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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	1,369.761	420.516	429.853	439.617	-	439.617	413.198	432.763	454.601	462.065	Continuing	Continuing
MD01: <i>Command & Control, Battle Management, Communications (C2BMC)</i>	1,028.662	254.080	260.100	249.662	-	249.662	232.379	240.621	255.093	255.258	Continuing	Continuing
MC01: <i>Cyber Operations</i>	0.655	0.819	0.543	0.905	-	0.905	0.942	0.979	1.018	1.058	Continuing	Continuing
MT01: <i>C2BMC Test</i>	76.296	51.890	56.318	52.727	-	52.727	55.665	53.188	55.129	56.207	Continuing	Continuing
MX01: <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>	215.379	89.235	93.097	116.552	-	116.552	104.221	115.994	120.027	125.174	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	48.769	24.492	19.795	19.771	-	19.771	19.991	21.981	23.334	24.368	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

MD01 - The decrease in funding from FY 2016 to FY 2017 is attributed to realigning funds from the Development project (MD01) to Sustainment project (MX01) to better align scope for all Integrated Logistics Support (ILS) to the Parallel Staging Network (PSN) Sustainment.

MX01 - The increase in funding from FY 2016 to FY 2017 is attributed to realigning funds from the Development project (MD01) to Sustainment project (MX01) to better align resources with scope of work. Additionally, funding increased to meet requirement to support both Spiral 6.4 and Spiral 8.2-1 operations

MT01 - The increase in funding from FY 2015 to FY 2016, along with the decrease in FY 2017 is attributed to moving forward the build-out of the Spiral 8.2 Labs located at the MDIOC to meet delivery schedule.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Command and Control, Battle Management and Communications (C2BMC) Program provides hardware and develops software to link separate sensors and weapons into an integrated, layered missile defense system that provides greater performance and defensive coverage than is possible with stand-alone elements. The C2BMC enables the BMDS to manage complex threats, including near-simultaneous enemy missiles aimed at theater, regional, or homeland assets. The systems linked through C2BMC include Patriot, Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense (BMD), Aegis Ashore, Ground Based Midcourse Defense (GMD), and Army Integrated Air and Missile Defense Battle Command System (IBCS); and sensors such as the Army Navy/ Ground Transportable Radar Surveillance model 2 (AN/TPY-2) radar, Sea-Based X-Band Radar (SBX), Space-Based Infrared System (SBIRS), and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA). In FY 2015, the C2BMC Program successfully tested and activated a C2BMC Deployable Interface Node (CDIN) in

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support of a second forward based AN/TPY-2 in the Pacific Command (PACOM). This capability improves homeland defense against emerging threats from North Korea and provides the Combatant Commander (CCMD) greater flexibility for regional defense in the PACOM Area of Responsibility (AOR). C2BMC delivered long haul communication upgrades to EUCOM, CENTCOM and PACOM AN/TPY-2 sites and to the Aegis Ashore site in Romania. The C2BMC Program also delivered the capability to integrate BMDS Middle East and European missile defense capabilities allowing both CCMD to leverage each other's assets.

Based on defined BMDS architectures and system specifications, C2BMC provides the warfighter the capability to plan the BMD fight while concurrently tracking all potential ballistic missile threats, and pairing any sensor with any shooter to defeat ballistic missile threats at any range, in all theaters. The C2BMC program will deliver full AN/TPY-2 X-Band radar sensor control and capabilities for improved threat object correlation to develop a common threat track from multiple sensors, with sufficient data accuracy and timeliness to enable successful engagements. The C2BMC program also works to increase coalition partners' capabilities.

The C2BMC program provides continuous incremental capability upgrades to the Warfighter via software Spirals; therefore, there are necessary overlaps in the fielded and in-development Spirals' activities. C2BMC structures software Spiral development and support cycles to meet defined fielding dates within the established Ground Test campaign schedules while allowing sufficient time for development and verification and validation test activities. The fieldings of Spirals are phased to accommodate fