program delivers spiral hardware, software capabilities, network connectivity, training, and logistics support to Combatant Commands and national command authorities. Hardware capabilities consist of Enterprise Work Stations (warfighter display monitors and access to BMD planner, situation awareness, and battle manager capabilities), servers, processors, communications racks and equipment, situational awareness web browsers, stand-alone laptop planners, and video distribution equipment. Logistics support includes C2BMC initial operational training, 24/7 on-site sustainment and operational support to the Combatant Commands, hardware and software maintenance and sustainment of deployed AN/TPY-2 radar communications, and C2BMC interface capabilities.

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

The C2BMC program contributes to the Ballistic Missile Defense System (BMDS) by delivering:

- BMD Defense design planning and analysis capability among all Combatant Commands and their service components so that warfighters have the capability to explore the effectiveness of potential BMD courses of action.

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<ul style="list-style-type: none"> <li>• Clear, accurate, and consistent display of the ballistic missile defense battlespace (situational awareness) to warfighters at the tactical, operational, and strategic levels of command, permitting key decision-makers the ability to render command and control decisions of global importance, in real-time.</li> <li>• A network tying together sensors (both BMDS radars and space sensors) and weapons systems via the Combatant Command and Control (COCOM C2) and Global Integrated Fire Control (GIFC) to enable system-wide detection, tracking, and decision tools for optimal engagement of ballistic missile threats across all flight regimes.</li> </ul> <p>C2BMC enables integrated system performance of all BMDS elements by providing missile detection, tracking, discrimination, and network distribution of threat information. It provides the warfighter the ability to rapidly identify and concurrently track multiple ballistic missile threats; dynamically adjust BMD system resources to engage multiple ballistic missile threats in the kill zone through all phases of flight; and globally direct engagement against multiple ballistic missile threats in any area of responsibility, at any time.</p> <p>The C2BMC program further enables an integrated, layered Ballistic Missile Defense by synergistically planning and operating existing and new theater and strategic ballistic missile defense weapon systems across the world for the highest probability of defeating threats of any type and range. These systems include Patriot, Theater High Altitude Area Defense (THAAD), Ground-based Midcourse Defense (GMD), Aegis BMD; and sensors such as the AN/TPY-2 radar, Sea-Based X-Band Radar (SBX), and Space-Based Infrared System (SBIRS).</p> <p>The C2BMC Program facilitates 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.</p> <p><b><u>A.3 Major System Element Goals</u></b></p> <p>Block 2004 (Initial Defense Against Rogue Threat)</p> <ul style="list-style-type: none"> <li>• Basic Deliberative/Crisis Action Planning</li> <li>• Common situational awareness capability/displays at the Combatant Commands (COCOMS) and National Military Command Center (NMCC)</li> <li>• Initial Sensor Battle Management of the AN/TPY-2 radar</li> <li>• Redundant communication/data paths and connections to Ground Based Missile Defense (GMD), Aegis BMD, AN/TPY-2 radar</li> <li>• Engagement Sequence Groups (ESG) involving Ground Based Interceptor (GBI), Standard Missile 3 (SM-3), SPY-1 Sensor, and AN/TPY-2.</li> <li>• Sustain Command and Control, Battle Management, and Communications (C2BMC) operations</li> </ul>		

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<p>Block 2006 (Integrated Defense Against Rogue Threat)</p> <ul style="list-style-type: none"><li>• Improved system reliability and availability to support test and operations</li><li>• Initial fielding of Global Integrated Fire Control (GIFC) capability at the Kenney Air Operations Center in Hawaii</li><li>• Enhanced situational awareness and command and control at Combatant Commands (COCOM) Headquarters</li><li>• Enhanced crisis action/deliberative planning capability</li><li>• Direct feed of SBIRS early warning data</li><li>• Sustain C2BMC operations</li></ul> <p>Block 2008 (Coordinated Defense Against Medium Size Raids and Asymmetric Threat)</p> <ul style="list-style-type: none"><li>• Fully integrated Planner and situation awareness displays with integrated intelligence information and defended asset priority schemes</li><li>• Initial type interfaces between weapons and sensors compatible with DoD network-centric service-oriented architecture</li><li>• GIFC coordination and optimization of increased “Launch-on and Engage-on” networked capability</li><li>• Sustain C2BMC operations</li></ul> <p>Block 2010 (Mature and Expand Integrated Layered BMD)</p> <ul style="list-style-type: none"><li>• Incorporate new sensors and weapons systems into a global, integrated C2BMC network</li><li>• Command and Control decision aids to re-direct coordinated engagements</li><li>• BMDS system level discrimination for boost/early ascent and expanded engagement coordination to include intelligence projections</li><li>• Sustain C2BMC operations</li></ul> <p>Block 2012 (Integrated BMDS)</p> <ul style="list-style-type: none"><li>• Incorporate new sensors and shooters into the BMDS</li><li>• Improve sensor management/data fusion</li><li>• Sustain C2BMC operations</li><li>• Integrated air and missile defense engagement planning</li></ul>		

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<b><u>A.4 Major Events Schedule and Description</u></b>			
<b>Major Event</b>	<b>Project</b>	<b>Timeframe</b>	<b>Description</b>
<b>Contract Activity</b>			
<b>C2BMC Element</b>			
GIFC Increment 5	0001	3Q FY 2009 - 3Q FY 2010	• Software development cycle and ready for integration test
Spiral 10.2 Content Agreement	0001	2Q FY 2010	• Definition of capabilities within the spiral
Spiral 10.4 Content Agreement	0001	2Q FY 2010	• Definition of capabilities within the spiral
GIFC Increment 6	0001	3Q FY 2010 - 3Q FY 2011	• Software development cycle and ready for integration test
Spiral 10.2 Cycle 2 Testing	0001	2Q FY 2011 - 3Q FY 2011	• C2BMC element functional verification test at JNIC
Spiral 10.2 Cycle 5 Testing	0001	3Q FY 2011 - 4Q FY 2011	• Field installation and checkout
GIFC Increment 7	0001	3Q FY 2011 - 3Q FY 2012	• Software development cycle and ready for integration test
Spiral 10.4 Cycle 2 Testing	0001	2Q FY 2012 - 3Q FY 2012	• C2BMC element functional verification test at JNIC
Spiral 10.4 Cycle 5 Testing	0001	3Q FY 2012 - 4Q FY 2012	• Field installation and checkout
Block 04 System Level Tests	0701	1Q FY 2007 - 3Q FY 2007	• C2BMC participation in BMDS-level ground and flight tests
Spiral 6.0 Cycle 5 Testing	0801	1Q FY 2007	• Field installation and check out
GIFC Increment 2	0801	1Q FY 2007 - 1Q FY 2008	• end of software development cycle and ready for integration test
Block 06 System Level Tests	0801	1Q FY 2007 - 3Q FY 2009	• C2BMC participation in BMDS-level ground and flight tests
Spiral 6.2 Cycle 2 Testing	0801	2Q FY 2007 - 3Q FY 2007	• C2BMC element functional verification test at JNIC
Spiral 6.2 Cycle 5 Testing	0801	3Q FY 2007 - 4Q FY 2007	• Field installation and checkout
Spiral 6.4 Cycle 2 Testing	0801	2Q FY 2008 - 3Q FY 2008	• C2BMC element functional verification test at JNIC
GIFC Increment 3.2	0801	3Q FY 2008 - 4Q FY 2008	• Portion of Increment 3 (i.e. Cycle 2) ready for integration with Spiral 6.4
Spiral 6.4 Cycle 5 Testing	0801	3Q FY 2008 - 4Q FY 2008	• Field installation and checkout
Spiral 8.2 Content Agreement	0901	2Q FY 2007	• Definition of capabilities within the spiral
GIFC Increment 3	0901	3Q FY 2007 - 3Q FY 2008	• Software development cycle and ready for integration test
Spiral 8.4 Content Agreement	0901	2Q FY 2008	• Definition of capabilities within the spiral
GIFC Increment 4	0901	3Q FY 2008 - 3Q FY 2009	• Software development cycle and ready for integration test
Spiral 8.2 Cycle 2 Testing	0901	2Q FY 2009 - 3Q FY 2009	• C2BMC element functional verification test at JNIC
Spiral 8.2 Cycle 5 Testing	0901	3Q FY 2009 - 4Q FY 2009	• Field installation and checkout
System Level Tests	0901	3Q FY 2009 - 4Q FY 2011	• C2BMC support to BMDS-level ground and flight tests per the IMTP
Spiral 8.4 Cycle 2 Testing	0901	2Q FY 2010 - 3Q FY 2010	• C2BMC element functional verification test at JNIC
Spiral 8.4 Cycle 5 Testing	0901	3Q FY 2010 - 4Q FY 2010	• Field installation and checkout
<b>Site Activation</b>			
S6.0 at STRATCOM, NORTHCOM, and PACOM	0801	1Q FY 2007	• Hardware and software installation and check out
S6.2 at STRATCOM, NORTHCOM, and PACOM	0801	3Q FY 2007	• Hardware and software installation and check out
C2BMC upgrades (PSN) at STRATCOM, PACOM, NORTHCOM	0801	4Q FY 2007	• Hardware installation and check out, and network connectivity

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Major Event	Project	Timeframe	Description
Second full C2BMC suite installed at PACOM	0801	4Q FY 2007	<ul style="list-style-type: none"> <li>• Hardware and software installation and check out</li> </ul>
GIFC Hardware at PACOM AOC	0801	4Q FY 2008	<ul style="list-style-type: none"> <li>• Hardware and software installation and check out</li> </ul>
Install Spiral 8.2	0901	3Q FY 2009 - 4Q FY 2009	<ul style="list-style-type: none"> <li>• Installation of C2BMC software and network connectivity</li> </ul>
Install EUCOM Hardware	0901	4Q FY 2009	<ul style="list-style-type: none"> <li>• Installation of C2BMC hardware</li> </ul>
Install Spiral 8.4	0901	3Q FY 2010 - 4Q FY 2010	<ul style="list-style-type: none"> <li>• Installation of C2BMC software and network connectivity</li> </ul>
Install CENTCOM Hardware	0901	4Q FY 2010	<ul style="list-style-type: none"> <li>• Installation of C2BMC hardware</li> </ul>
<b>Operation &amp; Sustainment</b>			
Block 06 O&S	0801	1Q FY 2008 - 4Q FY 2009	<ul style="list-style-type: none"> <li>• 24/7 on-site maintenance and sustainment</li> </ul>
Block 08 O&S	0901	4Q FY 2009 - 4Q FY 2011	<ul style="list-style-type: none"> <li>• 24/7 on-site maintenance and sustainment</li> </ul>

B. Program Change Summary	FY 2006	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2007 PB)	0	0	0	0
Current President's Budget (FY 2008 PB)	0	246,852	258,913	294,627
Total Adjustments	0	246,852	258,913	294,627
Congressional Specific Program Adjustments	0	247,896	0	0
Congressional Undistributed Adjustments	0	-1,044	0	0
Reprogrammings	0	0	0	0
SBIR/STTR Transfer	0	0	0	0
Adjustments to Budget Years	0	0	258,913	294,627

FY07 increase of \$246.852 million includes the congressionally directed creation of a new Program Element for BMD C2BMC and a portion of the MDA congressional undistributed reduction.

FY08 increase of \$258.913 million and FY09 increase of \$294.627 million reflects congressionally directed creation of a new Program Element for BMD C2BMC.

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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0701 Command and Control, Battle Management and Communications (C2BMC) Block 2004	0	54,968	0	0	0	0	0	0
RDT&E Articles Qty	0	0	0	0	0	0	0	0

**A. Mission Description and Budget Item Justification**

In support of and in collaboration with the Missile Defense Agency's Ballistic Missile Defense System (BMDS) architectures and system specifications, the Command and Control, Battle Management, and Communications (C2BMC) program is the lynchpin of integrated missile defense providing the warfighter the capability of planning the Ballistic Missile Defense (BMD) fight while concurrently tracking potential ballistic missile threats; directing weapons to engage via a distributed network; and, pairing appropriate sensors with the appropriate weapon system to defeat ballistic missile threats of any range, in any phase of flight, in all theaters, and with coalition partners. The C2BMC Program delivers continually increasing capabilities via hardware, software, network connectivity, and operations and sustainment support in two-year Blocks.

The Block 2004 C2BMC Program delivered the rudimentary foundation for integrated, layered defense for initial defense against a rogue threat or accidental ballistic missile launch. Block goals were to deliver:

- Basic deliberative/crisis action planning capability
- Common situational awareness capability/displays at the Combatant Commands (COCOMS) and National Military Command Center (NMCC)
- Initial sensor management of the AN/TPY-2 Radar in Japan to support Ground Based Missile Defense (GMD)
- Redundant communication/data paths and connections to GMD and Aegis BMD
- Engagement Sequence Groups (ESG) involving Ground Based Interceptor (GBI), Standard Missile 3 (SM-3), Cobra Dane Upgraded Early Warning Radar, SPY-1 Sensor, and AN/TPY-2
- Sustainment of C2BMC operations

**C2BMC ELEMENT**

The Command and Control, Battle Management, and Communications (C2BMC) Program includes program management and the hardware/software engineering necessary to accomplish Block 2004 objectives by balancing development in four product lines: BMD Planner, Situation Awareness, Battle Management, and BMD Network. This approach ensures that mature capabilities are integrated and incrementally delivered to the warfighter. Multiple incremental deliveries, or spirals, are planned in Block 2004. Each spiral represents an improvement in capability and functionality over the previous spiral. The delivery of these spirals includes the software, hardware, network connectivity, training, and operations and sustainment support needed to operate an integrated Ballistic Missile Defense System (BMDS). The capability delivered in the spirals enables ballistic missile defense

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<p>systems Engagement Sequence Groups (ESGs) by providing the proper interfaces, planning, and coordination to allow the BMDS elements and components to work together effectively. The C2BMC Program also includes development and post analysis support for BMDS-level wargames and tests of fielded spirals.</p> <p>The BMD Planner and Situation Awareness architecture is based on several design features emphasizing scalability and interoperability. The architecture is designed to utilize an open system approach. This approach also provides a path for technology upgrades. The BMD Planner emphasizes planning for both theater and global missile defense through all planning phases: deliberate, crisis, and execution. It provides the capability to coordinate with all weapon system elements in a collaborative fashion. This type of coherent planning results in ballistic missile defense for the full range and complexity of ballistic missile threats. To ensure the full C2BMC capability is realized by all weapon system elements, the architecture migrates in future Blocks to a network-centric (vice point-to-point) planner to ensure both vertical and horizontal collaboration.</p> <p>Block 2004 development includes the following BMD Planner and Situational Awareness capabilities:</p> <ul style="list-style-type: none"> <li>• Basic force level ballistic missile defense planning capability</li> <li>• Planning load robustness that protects against incomplete/inaccurate data</li> <li>• Initial external Extensible Machine Language (XML) interface with the Army Air and Missile Defense Work Station (AMDWS) planner</li> <li>• Sensor management display (AN/TPY-2 Radar), Integrated Ballistic Missile Picture (IBMP), BMDS Summary Screen (SS), and Executive Displays (displays all BMDS track and status data)</li> </ul> <p>Situation Awareness capability is further enhanced with the introduction of initial Protection Capability (PROCAP) which allows the operator to visually see status and capabilities of BMD assets. Remote situation awareness is also provided to the United Kingdom.</p> <p>Battle Management comprises the decisions and actions executed in direct response to the activities of enemy forces. In Block 2004, the battle management portion of C2BMC is focused at the Combatant Commands (COCOMs) Headquarters. Block 2004 battle management develops and delivers AN/TPY-2 radar management including Operational State Control, Sensor Tasking (cue), and Resource Management, all which increase the effectiveness of the radar system within the Ballistic Missile Defense System (BMDS). In addition, track data management capability is improved to include forwarding of AN/TPY-2 radar tracks to Ground Based Missile Defense Fire Control (GFC) via fiber and satellite.</p> <p>The Network Communications portion of C2BMC ensures connectivity between all components of the BMDS on the BMD network. The intent is to develop and deliver products that provide robust connectivity to quickly and unambiguously share information across the global BMD and with external users. Effective networking relies on an interconnection of a variety of platforms and capabilities. In Block 2004, network capability is</p>		

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<p>delivered to enable Aegis BMD and GMD Engagement Sequence Groups (ESGs), Joint Range Extension to convert Satellite Communications (SATCOM) formatted messages from Aegis to land line messages to interface with the rest of the BMDS, initial network monitoring and management, Communications Network Equipment (CNE) auto-fail over to prevent system outages, BMDS Global Network Operations Control Center (GNCC) at the Joint Functional Component Commander for Integrated Missile Defense (JFCC IMD) in Colorado Springs, CO for remote monitoring of the network, and support of dual redundant suites. Additionally, engineering planning is provided for communications to support products installed and tested by the GMD and Sensor elements.</p> <p>As the C2BMC products mature they are integrated into fielded spirals. The C2BMC Program uses spiral development (i.e., incremental development, test, and fielding) to produce the software required to provide a system-wide integrated BMD capability. The key test event for development is completion of Cycle 2, Simulation-Based Verification, when software completes internal C2MBC development and begins integration testing with other BMDS elements. Block 2004 matured products were integrated in Spirals 4.1 through 4.5 and delivered to the field for concurrent developmental testing and operational use in conjunction with the Responsible Test Organization (RTO) and Responsible Engineering Organization (REO) schedules and guidance. Completion of Cycle 5 testing, Site Activation Testing, signals delivery of fully functioning operational software. Spirals 4.1 and 4.2 provided infrastructure (including the development environment and initial message and track processing) and deliberate and dynamic planning (including planning tools and additional message processing and collaborative tools). Spiral 4.3 focused on developing the Initial Defensive Operations (IDO) capability, and was updated with Spiral 4.4 which incorporated high priority user fixes. Block 2004 was completed with the development and delivery of Spiral 4.5, which provides AN/TPY-2 radar management and aligns with the GMD Block 4B configuration.</p> <p><b>SITE ACTIVATION</b></p> <p>The C2BMC program delivered both spiral software and operational hardware/capabilities to the Combatant Commands at Northern Command (NORTHCOM), Strategic Command (STRATCOM) and Pacific Command (PACOM), and within the National Capital Region (NCR) to provide BMDS operations. Hardware capabilities consist of Enterprise Work Stations (warfighter display monitors and access to C2BMC planner, situation awareness and battle manager capabilities), servers, processors, and communications racks and equipment (up to eight racks of equipment per C2BMC suite in Block 2004), situational awareness web browsers, stand-alone laptop planners, and video distribution equipment. Additionally, Block 2004 site activation included the procurement and deployment of a C2BMC AN/TPY-2 shelter (with nine racks of equipment) in Japan, as well as extended situational awareness screens over leased communication lines to the United Kingdom. These international deployments enable BMDS global reach.</p>		

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OPERATIONS AND SUPPORT C2BMC Program Operations and Support consists of 24/7 On-Site Support, C2BMC Control Center activities, and hardware/software maintenance. On-site support provides: <ul style="list-style-type: none"><li>• Assistance to the System Administrator assigned by the site (e.g., Combatant Commands), with the general operational support of the C2BMC system</li><li>• Integration of the C2BMC support processes into the site's support regimen</li><li>• Daily network operations and security support for the C2BMC system as part of a transition plan</li><li>• Prime contractor 'over-the-shoulder' support to users when requested, or alternatively, via the C2BMC Control Center</li></ul> The C2BMC Control Center is located in Colorado Springs, CO and provides: <ul style="list-style-type: none"><li>• Technical support to on-site personnel and to the C2BMC end-user</li><li>• Review of hardware/software problems and coordination of Commercial Off-the-Shelf (COTS) developer/vendor service calls</li><li>• Trouble ticket work-off</li><li>• Tracking and implementing documented escalation procedures</li><li>• Collecting of metrics</li><li>• Maintenance of the C2BMC Control Center web site</li></ul> Maintenance of the C2BMC system includes both software and hardware maintenance and sustaining engineering. Sustaining engineering consists of network and development engineering in support of system anomalies. Operations and Support also includes the procurement of communications lines from the Defense Information Service Agency (DISA), as well as fielding and maintaining, Communications Nodal Equipment (CNE), to include the Joint Range Extension (JRE) equipment, which enables a global network grid. Operations and Support includes on-site maintenance of communications equipment and C2BMC AN/TPY-2 radar interface equipment at the first AN/TPY-2 radar site in Japan.		

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<b><u>B. Accomplishments/Planned Program</u></b>				
	FY 2006	FY 2007	FY 2008	FY 2009
C2BMC Element	0	2,735	0	0
RDT&E Articles (Quantity)	0	0	0	0
<p>The C2BMC Element accomplishes Block 2004 objectives by balancing the development of four principle product lines: BMD Planner, Situation Awareness, Battle Management, and BMD Network, enabling capabilities to be integrated and incrementally delivered to the warfighter via spirals. Block 2004 includes infrastructure development, testing activity, and development support of fielded hardware and software.</p> <p>FY07 Planned Program</p> <ul style="list-style-type: none"> <li>• Design, develop, and test upgrades to resolve System Modification Requests (SMRs)</li> <li>• Support BMDS-level tests in accordance with the BMDS Integrated Master Test Plan (IMTP) and post analyses involving Spiral 4.5</li> </ul>				
	FY 2006	FY 2007	FY 2008	FY 2009
Operations and Support	0	52,233	0	0
RDT&E Articles (Quantity)	0	0	0	0
<p>Operations and Support procedures are in place for all fielded Block 2004 hardware and software. Maintenance agreements were established and spare parts were procured and delivered to each site. At each location an agreement in the form of a site installation plan was drafted and approved to outline roles and responsibilities of all stakeholders. A follow-on engineering site implementation document was developed to lay out the details for activating the site.</p> <p>FY07 Planned Program:</p> <ul style="list-style-type: none"> <li>• Provide on-site 24/7 C2BMC support of fielded sites for hardware and software</li> <li>• Maintain C2BMC Control Center at the Joint National Integration Center (JNIC) for fielded capabilities</li> <li>• Provide C2BMC operator training for fielded capabilities</li> <li>• Provide and support communications circuits for fielded C2BMC locations</li> <li>• Provide sustaining engineering support for fielded hardware and software</li> </ul>				

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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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<b>C. Other Program Funding Summary</b>									
	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 0603884C Ballistic Missile Defense Sensors	284,297	514,129	778,163	984,963	939,417	791,701	723,843	603,585	5,620,098
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 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 Command and Control Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Missile Defense Agency's capability-based acquisition strategy that emphasizes testing, spiral development, evolutionary acquisition, and knowledge-based funding through the use of two-year capability blocks. Lockheed Martin Mission Systems is the C2BMC prime contractor via an Other Transactions Agreement. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, fielding, training, and operations and sustainment support of the C2BMC system. They perform development and testing of C2BMC products in Arlington, VA; Huntsville, AL; and Colorado Springs, CO; and provide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) is charged to support fielded C2BMC capabilities in Nebraska, Colorado, Hawaii, Virginia, and Japan. C2BMC Program Office government, Federally Funded Research Development Center/University Affiliated Research Centers (FFRDC/UARC), and Scientific Engineering and Technical Assistance (SETA) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

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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 0603896C BMD C2BMC					
<b>I. Product Development Cost ( \$ in Thousands )</b>										
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
<b>C2BMC Element</b>										
C2BMC HW/SW Development, I&T	SS/CPAF	Lockheed Martin Team/ Col. Springs, CO	0	903	1/2Q	0	N/A	0	N/A	903
C2BMC HW/SW Development, I&T	SS/CPAF	Lockheed Martin Team/ Huntsville, AL	0	137	1/2Q	0	N/A	0	N/A	137
C2BMC Product Engineering & Development	SS/CPAF	Lockheed Martin Team/ Arlington, VA	0	1,695	1/2Q	0	N/A	0	N/A	1,695
EW/CEW; GCCS; JDP; JRE; ISC2; SBIRS-DSP; PATRIOT-JTAGS		Services, DISA, Agencies	0	0	N/A	0	N/A	0	N/A	
Federally Funded Research Development Center	SS/CPAF	MITRE, IDA, ORNL, MIT/LL/ Washington, DC	0	0	N/A	0	N/A	0	N/A	
Scientific Engineering and Technical Assistance	SS/CPAF	SPARTA/CSC/ MDA HQ, / Arlington, VA	0	0	N/A	0	N/A	0	N/A	
<b>Operations and Support</b>										
Unit Personnel, Cont System Improv, Sustaining Suppt	SS/CPAF	Lockheed Martin Team	0	43,497	1Q	0	N/A	0	N/A	43,497
Indirect Support	MIPR	DISA Defense Enterprise Computing Center (DECC)	0	3,715	1/2Q	0	N/A	0	N/A	3,715
Unit Operations - Circuit Costs	MIPR	DISA	0	5,021	1/2Q	0	N/A	0	N/A	5,021
Subtotal Product Development			0	54,968		0		0		54,968
<b>Remarks</b>										

Project: 0701 Command and Control, Battle Management and Communications (C2BMC) Block 2004

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<b>II. Support Costs Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>III. Test and Evaluation Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>IV. Management Services Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
Project Total Cost			0	54,968		0		0		54,968
<b>Remarks</b>										



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<b>Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail</b>						Date <b>February 2007</b>		
<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDTE&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>				<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>				
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
<b>C2BMC Element</b>								
Block 04 System Level Tests		1Q-3Q						
<b>Operation &amp; Sustainment</b>								
Block 04 O&S		1Q-4Q						

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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>				<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>				
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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0801 Command and Control, Battle Management and Communications (C2BMC) Block 2006	0	166,374	173,137	61,109	0	0	0	0
RDT&E Articles Qty	0	6	2	0	0	0	0	0

*Note: FY07 RDT&E Articles: Spiral 6.0, 6.2; 1 Full C2BMC Suite; 1 Communications Node; 3 Upgraded C2BMC Suites; GIFC at PACOM  
FY08 RDT&E Article: Spiral 6.4*

**A. Mission Description and Budget Item Justification**

In support of and in collaboration with the Missile Defense Agency's defined architectures and system specifications, the Command and Control, Battle Management and Communications (C2BMC) Program will provide the warfighter the capability to systematically plan the fight, see it unfold, and dynamically direct and adjust ballistic missile defense networked sensors and weapons to engage and defeat ballistic missile threats at any range, in any phase, in all theaters. The C2BMC products will provide the warfighter the capability to optimize ballistic missile defense from a global level by combining the best sensor information with the most efficient weapon from complimentary weapons systems, which individually, provide only limited area protection.

Today, the center of gravity for integrated BMDS is with C2BMC at the Combatant Command (COCOM) Headquarters, where BMD mission planning, situation awareness, and decisions aids are focused. All processing is performed at Strategic Command (STRATCOM), Northern Command (NORTHCOM), and Pacific Command (PACOM) headquarters. Users of the system are either collocated with, or directly connected to the equipment suites at these COCOMs. As the system evolves from Block 2004 through Block 2006 to Block 2008, the center of gravity will shift from the COCOMs to the Air Operations Centers (AOCs) and supporting Service Components (e.g., Army), where real-time automated battle management will be introduced and deployed. Development of this Area of Operational Responsibility (AOR)-centric enterprise architecture will allow C2BMC workload to be focused on the "battle in front of the warfighter", through the deployment of Global Integrated Fire Control (GIFC) functions within the Area Air Defense Commander's staff while also providing global situation awareness and senior leader decision aides at the COCOM Headquarters. Together, these separate capabilities enable integrated support of prioritized theater, regional, and homeland defense missions. To accomplish this shift in the center of gravity and meet the C2BMC mission objective of any sensor, any weapon, any threat, in any phase of flight, the C2BMC program of work in Block 2006 includes concentrated effort on developing complementary C2BMC system capabilities (i.e., global BMD planning and situation awareness at the Combatant Commands Headquarters and Global Integrated Fire Control (GIFC), based on dependable, trusted software at the Air Operations Center for initial deployment by the end of the Block.

In Block 2006, the C2BMC program will deliver to the warfighters the foundation for an integrated, layered defense against a rogue threat or accidental ballistic missile launch. Block goals are to deliver:

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- Improved C2BMC system reliability and availability
- Initial GIFC capability at the Air Operations Center
- Enhanced BMD Planner - better user displays, flexible defense designs, faster analysis
- Enhanced situational awareness and command and control at the COCOM headquarters - consolidated essential elements of information, more informative visual representations
- High availability, redundant communications
- Combined test and operations capability via a Parallel Staging Network (PSN)
- Engagement Sequence Groups (ESG) that involve the Ground Based Missile Defense Interceptor, Aegis BMD, Standard Missile 3 (SM-3) and Army/Navy/Surfaced Phased Array system (AN/SPY-2) Radar, Terminal High Altitude Area Defense (THAAD) Interceptors, Army/Navy/Transportable Phased array radar (AN/SPY-2), and Space Based Infrared Sensor (SBIRS)

C2BMC ELEMENT

The C2BMC Program accomplishes integrated BMDS and Block 2006 objectives by designing, developing and delivering enhanced and new capabilities via incremental spirals. Each spiral, 6.0, 6.2, and 6.4, represents an improvement in capability and functionality over its predecessor spiral. The delivery of these spirals includes the software, hardware, and network connectivity needed to operate an integrated Ballistic Missile Defense System (BMDS). C2BMC Program work is integrated across four product lines: BMD Planner, Combatant Command Command and Control (COCOM C2), Global Integrated Fire Control (GIFC), and BMD Network. The C2BMC Program also includes development support and post analysis for BMDS-level wargames and tests with fielded spirals.

The Command, Control, Battle Management, and Communications (C2BMC) Planner, a part of the BMDS test bed system, allows the warfighter to optimize the organization and configuration of the missile defense force (sensor, interceptors, and systems) to counter ballistic missile threats. Because of the global nature of ballistic missile threat, the BMDS requires the use of a C2BMC planner to coordinate between the dispersed commanders with the primary focus of coordinating strategic ballistic missile defense and organizing and coordinating theater missile defense. Rapidly changing geo-political issues will require rapid analysis, planning, and adjustment to missile system platforms and courses of actions among U.S. forces and allied partners, which in turn enables protection of the Homeland while enabling maximum coverage of the troops in the field. The C2BMC Planner uses defense designs that pair specific BMDS systems and sensors (THAAD, GMD, Aegis BMD, AN/TPY-2) to defend specified prioritized defended assets (cities, military installations, command infrastructure) against a given threat or set of threats. The flexibility of the planner allows the user to function in the three modes of activity: Deliberate Planning (18-24 months before a battle), Crisis Action Planning (hours or days before an attack, based on updated information), and Dynamic Planning (near real time agility for changing situations). The C2BMC Planner provides the theater and strategic commanders the ability to build, analyze and coordinate a global, integrated and layered defense at both the

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operational and strategic levels across all levels of command including across Combatant Commands. This type of coherent planning results in ballistic missile defense for the planned range and complexity of ballistic missile threats.

Specific BMD Planner capabilities in Block 06 are: (1) The C2BMC planner and analysis engines are rearchitected to run more efficiently and more quickly (as much as 4 times) than in Block 04. This increased efficiency results in the warfighters ability to rapidly assess the BMD protection capability (PROCAP) provided by estimating the performance and capability of the BMD systems against the assigned threats-- a unique and necessary capability required for strategic defense. (2) Operator displays and inputs are simplified and streamlined into a single graphical user interface, per Block 2004 user feedback. (3) The Block 2006 Planner incorporates the ability to create planning sequels and branches and adds merge and unmerge functions. This capability improves the warfighters ability to create and adapt integrated defense designs at the strategic and tactical levels by allowing the warfighter to take plans from different COCOMs and merge them and modify them in order to determine what type of coverage is available across commands. It will help to insure the efficient use of resources across commands. (4) The C2BMC Planner utilizes an open system architecture, which provides an evolutionary path for potential technology upgrades.

For the Block 06 C2BMC planner analysis capability, the analysis tool will be improved to include updated Element representations capabilities and Concept of Operations (CONOPS). This will continue through each of the spiral builds and Blocks. Current Block 06 Ballistic Missile Defense System (BMDS) capability assessments include the Ground Based Midcourse Defense System (GMD) with the Sea-Based X-band Radar (SBX), the Theater High Altitude Area Defense System (THAAD), one AN/TPY-2 radar, an interface to the AEGIS Ballistic Missile Defense System (AEGIS BMD), and an interface to the Army's Air and Missile Defense Work Station to enable interface with the PATRIOT systems.

The Combatant Command and Control (COCOM C2) product line consists of: situation awareness displays; decision aids that allow senior defense officials the ability to quickly see and evaluate the global missile defense threat and take appropriate defense responses; AN/TPY-2 radar sensor management; and, ability to forward radar tracks to other BMDS elements. Situation awareness emphasizes common, Single Integrated Ballistic Missile Picture (IBMP) and Summary Screens (SS) from the President down to the operational level of command. It combines the information from the BMD Planner with real-world intelligence information to provide the "big picture" view of worldwide threats, as well as the ability to focus on specific regions and individual launch events. It provides decision-makers, at all levels of command, BMDS readiness status and its ability to defend specific areas. Displayed data and assessment tools also provide the essential elements of information to enable senior-level decisions regarding defensive measures. COCOM C2 improvements in Block 2006 include executive summary screen enhancements such as Global Integrated Fire Control (GIFC) situation awareness interaction with COCOM Headquarters, additional battlespace information, consolidated display of Essential Elements of Information (EIs), and improved ability to organize and manage on-screen information with filters and moveable screen windows. Additionally, AN/TPY-2 radar management functionality in Block 2004 is re-hosted in Block 2006 software with enhancements for precision cueing

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and focused search plan selection, as well as improvements in user controls/displays. The ability to forward threat tracks from the AN/TPY-2 radar in Japan to U.S. Forces Japan and to Aegis BMD for cueing is also added in Block 2006. Finally, Block 2006 includes upgrades to interface with the Ground Based Missile Fire Control software version 6A and a direct data connection to Space Based Infrared System (SBIRS) information.

The Global Integrated Fire Control (GIFC) product line provides the first true BMDS battle management capability through C2BMC. It contains algorithms, decision aids, user interfaces, and sensor controls to allow the Integrated Missile Defense Operations Cell inside the Kenney Air Operations Center (AOC) (Hawaii) to optimize available sensor energy and interceptor inventory. GIFC capabilities are based on cutting-edge, dependable software development tools and techniques with significant testing performed up-front to prevent delivered software deficiencies. At the end of Block 2006, GIFC will have the primary task of managing the AN/TPY-2 radar in Japan (with COCOM C2 providing a backup capability) and include Patriot and Aegis BMD interceptors in its weapons assignment calculations. It will communicate intent to these elements using existing Link 16 message sets in the initial release, with eventual transition to BMDS Extensible Markup Language (XML) formatted messages throughout the BMDS network. As we develop the GIFC product line, we are moving towards a Service Oriented Architecture (SOA) for the BMDS. This will allow independent development of the individual elements and well-managed interfaces for integration into the BMD Network. By applying advanced development techniques, the C2BMC Program will produce a highly dependable network that has predictable behavior, is scalable for future growth, and will provide advanced information assurance to protect the BMDS. It will provide these interfaces between BMDS elements, beginning with GIFC in Spiral 6.4. Data Services will provide the right data to applications that need it throughout the BMDS network, and will minimize the number of interfaces required between individual elements.

The Network Communications portion of C2BMC ensures that communications and networking are not the limiting factor in fielding or operation of the BMDS. The intent is to develop products that provide robust, high availability, survivable connectivity to quickly and unambiguously share information across the global BMDS consisting of multiple sensors, weapon systems, and command and control nodes, as well as external users. Effective networking management and operations will rely on the ability to manage, coordinate, and integrate a wide variety of equipment platforms; interfaces with other DoD communications systems and existing/evolving information standards and capabilities. Defense Information Systems Agency (DISA) services are also highly leveraged in providing world-wide communications. In Block 2006, the Network portion of C2BMC will provide initial Network Centric Enterprise Services (NCES) capabilities, starting with centralized detailed network performance monitoring and cryptographic device management, which will evolve to full Quality of Service (QoS) network monitoring to ensure messages and communications are properly routed to avoid bottlenecks. Network development also includes development and fielding of a Parallel Staging Network (PSN) which allows new software spirals to be developed, tested, and operationally checked-out on fielded communications and C2BMC equipment prior to switching over to operational use. The PSN assures the operator higher availability of the operational system while continuing development on the parallel system. Once the warfighter accepts the developmental system, with new spiral software, as being operationally ready, it is switched over to

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operational use and existing operational hardware is turned over to development for the next generation of software. This capability enables concurrent operations and test and seamless transition of new C2BMC capabilities to the warfighter. Also, during Block 2006, Aegis Extremely High Frequency (EHF) connectivity will be established with U.S. Forces Japan (USFJ) and U.S. Forces Korea (USFK). Continued program planning and engineering support for network products provided to the GMD and Sensor elements for development, integration, and test.

As the C2BMC products mature they are engineered and integrated into fielded spirals. The C2BMC program uses spiral development (incremental development, test, and fielding) to deliver the hardware and software required to provide a system-wide integrated BMD capability. The key test event for development is completion of Cycle 2, Simulation-Based Verification, when software completes internal Command and Control, Battle Management, and Communications (C2BMC) development and begins integration testing with other Ballistic Missile Defense System (BMDS) elements. Block 2006 matured products are integrated in Spirals 6.0, 6.2 and 6.4, and then delivered to the field for concurrent development testing and operational use in conjunction with Responsible Test Organization (RTO), Responsible Engineering Organization (REO), and Aegis BMD and Ground-based Midcourse Defense (GMD) schedules and guidance. Completion of Cycle 5 testing, Site Activation Testing, signals delivery of fully functioning operational software. Spiral 6.0 is a minor capability improvement to Spiral 4.5 that enables a host nation interface for the AN/TPY-2 radar and interfaces for new element software improvements. Spiral 6.2 is the first major capability delivery of Block 2006 with the primary focus on improved reliability and availability, particularly with the BMD Planner. Spiral 6.4 delivers complete Block 2006 capability with a focus on the initial fielding of a Global Integrated Fire Control (GIFC) at the Kenney Air Operations Center (AOC).

**SITE ACTIVATION**

In addition to Block 2006 spiral software, fielding capability also includes installation and activation of C2BMC capabilities at U.S. Forces Korea (USFK), U.S. Forces Japan (USFJ), Cheyenne Mountain Operations Center (CMOC) equipment moves, and Kenney (Hawaii) AOC. Additionally, Pacific Command (PACOM) will receive a second C2BMC equipment suite. C2BMC fielding at these locations results in improved capability of the BMDS to meet global threats. All Combatant Commands (COCOMs) as well as Ft. Greely, AK will be installed with the parallel staging node hardware and capability. Block 2006 expands on current capability with numerous C2BMC planner and web browser installs as identified by the warfighter throughout the Block. Site Activation will include participation in planning for future Global BMDS operations and site installations.

**OPERATIONS AND SUPPORT**

C2BMC program Operations and Support consists of 24/7 on-site support, C2BMC Control Center activities, and hardware/software maintenance. On-site support provides:

- Assistance to the System Administrator assigned by the site (e.g. Combatant Commands), with the general operational support of the C2BMC system

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- Integration of the C2BMC support processes into the site's support regimen
- Daily network operations and security support for the C2BMC system as part of a transition plan
- Prime contractor “over-the-shoulder” support to users when requested, or alternatively, when they contact the C2BMC Control Center.

The C2BMC Control Center is located in Colorado Springs, CO and provides:

- Technical support to on-site personnel and to the C2BMC end-user
- Review of hardware/software problems and coordination of Commercial Off-the-Shelf (COTS) developer/vendor service calls
- Collect and prioritize failure data as identified by site support staff; implement corrective actions, and recommend changes to be implemented in future spirals
- Tracking and implementing documented escalation procedures
- Collection of reliability, availability and maintainability data for development of readiness metrics
- Maintenance of the C2BMC Control Center web site

Maintenance of the C2BMC system includes both software and hardware maintenance and sustaining engineering. Sustaining engineering consists of network and development engineering in support of system anomalies. Operations and Support also includes the procurement of communications lines from the Defense Information Service Agency (DISA), as well as fielding and maintaining, Communications Nodal Equipment (CNE), to include the Joint Range Extension (JRE) equipment, which enables a global network grid. Operations and Support includes on-site maintenance of communications equipment and C2BMC AN/TPY-2 radar interface equipment at the first AN/TPY-2 radar site in Japan.

**B. Accomplishments/Planned Program**

	FY 2006	FY 2007	FY 2008	FY 2009
C2BMC Element	0	150,982	106,566	3,766
RDT&E Articles (Quantity)	0	2	1	0

The C2BMC Element accomplishes block objectives by integrating work across five product lines: BMD Planner, Combatant Command Command and Control (COCOM C2), Global Integrated Fire Control (GIFC), Data Services, and Networks, so that mature capabilities can be integrated and incrementally delivered to the warfighter. Three incremental deliveries, or spirals, are planned in Block 2006: Spirals 6.0, 6.2, and 6.4.

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>		Date <b>February 2007</b>
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	R-1 NOMENCLATURE <b>0603896C BMD C2BMC</b>	
<p>FY07 Planned Program: FY07 RDT&amp;E Articles: Spiral 6.0 and Spiral 6.2</p> <ul style="list-style-type: none"> <li>• Deliver Spiral 6.0 (RDT&amp;E article). Spiral 6.0 is a minor software drop that enables the host nation (Japan) to receive data from the FY06 deployment of the AN/TPY-2 radar and establishes early C2BMC interfaces with emerging Ground Based Missile Defense (GMD) and Space Based Infrared System (SBIRS) capabilities. Spiral 6.0 includes the following additional capabilities to Spiral 4.5: <ul style="list-style-type: none"> <li>○ AN/TPY-2 radar to U.S. Forces Japan interface (Host Nation Interface)</li> <li>○ Interface for GMD Fire Control (GFC) version 6A</li> <li>○ Direct data connection to SBIRS</li> </ul> </li> <li>• Deliver Spiral 6.2 (RDT&amp;E article). Spiral 6.2 is a major capability increase over the functions found in Spiral 4.5. It also incorporates those capabilities delivered early in FY07 with Spiral 6.0. Spiral 6.2 includes the following additional capabilities:</li> <li>• Ballistic Missile Defense (BMD) Planner <ul style="list-style-type: none"> <li>○ Rearchitected/Reengineered software to improve reliability, maintainability, and response</li> <li>○ Redesigned user displays and data input</li> <li>○ Improved plan integration (ability to combine individual plans and create excursions without affecting the core plan)</li> <li>○ For development test only: interface with Aegis Global Command Control System (GCCS-M) planner</li> </ul> </li> <li>• Combatant Command Command and Control (COCOM C2) <ul style="list-style-type: none"> <li>○ AN/TPY-2 radar management (improved ability to pass precision cues and select focused search plans)</li> <li>○ Operational Capability/Protection Capability (OPSCAP/PROCAP) integration and display</li> <li>○ AN/TPY-2 radar track forwarding to Aegis BMD via Air Defense System Integrator (ADSI) and Link 16</li> <li>○ Consolidation and display of warfighter essential elements of information (EEl)s for more informed decision making</li> <li>○ Improved ability to organize and manage display data through the use of configurable filters, information flags, and window sizing</li> <li>○ For development testing only: initial use of Multi-Hypothesis Correlator/BMDS Launch Event Association - Global Vision (MHC/BLEA-GV). MHC improves ability to create a single threat radar track from multiple sensors; BLEA-GV merges multiple radar tracks to an associated launch event. Both capabilities improve the accuracy of threat information for decision making and defensive responses.</li> </ul> </li> <li>• Network <ul style="list-style-type: none"> <li>○ Synchronize data between Combatant Commands (COCOMs) that allows the same information to be displayed at any BMD display</li> <li>○ Initial Network Quality of Service (QoS) to ensure constant communications</li> <li>○ Aegis Extremely High Frequency (EHF), United States Forces Japan (USFJ), United States Forces Korea (USFK) connectivity</li> <li>○ Communications Parallel Staging Network (PSN)</li> <li>○ Develop and code Spiral 6.4, COCOM C2, and GFIC software</li> </ul> </li> </ul>		

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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 0603896C BMD C2BMC	
<ul style="list-style-type: none"><li>○ Provide network engineering support for testing AN/TPY-2 #3 at Vandenberg AFB</li><li>○ Perform software deficiency analyses and develop solutions</li><li>○ Perform monthly information assurance scans and correct deficiencies</li><li>○ Participate in and analyze results of Ballistic Missile Defense System integration, ground, and flight tests (minimum of 6 events)</li><li>○ Participate in and analyze results of wargames (minimum of 6 events)</li></ul> <p>FY08 Planned Program</p> <ul style="list-style-type: none"><li>● Deliver Spiral 6.4 (RDT&amp;E article). Spiral 6.4 is a major capability increase and includes the following additional capabilities over the functions found in Spiral 6.2<ul style="list-style-type: none"><li>○ BMD Planner<ul style="list-style-type: none"><li>▪ Provide defense designs (individual BMD plans) to data services for Global Integrated Fire Control (GIFC) consumption</li><li>▪ Provide an initial integration of the BMD Planner and Joint Engine for Defense Analysis (JEDA) graphical user interface “with Defended Area Analysis” which provides a quick visualization of how well a particular plan performs its mission</li><li>▪ External Interface Improvements with Element Planners (Army Missile Defense Warning System (AMDWS), Aegis Global Command Control System (GCCS-M)) and Intel database</li></ul></li><li>○ COCOM C2<ul style="list-style-type: none"><li>▪ Operationalize Multi-Hypothesis Correlation/BMDS Launch Event Association - Global Vision (MHC/BLEA-GV)</li><li>▪ Synchronize GIFC to COCOM track ID association for consistent threat tracks at all levels of command</li><li>▪ GIFC Summary Information Displays at COCOM headquarters which provides the same “sight-picture” to both the theater and strategic commanders</li><li>▪ COCOM Processing of Implemented BXF Messages to speed processing and display of information</li><li>▪ MW/MD display overlays to streamline operator access to information</li><li>▪ Retain Spiral 6.2 AN/TPY-2 radar management capability at the COCOM C2 as fail over from GIFC</li><li>▪ Retain Spiral 6.2 track forwarding capability at the COCOM C2 as fall back from GIFC</li></ul></li><li>○ GIFC<ul style="list-style-type: none"><li>▪ Increment 3.2: Initial GIFC capability</li><li>▪ Correlate tracks, lethal tracks automatically identified based on high quality information</li><li>▪ Primary control, monitoring, and tasking of AN/TPY-2 radar</li><li>▪ Weapon system health and monitoring</li><li>▪ Optimize weapon usage; de-conflict weapon intent and integrated engagement plan</li></ul></li></ul></li></ul>		

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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- Track forwarding via Link 16 for communication with Aegis BMD
- Forward AN/TPY-2 radar tracks, Integrated Engagement Plan, and engagement status to COCOM C2
- Provide filters to improve decision making on lower quality data
- Provide the following data services: Defense Design, Blue Force Operations Capability (OPSCAP), AN/TPY-2 Data, System Track, Battle Manager Alert, Integrated Engagement Plan, Object Reporting, Weapon Tasking, Health & Status Reporting
- Networks
  - Full Quality of Service Network Monitoring implementation
  - Improved system management to identify communication failure/overloads for immediate corrective action
  - Improved message handling reliability to ensure transmission even in a degraded communications environment
  - Delivery of Protection Capability (PROCAP) to all levels of command
  - Implementation of upgrades to increase system performance/survivability of network to support GIFC
- Perform software deficiency analyses and develop solutions
- Perform monthly information assurance scans and correct deficiencies
- Participate in and analyze results of Ballistic Missile Defense System integration, ground and flight tests per the BMDS Integrated Master Test Plan
- Participate in and analyze results of wargames (minimum of 6 events) in accordance with the BMDS Integrated Master Test Plan

**FY09 Planned Program**

- Perform software deficiency analyses and develop solutions
- Perform monthly information assurance scans and correct deficiencies
- Participate in and analyze results of BMDS integration, ground, and flight tests per the BMDS Integrated Master Test Plan
- Participate in and analyze results of wargames

	FY 2006	FY 2007	FY 2008	FY 2009
Site Activation	0	15,392	9,466	0
RDT&E Articles (Quantity)	0	4	1	0

Block 2006 Site Activation efforts continue to address the fielding and upgrade of all C2BMC associated hardware and software (Suites, Enterprise Work Stations (EWS), web browsers, and communications equipment) which enable the warfighter to plan, see, and manage the ballistic missile defense battle.

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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**FY07 Planned Program:**

**FY07 RDT&E Articles:** Full C2BMC Suite, 3 Upgraded C2BMC Suites (PSN)

- Install Strategic Command (STRATCOM) 6.2 Parallel Staging Node (RDT&E and Article)
- Install Pacific Command (PACOM) 6.2 Parallel Staging Node (RDT&E and Article)
- Install Northern Command (NORTHCOM) 6.2 Parallel Staging Node (RDT&E and Article)
- Install Enterprise Work Stations (EWS) at Missile Operations Center
- Install U.S. Forces Japan (USFJ) Web Browser
- Install U.S. Forces Korea (USFK) Web Browser
- Install New SecDef Web Browser 4.5
- Install second Pacific Command (PACOM) C2BMC Suite (RDT&E and Article)
- Install Spiral 6.0 software at NORTHCON, PACOM, and SRATCOM
- Install Spiral 6.2 software at NORTHCON, PACOM, and SRATCOM

**FY08 Planned Program:**

**FY08 RDT&E Articles:** GIFC at PACOM, 3 spiral software loads

- Install Global Integrated Fire Control (GIFC) hardware at PACOM (RDT&E and Article)
- Install Northern Command (NORTHCOM) Spiral 6.4
- Install Strategic Command (STRATCOM) Spiral 6.4
- Install Pacific Command (PACOM) Spiral 6.4
- Install Spiral 6.4 software at NORTHCOM, STRATCOM, and PACOM
- Install Enterprise Work Stations and Web Browsers

	FY 2006	FY 2007	FY 2008	FY 2009
Operations and Support	0	0	57,105	57,343
RDT&E Articles (Quantity)	0	0	0	0

Operations and Support procedures are planned for all fielded Block 2006 hardware and software. Maintenance agreements will be established and spare parts will be procured and delivered to each site. At each location an agreement in the form of a site installation plan will be drafted and approved to outline roles and responsibilities of all stakeholders. A follow-on engineering site implementation document will be developed to lay out the details for activating the site.

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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**FY08 Planned Program:**

- Provide on-site C2BMC support of fielded sites for hardware and software
- Maintain C2BMC Control Center at JNIC for fielded capabilities
- Provide C2BMC operator training for fielded capabilities
- Provide and support communications circuits for fielded C2BMC locations
- Provide sustaining engineering support for fielded hardware and software

**FY09 Planned Program:**

- Provide on-site C2BMC support of fielded sites for hardware and software
- Maintain C2BMC Control Center at JNIC for fielded capabilities
- Provide C2BMC operator training for fielded capabilities
- Provide and support communications circuits for fielded C2BMC locations
- Provide sustaining engineering support for fielded hardware and software

**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 0603884C Ballistic Missile Defense Sensors	284,297	514,129	778,163	984,963	939,417	791,701	723,843	603,585	5,620,098
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

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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 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**

The Command and Control Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Missile Defense Agency's capability-based acquisition strategy that emphasizes testing, spiral development, evolutionary acquisition, and knowledge-based funding through the use of two-year capability blocks. Lockheed Martin Mission Systems is the C2BMC prime contractor via an Other Transactions Agreement. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, fielding, training, and operations and sustainment support of the C2BMC system. They perform development and testing of C2BMC products in Arlington, VA; Huntsville, AL; and Colorado Springs, CO; and provide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) is charged to support fielded C2BMC capabilities in Nebraska, Colorado, Hawaii, Virginia, and Japan. C2BMC Program Office government, Federally Funded Research Development Center/University Affiliated Research Centers (FFRDC/UARC), and Scientific Engineering and Technical Assistance (SETA) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

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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 0603896C BMD C2BMC					
<b>I. Product Development Cost ( \$ in Thousands )</b>										
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
<b>C2BMC Element</b>										
C2BMC HW/SW Development/I&T	SS/CPAF	Lockheed Martin Team/ Colorado Springs, CO	0	32,627	1/2Q	32,228	1Q	1,243	1Q	66,098
C2BMC HW/SW Development/I&T	SS/CPAF	Lockheed Martin Team/ Huntsville, AL	0	4,943	1/2Q	4,883	1Q	188	1Q	10,014
C2BMC Product Engineering & Development	SS/CPAF	Lockheed Martin Team/ Arlington, VA	0	61,299	1/2Q	60,550	1Q	2,335	1Q	124,184
EW/CEW; SBIRS-DSP; GCCS; JDP; JRE; ISC2; ECPs		Services, DISA, Agencies	0	16,565	N/A	8,905	N/A	0	N/A	25,470
Federally Funded Research Development Centers	SS/CPAF	MITRE, IDA, ORNL, MIT/LL/ Washington, DC	0	11,441	N/A	0	N/A	0	N/A	11,441
MDA Civilian			0	5,387	N/A	0	N/A	0	N/A	5,387
Scientific Engineering Technical Assistance	SS/FFP	Sparta/Arlington, VA	0	18,720	N/A	0	N/A	0	N/A	18,720
<b>Site Activation</b>										
Suites and Comms Gateways	SS/CPAF	Lockheed Martin Team/COCOMS	0	15,392	1/2Q	9,466	1Q	0	N/A	24,858
<b>Operations and Support</b>										
Unit Personnel, Cont System Improv, Sustaining Suppt	SS/CPAF	Lockheed Martin Team/ Washington, DC	0	0	N/A	43,059	1Q	41,636	N/A	84,695
Indirect Support	MIPR	DISA DECC	0	0	N/A	4,296	1Q	5,752	N/A	10,048
Unit Operations - Leased Circuits	MIPR	DISA	0	0	N/A	9,750	1Q	9,955	N/A	19,705

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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 0603896C BMD C2BMC					
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			0	166,374		173,137		61,109		400,620
<b>Remarks</b>										
<b>II. Support Costs Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>III. Test and Evaluation Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>IV. Management Services Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
Project Total Cost			0	166,374		173,137		61,109		400,620
<b>Remarks</b>										

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<b>Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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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					
<b>C2BMC Element</b>																																					
Spiral 6.0 Cycle 5 Testing					▲																																
Spiral 6.2 Cycle 2 Testing							△	△																													
Spiral 6.2 Cycle 5 Testing								△	△																												
Spiral 6.4 Cycle 2 Testing											△	△																									
Spiral 6.4 Cycle 5 Testing												△	△																								
GIFC Increment 2					▲	▲			△	△																											
GIFC Increment 3.2												△	△																								
Block 06 System Level Tests					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲																					
<b>Site Activation</b>																																					
C2BMC upgrades (PSN) at STRATCOM, PACOM, NORTHCOM												△																									
S6.0 at STRATCOM, NORTHCOM, and PACOM					△																																
S6.2 at STRATCOM, NORTHCOM, and PACOM								△																													
Second full C2BMC suite installed at PACOM								△																													

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



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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 0603896C BMD C2BMC				
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
<b>C2BMC Element</b>								
Spiral 6.0 Cycle 5 Testing		1Q						
Spiral 6.2 Cycle 2 Testing		2Q-3Q						
Spiral 6.2 Cycle 5 Testing		3Q-4Q						
Spiral 6.4 Cycle 2 Testing			2Q-3Q					
Spiral 6.4 Cycle 5 Testing			3Q-4Q					
GIFC Increment 2		1Q-4Q	1Q					
GIFC Increment 3.2			3Q-4Q					
Block 06 System Level Tests		1Q-4Q	1Q-4Q	1Q-3Q				
<b>Site Activation</b>								
C2BMC upgrades (PSN) at STRATCOM, PACOM, NORTHCOM		4Q						
S6.0 at STRATCOM, NORTHCOM, and PACOM		1Q						
S6.2 at STRATCOM, NORTHCOM, and PACOM		3Q						
Second full C2BMC suite installed at PACOM		4Q						
GIFC Hardware at PACOM AOC			4Q					
<b>Operation &amp; Sustainment</b>								
Block 06 O&S			1Q-4Q	1Q-4Q				

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>						Date <b>February 2007</b>		
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>				<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>				
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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0901 Command and Control, Battle Management and Communications (C2BMC) Block 2008	0	16,520	73,688	209,068	179,982	72,967	0	0
RDT&E Articles Qty	0	0	0	2	2	0	0	0

*Note: RDT&E Articles: Spiral 8.2 and 8.4; EUCOM and CENTCOM C2BMC hardware*

**A. Mission Description and Budget Item Justification**

In support of and in collaboration with the Missile Defense Agency's defined architectures and system specifications, the Command and Control, Battle Management and Communications (C2BMC) Program will provide the warfighter the capability to plan the Ballistic Missile Defense (BMD) fight while concurrently tracking all potential ballistic missile threats, directing weapons to engage on a distributed network; and pairing any sensor with any shooter to defeat ballistic missile threats at any range, in any phase, in all theaters. The C2BMC Program will also work to increase coalition partners' capabilities via hardware, software, and operations and sustainment support.

The C2BMC Block 2008 Program enables a coordinated ballistic missile defense against medium size raids and asymmetric threats (as would occur from non-traditional threat trajectories from the south or ship-based). Specific Block goals are to deliver:

- Improved system reliability and availability through network monitoring, equipment upgrades, and maintainable software
- Fully integrated planner and situation awareness displays with integrated intelligence information and defended asset priority schemes
- Initial type interfaces between weapons and sensors compatible with DoD network-centric service-oriented architecture to enable more rapid integration of new assets into the BMDS
- Global Integrated Fire Control (GIFC) coordination and optimization of increased “Launch-on and Engage-on” networked capability
- Communication capability which will extend BMDS mission success by providing information management and quality of service to the individual user
- Expanded C2BMC, hence the Ballistic Missile Defense System global coverage with activation of European Command (EUCOM) and Central Command (CENTCOM) C2BMC capability

**C2BMC ELEMENT**

The C2BMC Program accomplishes block objectives by demonstrating and operationalizing advancements in the integration of four product lines -- BMD Planner, Combatant Command and Control (COCOM C2), GIFC, and BMD Network. Two software spirals (8.2 and 8.4) are delivered in Block 2008. The delivery of these spirals includes the software, hardware, and network connectivity needed to operate an integrated Ballistic Missile

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<p>Defense System (BMDS), consists of a greater number of radars and tactical weapon systems as compared to Block 2006. The hardware and software in Block 2008 will allow network sharing of target data to enable launch/engage on sensors that are not organic to the individual weapon system, but rather belong to the BMDS network as a whole. The capability delivered in these spirals will enable BMDS Block 2008 Engagement Sequence Groups (ESG's) by delivering the key interfaces, planning, and coordination to allow BMDS elements and components to work together more effectively by extending the range and reach of the weapon systems.</p> <p>The Block 08 BMD Planner increases the flexibility, interoperability, and speed of command with innovative new planning capabilities. The first new capability will transition the BMD Planner to a net-centric architecture. Net-Centric Enterprise Services (NCES) will provide publication/subscription planning services to the Combatant Commands, MDA, BMDS Elements, or other authenticated users, laying the foundations for dynamic planning (near real-time). The integration of the BMD Planner with various existing operational planning systems such as the Joint Operational Planning and Execution System (JOPES) and the Time Phased Force Deployment Data (TPFDD) (which estimates force flow and maneuvers), provides the theater and strategic commanders the flexibility to build, analyze and coordinate global, layered defense designs across all levels of command in both time and space. The second new capability is the ability to develop robust two-way interfaces with real-time Global Integrated Fire Control System (GIFC) via C2BMC data services. This will increase the flexibility and speed of command by providing real-time status of weapons inventories, operational capabilities (OPSCAP) status, and engagement recommendations to update current execution plans. This enables capturing battlespace activities and trends, and automatic feed of that information into follow-on planning sessions. This will also enable initial updates to plans given near real-time situational inputs. The third new capability will add integration of Offensive/Defensive Integration (ODI) Planning through the Strategic Command's Integrated Strategic Planning and Analysis Network (ISPAN) and the JFACC's Theater Battle Operations Network Centric Environment (TBONE).</p> <p>The Block 08 BMD Planner's analysis capability will continue to update existing Element representations and add improved capabilities and limitations for Ground-Based Midcourse Defense (GMD), add AN/TPY-2 radars to the BMDS, and provide an initial assessment of Airborne Laser (ABL).</p> <p>The Combatant Command Command and Control (COCOM C2) product line consists of situation awareness displays, decision aids that allow senior defense officials the ability to quickly see and evaluate the global missile defense threat and take appropriate defense responses, AN/TPY-2 radar sensor management (as a fail over capability from Global Integrated Fire Control), and ability to forward radar tracks to other BMDS elements (also, as a fail over capability from Global Integrated Fire Control). Block 2008 COCOM C2 situation awareness displays add offensive/defensive integration (ODI) implementing an interface with the Air Force Theater Battle Management Core System (TBMCS) for retrieval and display of Air Tasking Orders, and transmission of launch points and target nominations. Additionally, it incorporates basic consequence mitigation information</p>		

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<p>consisting of transmitting consequence prediction data (system track, impact point, hit assessment) to external agencies. Block 2008 COCOM C2 warfighter decision aids are also improved based upon feedback on fielded C2BMC systems and includes the automatic generation of world-wide protection capability (PROCAP) based on real-time status of threats and BMDS assets. Collaboration with friends and Allies will also be enabled via expanded Network Enterprise Centric Services (NECS). Government/Contractor off-the-shelf (GOTS/COTS) products, system administration improvements, post-analysis tools for tests and trouble shooting, a space object catalog for storage and periodic transmission to Ground-Based Midcourse Defense, and hardware upgrades to increase processing capacity are also planned in Block 2008.</p> <p>The Global Integrated Fire Control (GIFC) product line provides BMDS battle management capability through C2BMC. It contains algorithms, decision aids, user interfaces, and sensor controls to allow an Integrated Missile Defense Operations Cell to optimize available sensor energy and interceptor inventory. GIFC capabilities are based on cutting-edge, dependable software development tools and techniques with significant testing performed up-front to prevent delivered software deficiencies. In Block 2008, Global Integrated Fire Control (GIFC) will fully mature as the Ballistic Missile Defense System (BMDS) battle manager with expansion to the European and Middle Eastern areas of responsibility. Enhanced sensor management includes the creation of common X-Band type interfaces to more easily incorporate Theater High Altitude Area Defense (THAAD) and Sea-Based X-Band Radar (SBX) into the BMDS; ability to receive track-based measurement data from AN/TPY-2 radar and SBX; a direct SBX connection to C2BMC; and AN/TPY-2 radar hit assessment processing. Additionally, Block 2008 capabilities include interfaces for AN/TPY-2 radar capability 2 and 3 (CR2/CR3) discrimination data and ability to perform feature-aided track correlation. The Block 2008 GIFC will also monitor and coordinate sensor registration of BMDS radars and be able to forward radar tracks from AN/TPY-2 radar to THAAD, from THAAD to Ground-based Midcourse Defense (GMD), and from Upgraded Early Warning Radars (UEWRs)/SBX to other Link 16 platforms (such as THAAD and Aegis BMD), as well as, perform engagement coordination between Aegis BMD, THAAD, Patriot and GMD. Finally, the Block 2008 GIFC will be able to create and transmit an initial BMD system track for use by all elements. As GIFC matures it will move towards a Service Oriented Architecture (SOA) -- key to ensuring a BMDS network-centric architecture. This will allow independent development of the individual elements and well-managed interfaces for integration into the BMD Network. By applying advanced development techniques, the C2BMC Program will produce a highly dependable network with predictable behavior, scalable for future growth, providing advanced information assurance to protect the BMDS. Block 2008 incorporates all available services necessary to plan and operate the BMDS. These services will migrate to the DOD-wide move to Network Enabled Command Capability (NECC).</p> <p>The BMD Network product features a more redundant, high availability network with diverse paths and increased communications support to the BMDS elements to include added sensors and weapons. Capabilities such as dynamic real-time network management and monitoring will enable the warfighter to monitor the connection to BMDS weapons and anticipate and remedy any issues as they occur, vice having to wait for a human-in-the-loop to report a problem and provide a correction. Additionally, an expanded network centric capability (worldwide connectivity of separately</p>		

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<p>developed sensors and weapon systems) will extend BMDS mission success by providing information management and quality of service to the individual user. During Block 2008, connectivity will be established with European Command (EUCOM) and Central Command (CENTCOM). Engineering and program planning support will be provided to the GMD and Sensors elements for development of network products for the 3rd Site.</p> <p><b>SITE ACTIVATION</b> C2BMC capabilities (hardware and software) will be deployed to EUCOM and CENTCOM with existing sites receiving upgrades as needed. Deployment to these combatant commands continues to expand BMDS on a global scale, providing increased protection to the U.S., and its friends and Allies. Block 2008 expands current capability with numerous BMD Planner, web browser, and Enterprise Workstation installations per warfighter requirements. Site Activation also includes participation in planning for future BMDS operations and site installations.</p> <p><b>OPERATIONS AND SUPPORT</b> C2BMC Program Operations and Support consists of 24/7 on-site support, C2BMC Control Center activities, and hardware/software maintenance.</p> <p>On-site support provides:</p> <ul style="list-style-type: none"><li>• Assistance to the System Administrator assigned by the site (e.g., Combatant Commands), with the general operational support of the C2BMC system</li><li>• Integration of the C2BMC support processes into the site's support regimen</li><li>• Daily network operations and security support for the C2BMC system as part of a transition plan</li><li>• Prime contractor “over-the-shoulder” support to users when requested, or alternatively, via the C2BMC Control Center</li></ul> <p>The C2BMC Control Center is located in Colorado Springs, CO and provides:</p> <ul style="list-style-type: none"><li>• Technical support to on-site personnel and to the C2BMC end-user</li><li>• Review of hardware/software problems and coordination of Commercial Off-the-Shelf (COTS) developer/vendor service calls</li><li>• Collect and prioritize failure data as identified by site support staff; implement corrective actions, and recommend changes to be implemented in future spirals</li><li>• Tracking and implementing documented escalation procedures</li><li>• Collection of reliability, availability and maintainability data for development of readiness metrics</li><li>• Maintenance of the C2BMC Control Center web site</li></ul>		

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Maintenance of the C2BMC System includes both software and hardware maintenance and sustaining engineering. Sustaining engineering consists of network and development engineering in support of system anomalies. Operations and Support also includes the procurement of communications lines from the Defense Information Service Agency (DISA), as well as fielding and maintaining, Communications Nodal Equipment (CNE), to include the Joint Range Extension (JRE) equipment, which enables a global network grid. Operations and Support includes on-site maintenance of communications equipment and C2BMC AN/TPY-2 radar interface equipment at the first AN/TPY-2 radar site in Japan.

**B. Accomplishments/Planned Program**

	FY 2006	FY 2007	FY 2008	FY 2009
C2BMC Element	0	16,520	73,688	183,105
RDT&E Articles (Quantity)	0	0	0	1

The C2BMC Element accomplishes block objectives by integrating work across four product lines: BMD Planner, Combatant Command Command and Control (COCOM C2), Global Integrated Fire Control (GIFC), and BMD Networks, so mature capabilities are integrated and incrementally delivered to the warfighter. Spirals 8.2 and 8.4 are planned in Block 2008:

**FY07 Planned Program**

- Conduct block architecture, design trade studies
- Conduct block system requirements allocation
- Establish Spiral 8.2 Content Agreement
- Perform Spiral 8.2 software/hardware engineering
- Develop BMD Network requirements for Block 2008

**FY08 Planned Program**

- Perform Spiral 8.2 software development/coding
- Establish Spiral 8.4 Content Agreement
- Perform Spiral 8.4 software/hardware engineering

**FY09 Planned Program**

- Perform Spiral 8.2 COCOM C2, GFIC, and Network software verification and integration
- Deliver Spiral 8.2 (RDT&E article). Spiral 8.2 is a major capability increase and includes the following additional capabilities over the functions found in Spiral 6.4.

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<ul style="list-style-type: none"><li>○ BMD Planner<ul style="list-style-type: none"><li>▪ Net-centric planning</li><li>▪ Global Priority Defended Asset List</li><li>▪ Re-architected Joint Defense Planner (JDP)/Joint Engine for Defense Analysis (JEDA)</li><li>▪ BMD Planner/Intel Data interface</li></ul></li><li>○ COCOM C2<ul style="list-style-type: none"><li>▪ Improved user displays</li><li>▪ Automated Protection Capability (PROCAP) generation</li><li>▪ Offensive/Defensive Integration (ODI)</li><li>▪ Initial Consequence Mitigation</li><li>▪ System Administration improvements</li><li>▪ Fail-over for AN/TPY-2 radar management and track forwarding</li><li>▪ Space Catalog initial integration</li></ul></li><li>○ GIFC<ul style="list-style-type: none"><li>▪ Common X-Band type interface</li><li>▪ Sea-Based X-Band Radar (SBX) Direct interface</li><li>▪ Monitor sensor registration</li><li>▪ Engagement planning and execution between Aegis BMD, THAAD, and Patriot</li><li>▪ Capability 2 and 3 (CR2/CR3) Discrimination interface</li><li>▪ Net-Enabled Command Capability (NECC) integration</li></ul></li><li>○ Network<ul style="list-style-type: none"><li>▪ Develop strategies to migrate to Internet Protocol Version 6 (IP v6) with no impact to operational capability</li><li>▪ Implement European Command (EUCOM) connectivity and deploy Communications Network Equipment (CNE)</li></ul></li><li>● Perform software deficiency analyses and develop solutions</li><li>● Perform Spiral 8.4 COCOM C2, GIFC and Network software development/coding</li><li>● Perform monthly information assurance scans and correct deficiencies</li><li>● Participate in and analyze results of BMDS integration, ground, and flight tests per the BMDS Integrated Master Test Plan (IMTP)</li><li>● Participate in and analyze results of wargames</li></ul>		

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	FY 2006	FY 2007	FY 2008	FY 2009
Site Activation	0	0	0	25,963
RDT&E Articles (Quantity)	0	0	0	1

Block 2008 Site Activation efforts continue to address the fielding and upgrade of all C2BMC associated hardware and software (Suites, Enterprise Work Stations (EWS), web browsers, and communications equipment) enabling the warfighter to plan, see, and manage the ballistic missile defense battle.

**FY09 Planned Program:**

- Install Spiral 8.2 at NORTHCOM, STRATCOM, PACOM, Pacific AOC, and EUCOM
- Install EUCOM C2BMC hardware (RDT&E Article)

**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 0603884C Ballistic Missile Defense Sensors	284,297	514,129	778,163	984,963	939,417	791,701	723,843	603,585	5,620,098
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 0603897C BMD Hercules	0	49,674	53,658	54,264	54,405	55,142	53,355	54,198	374,696

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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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**

The Command and Control Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Missile Defense Agency's capability-based acquisition strategy that emphasizes testing, spiral development, evolutionary acquisition, and knowledge-based funding through the use of two-year capability blocks. Lockheed Martin Mission Systems is the C2BMC prime contractor via an Other Transactions Agreement. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, fielding, training, and operations and sustainment support of the C2BMC system. They perform development and testing of C2BMC products in Arlington, VA; Huntsville, AL; and Colorado Springs, CO; and provide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) is charged to support fielded C2BMC capabilities in Nebraska, Colorado, Hawaii, Virginia, and Japan. C2BMC Program Office government, Federally Funded Research Development Center/University Affiliated Research Centers (FFRDC/UARC), and Scientific Engineering and Technical Assistance (SETA) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

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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 0603896C BMD C2BMC					
<b>I. Product Development Cost ( \$ in Thousands )</b>										
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
<b>C2BMC Element</b>										
C2BMC HW/SW Development, I&T	SS/CPAF	Lockheed Martin Team/ Col. Springs, Co	0	5,452	1/2Q	9,386	1Q	37,274	1Q	52,112
C2BMC HW/SW Development, I&T	SS/CPAF	Lockheed Martin Team/ Huntsville, AL	0	826	1/2Q	1,422	1Q	5,648	1Q	7,896
C2BMC Product Engineering & Development	SS/CPAF	Lockheed Martin Team/ Arlington, VA	0	10,242	1/2Q	17,634	1Q	70,028	1Q	97,904
Scientific Engineering and Technical Assistance	SS/FFP	Sparta/ Arlington, VA	0	0	N/A	20,349	1Q	20,776	1Q	41,125
Federally Funded Research Development Centers	SS/CPAF	MITRE, IDA, ORNL, MIL/LL// Washington, DC	0	0	N/A	11,717	1Q	11,963	1Q	23,680
MDA Civilian & Travel			0	0	N/A	5,503	1Q	5,618	1Q	11,121
EW/CEW; NECC; JDP; JRE; ISC2; PATRIOT-JTAGS		Services, DISA, Agencies	0	0	N/A	7,677	1Q	16,798	1Q	24,475
C2BMC Program Office Move			0	0	N/A	0	N/A	15,000	1Q	15,000
<b>Site Activation</b>										
Suites and Comms Gateways	SS/CPAF	Lockheed Martin Team/ COCOMs	0	0	N/A	0	N/A	25,963	1Q	25,963
<b>Subtotal Product Development</b>			0	16,520		73,688		209,068		299,276
<b>Remarks</b>										

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Missile Defense Agency (MDA) Exhibit R-3 RDT&E Project Cost Analysis								Date <b>February 2007</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>					R-1 NOMENCLATURE <b>0603896C BMD C2BMC</b>					
<b>II. Support Costs Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>III. Test and Evaluation Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>IV. Management Services Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
Project Total Cost			0	16,520		73,688		209,068		299,276
<b>Remarks</b>										

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<b>Missile Defense Agency (MDA) Exhibit R-4 Schedule Profile</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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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				
<b>C2BMC Element</b>																																				
Spiral 8.2 Content Agreement					Δ																															
Spiral 8.2 Cycle 2 Testing													Δ	Δ																						
Spiral 8.2 Cycle 5 Testing															Δ	Δ																				
Spiral 8.4 Content Agreement											Δ																									
Spiral 8.4 Cycle 2 Testing																	Δ	Δ																		
Spiral 8.4 Cycle 5 Testing																			Δ	Δ																
GIFC Increment 3									Δ	Δ	Δ	Δ																								
GIFC Increment 4											Δ	Δ	Δ	Δ																						
System Level Tests																	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ												
<b>Site Activation</b>																																				
Install EUCOM Hardware																																				
Install Spiral 8.2																	Δ	Δ																		
Install CENTCOM Hardware																																			Δ	

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



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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date <b>February 2007</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>				R-1 NOMENCLATURE <b>0603896C BMD C2BMC</b>				
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
<b>C2BMC Element</b>								
Spiral 8.2 Content Agreement		2Q						
Spiral 8.2 Cycle 2 Testing				2Q-3Q				
Spiral 8.2 Cycle 5 Testing				3Q-4Q				
Spiral 8.4 Content Agreement			2Q					
Spiral 8.4 Cycle 2 Testing					2Q-3Q			
Spiral 8.4 Cycle 5 Testing					3Q-4Q			
GIFC Increment 3		3Q-4Q	1Q-3Q					
GIFC Increment 4			3Q-4Q	1Q-3Q				
System Level Tests				3Q-4Q	1Q-4Q	1Q-4Q		
<b>Site Activation</b>								
Install EUCOM Hardware				4Q				
Install Spiral 8.2				3Q-4Q				
Install CENTCOM Hardware					4Q			
Install Spiral 8.4					3Q-4Q			
<b>Operation &amp; Sustainment</b>								
Block 08 O&S				4Q	1Q-4Q	1Q-4Q		

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0001 Command and Control, Battle Management and Communications (C2BMC) Block 2010	0	0	1,111	8,417	99,174	183,481	98,362	56,456
RDT&E Articles Qty	0	0	0	0	0	1	1	0

*Note: RDT&E Articles: Spiral 10.2 and 10.4*

**A. Mission Description and Budget Item Justification**

In collaboration with MDA Systems Engineering and Integration defined architectures and system specifications, the Command and Control, Battle Management and Communications (C2BMC) Program will provide the warfighter the capability to plan the Ballistic Missile Defense (BMD) fight while concurrently: tracking all potential ballistic missile threats, directing weapons to engage on a distributed network and pairing any sensor with any shooter to defeat ballistic missile threats at any range, in any phase, in all theaters, with coalition partners increase capabilities via hardware, software, and operations and sustainment support in two-year blocks.

The C2BMC Block 2010 Program enables a coordinated defense against medium size raids and asymmetric threats (as would occur from non-traditional threat trajectories). Specific Block goals are to deliver:

- Capability to easily and quickly incorporate new sensors and weapon systems into global integrated C2BMC network
- Command and Control decision aids to re-direct coordinated engagements
- BMDS-level discrimination for boost/early ascent and expanded engagement coordination to include intelligence projections
- Continued BMDS global expansion with additional C2BMC deployed locations

**C2BMC ELEMENT**

The C2BMC Element accomplishes Block 2010 objectives by designing, developing and delivering enhanced and new capabilities via incremental spirals. Each spiral, 10.2 and 10.4, represents an improvement in capability and functionality over its predecessor spiral. The delivery of these spirals includes the software, hardware, and network connectivity needed to operate an integrated BMDS. C2BMC Program work is integrated among four product lines: BMD Planner, Combatant Command Command and Control (COCOM C2), Global Integrated Fire Control (GIFC), and BMD Network. The C2BMC Program also includes development support and post analysis for BMDS-level wargames and tests with fielded spirals.

In Block 2010, the BMD Planner, COCOM C2, GIFC, and BMD Network will all be expanded to include additional BMDS sensors and weapons. This includes planning capability for Kinetic Energy Interceptors, Space Tracking and Surveillance System (STSS), and Third Site deployment in Europe. The BMD Planner and COCOM C2 functions will be matured, supporting operators in rapid battle plan adjustments with incorporation of

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<p>more robust simulation/wargaming/modeling tools to improve “what-if” assessments of the battlespace; and, command and control decision aids to re-direct coordinated engagements based on GIFC hit/kill assessments. COCOM C2 will also add consequence management displays. The C2BMC GIFC evolves to a mature real-time battle management system fully utilizing the growing network of BMDS sensors and weapons, including direct feed of space-based detections and tracking to improve the timeliness of weapon delivery. GIFC will also incorporate BMDS-level discrimination, to include classification and feature-based discrimination fusion, for target boost/early ascent. Additionally, GIFC will expand engagement coordination to include intelligence projections.</p> <p>The BMD Network product features a more redundant, high availability network with diverse paths and increased communications support to the BMDS elements to include added sensors and weapons to the overall BMDS. Capabilities such as dynamic real-time network management and monitoring will enable the warfighter to monitor the connection to BMDS weapons and anticipate and remedy any issues as they occur, vice having to wait for a human-in-the-loop to report a problem and provide a correction. Additionally, an expanded network centric capability (worldwide connectivity of separately developed sensors and weapon systems) supporting Internet Protocol Version 6 will extend BMDS mission success by providing information management and quality of service to the individual user.</p> <p>As C2BMC products mature they are engineered and integrated into fielded Spirals. The C2BMC Program uses spiral development (incremental development, test, and fielding) to produce the software required to provide a system-wide integrated BMD capability. The key test event for development is completion of Cycle 2, Simulation-Based Verification, when software completes internal C2MBC development and begins integration testing with other BMDS elements. Block 2010 matured products are integrated in Spiral 10.2 and 10.4, and delivered to the field for concurrent development testing and operational use in conjunction with Responsible Test Organization and Responsible Engineering Organization schedules and guidelines. Completion of Cycle 5 testing, Site Activation Testing, signals delivery of fully functioning operational software.</p> <p><b>SITE ACTIVATION</b> C2BMC capability is expanded with the installation of Spirals 10.2 and 10.4. Installations also include numerous BMD Planner, web browser, and Enterprise Workstations per warfighter requirements. Site Activation continues participation in planning for future BMDS operations and site installations.</p> <p><b>OPERATIONS AND SUPPORT</b> C2BMC Program Operations and Support consists of 24/7 on-site support, C2BMC Control Center activities, and hardware/software maintenance.</p>		

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Missile Defense Agency (MDA) Exhibit R-2A RDT&E Project Justification	Date <b>February 2007</b>
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APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	R-1 NOMENCLATURE <b>0603896C BMD C2BMC</b>
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On-site support provides:

- Assistance to the System Administrator assigned by the site (e.g., Combatant Commands), with the general operational support of the C2BMC system
- Integration of the C2BMC support processes into the site's support regimen
- Daily network operations and security support for the C2BMC system as part of a transition plan
- Prime contractor “over-the-shoulder” support to users when requested, or alternatively, via the C2BMC Control Center

The C2BMC Control Center is located in Colorado Springs, CO and provides:

- Technical support to on-site personnel and to the C2BMC end-user
- Review of hardware/software problems and coordination of Commercial Off-the-Shelf (COTS) developer/vendor service calls
- Collect and prioritize failure data as identified by site support staff; implement corrective actions, and recommend changes to be implemented in future spirals
- Tracking and implementing documented escalation procedures
- Collection of reliability, availability and maintainability data for development of readiness metrics
- Maintenance of the C2BMC Control Center web site

Maintenance of the C2BMC System includes both software and hardware maintenance and sustaining engineering. Sustaining engineering consists of network and development engineering in support of system anomalies. Operations and Support also includes the procurement of communications lines from the Defense Information Service Agency (DISA), as well as fielding and maintaining, Communications Nodal Equipment (CNE), to include the Joint Range Extension (JRE) equipment, which enables a global network grid.

**B. Accomplishments/Planned Program**

	FY 2006	FY 2007	FY 2008	FY 2009
C2BMC Element	0	0	1,111	8,417
RDT&E Articles (Quantity)	0	0	0	0

The C2BMC Element accomplishes block objectives by integrating work across four product lines: BMD Planner, Combatant Command Command and Control (COCOM C2), Global Integrated Fire Control (GIFC), and BMD Networks, so that mature capabilities can be integrated and incrementally delivered to the warfighter. Spirals 10.2 and 10.4 will be delivered in Block 2010:

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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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**FY08 Planned Program**

- Conduct block architecture, design trade studies

**FY09 Planned Program**

- Conduct block system requirements allocation
- Develop BMD Network requirements

**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 0603884C Ballistic Missile Defense Sensors	284,297	514,129	778,163	984,963	939,417	791,701	723,843	603,585	5,620,098
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 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

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>							Date <b>February 2007</b>		
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>					<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>				
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	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Cost
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**

The Command and Control Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Missile Defense Agency's capability-based acquisition strategy that emphasizes testing, spiral development, evolutionary acquisition, and knowledge-based funding through the use of two-year capability blocks. Lockheed Martin Mission Systems is the C2BMC prime contractor via an Other Transactions Agreement. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, fielding, training, and operations and sustainment support of the C2BMC system. They perform development and testing of C2BMC products in Arlington, VA; Huntsville, AL; and Colorado Springs, CO; and provide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) is charged to support fielded C2BMC capabilities in Nebraska, Colorado, Hawaii, Virginia, and Japan. C2BMC Program Office government, Federally Funded Research Development Center/University Affiliated Research Centers (FFRDC/UARC), and Scientific Engineering and Technical Assistance (SETA) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

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<b>Missile Defense Agency (MDA) Exhibit R-3 RDT&amp;E Project Cost Analysis</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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<b>I. Product Development Cost ( \$ in Thousands )</b>										
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
<b>C2BMC Element</b>										
C2BMC HW/SW Development, I&T	SS/CPAF	Lockheed Martin Team/ Col. Springs Co	0	0	N/A	367	1Q	2,778	1Q	3,145
C2BMC HW/SW Development, I&T	SS/CPAF	Lockheed Martin Team/ Huntsville, AL	0	0	N/A	56	1Q	421	1Q	477
C2BMC Product Engineering & Development	SS/CPAF	Lockheed Martin Team/ Arlington, VA	0	0	N/A	688	1Q	5,218	1Q	5,906
Subtotal Product Development			0	0		1,111		8,417		9,528

**Remarks**

<b>II. Support Costs Cost ( \$ in Thousands )</b>										
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**

<b>III. Test and Evaluation Cost ( \$ in Thousands )</b>										
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**

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<b>Missile Defense Agency (MDA) Exhibit R-3 RDT&amp;E Project Cost Analysis</b>	Date <b>February 2007</b>
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APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	R-1 NOMENCLATURE <b>0603896C BMD C2BMC</b>
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**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	0		1,111		8,417		9,528
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**Remarks**



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Missile Defense Agency (MDA) Exhibit R-4A Schedule Detail						Date <b>February 2007</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>				R-1 NOMENCLATURE <b>0603896C BMD C2BMC</b>				
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
<b>C2BMC Element</b>								
Spiral 10.2 Content Agreement					2Q			
Spiral 10.2 Cycle 2 Testing						2Q-3Q		
Spiral 10.2 Cycle 5 Testing						3Q-4Q		
Spiral 10.4 Content Agreement					2Q			
Spiral 10.4 Cycle 2 Testing							2Q-3Q	
Spiral 10.4 Cycle 5 Testing							3Q-4Q	
GIFC Increment 5				3Q-4Q	1Q-3Q			
GIFC Increment 6					3Q-4Q	1Q-3Q		
GIFC Increment 7						3Q-4Q	1Q-3Q	

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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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COST (\$ in Thousands)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
R101 Command and Control, Battle Management and Communications (C2BMC) Block 2012	0	0	0	0	0	8,536	152,815	196,866
RDT&E Articles Qty	0	0	0	0	0	0	0	1

*Note: RDT&E Articles: Spiral 12.2 and 12.4*

**A. Mission Description and Budget Item Justification**

In collaboration with MDA Systems Engineering and Integration defined architectures and system specifications, the Command and Control, Battle Management and Communications (C2BMC) Program will provide the warfighter the capability to plan the Ballistic Missile Defense (BMD) fight while concurrently: tracking all potential ballistic missile threats, directing weapons to engage on a distributed network and pairing any sensor with any shooter to defeat ballistic missile threats at any range, in any phase, in all theaters, with coalition partners increase capabilities via hardware, software, and operations and sustainment support in two-year blocks.

The C2BMC Block 2012 Program enables a coordinated BMD. Specific Block goals are to deliver:

- Integrated BMDS with new sensors and weapon systems (e.g., Airborne Laser (ABL), Multiple Kill Vehicle (MKV), Kinetic Energy Interceptor (KEI), and Space Tracking and Surveillance System (STSS))
- Networked coalition sensors and weapons
- Mobile/survivable C2BMC

**C2BMC ELEMENT**

The C2BMC Element accomplishes Block 2012 objectives by designing, developing, and delivering enhanced and new capabilities via incremental spirals. Spirals 12.2 and 12.4 represent an improvement in capability and functionality over proceeding spirals. The delivery of these spirals includes the software, hardware, and network connectivity needed to operate an integrated BMDS. C2BMC Element work is integrated among four product lines: BMD Planner, Combatant Command and Control (COCOM C2), Global Integrated Fire Control (GIFC), and BMD Network. The C2BMC Element also includes development support and post analysis for BMDS-level wargames and tests with fielded spirals.

In Block 2012, the BMD Planner and COCOM C2 continue to expand global BMDS integration with the addition of ABL, KEI, MKV and STSS systems and associated capabilities. The BMD Planner incorporates these new capabilities into the creation of defense designs and continues to merge its data with evolving Army, Air Force, and Navy air defense planners. COCOM C2 displays and decision tools are upgraded to include

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<p>additional BMDS sensors and shooters and will merge with, and be incorporated by, emerging Department of Defense Network Enabled Command and Control (NECC). These capabilities will give the warfighter a single integrated air and missile defense picture.</p> <p>The GIFC incorporates many improvements in its ability to network worldwide sensors, as well as greater engagement coordination. Using Tactical Communications Network technology, GIFC will be able to perform distributed integrated air and missile defense track processing. In other words, instead of relying on a central high-powered computer to form a single track from multiple sensors, it will be able to merge the processing capability of the sensors themselves to create a fused, highly engageable radar track. This form of sensor netting will also incorporate additional data from national and coalition sensors. Additionally, GIFC will improve sensor management with the incorporation of STSS cueing and sensor registration (i.e., global publishing of and corrections for radar inaccuracies). An improved GIFC ability to coordinate an integrated BMDS engagement will incorporate system-level hit/kill assessment, an integrated BMD Engagement Plan, incorporation of threat target features in discrimination algorithms, and consequence management (during both planning and defense execution). Finally, GIFC survivability is improved with the addition of a mobile C2BMC capability.</p> <p>The BMD Network product will expand to incorporate new BMDS and coalition sensors and weapon systems, as well as national sensors. Additional ground and space communications links will be established, as well as improved ability to monitor and redirect transmissions during outages or peak demand times.</p> <p>As C2BMC products mature they are engineered and integrated into fielded Spirals. The C2BMC Program uses spiral development (incremental development, test, and fielding) to produce the software required to provide a system-wide integrated BMD capability. The key test event for development is completion of Cycle 2, Simulation-Based Verification, when software completes internal C2MBC development and begins integration testing with other BMDS elements. Block 2012 matured products are integrated in Spirals 12.2 and 12.4, and delivered to the field for concurrent development testing and operational use in conjunction with Responsible Test Organization and Responsible Engineering Organization schedules and guidelines. Completion of Cycle 5 testing, Site Activation Testing, signals delivery of fully functioning operational software.</p> <p><b>SITE ACTIVATION</b> C2BMC capabilities (hardware and software) will be updated and deployed worldwide and provide increased protection to the U.S., and its friends and allies via an integrated BMDS.</p> <p><b>OPERATIONS AND SUPPORT</b> C2BMC Program Operations and Support consists of 24/7 on-site support, C2BMC Control Center activities, and hardware/software maintenance.</p>		

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<p>On-site support provides:</p> <ul style="list-style-type: none"><li>• Assistance to the System Administrator assigned by the site (e.g., Combatant Commands), with the general operational support of the C2BMC system</li><li>• Integration of the C2BMC support processes into the site's support regimen</li><li>• Daily network operations and security support for the C2BMC system as part of a transition plan</li><li>• Prime contractor “over-the-shoulder” support to users when requested, or alternatively, via the C2BMC Control Center</li></ul> <p>The C2BMC Control Center is located in Colorado Springs, CO and provides:</p> <ul style="list-style-type: none"><li>• Technical support to on-site personnel and to the C2BMC end-user</li><li>• Review of hardware/software problems and coordination of Commercial Off-the-Shelf (COTS) developer/vendor service calls</li><li>• Collect and prioritize failure data as identified by site support staff; implement corrective actions, and recommend changes to be implemented in future spirals</li><li>• Tracking and implementing documented escalation procedures</li><li>• Collection of reliability, availability and maintainability data for development of readiness metrics</li><li>• Maintenance of the C2BMC Control Center web site</li></ul> <p>Maintenance of the C2BMC System includes both software and hardware maintenance and sustaining engineering. Sustaining engineering consists of network and development engineering in support of system anomalies. Operations and Support also includes the procurement of communications lines from the Defense Information Service Agency (DISA), as well as fielding and maintaining, Communications Nodal Equipment (CNE), to include the Joint Range Extension (JRE) equipment, which enables a global network grid.</p>		

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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>					<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>				
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<b>C. Other Program Funding Summary</b>									
	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
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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-3 RDT&E Project Cost Analysis								Date <b>February 2007</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>					R-1 NOMENCLATURE <b>0603896C BMD C2BMC</b>					
<b>I. Product Development Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>II. Support Costs Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>III. Test and Evaluation Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
<b>IV. Management Services Cost ( \$ in Thousands )</b>										
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										
<b>Remarks</b>										
Project Total Cost										
<b>Remarks</b>										

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<b>Missile Defense Agency (MDA) Exhibit R-2A RDT&amp;E Project Justification</b>	Date <b>February 2007</b>
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<b>APPROPRIATION/BUDGET ACTIVITY</b> <b>RDT&amp;E, DW/04 Advanced Component Development and Prototypes (ACD&amp;P)</b>	<b>R-1 NOMENCLATURE</b> <b>0603896C BMD C2BMC</b>
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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	0	8,990	10,977	16,033	21,691	17,631	16,098	16,098
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	0	8,990	10,977	16,033
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 0603896C BMD C2BMC				
<b>C. Other Program Funding Summary</b>									
	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 0603884C Ballistic Missile Defense Sensors	284,297	514,129	778,163	984,963	939,417	791,701	723,843	603,585	5,620,098
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 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
APPROPRIATION/BUDGET ACTIVITY RDT&E, DW/04 Advanced Component Development and Prototypes (ACD&P)	R-1 NOMENCLATURE 0603896C BMD C2BMC	

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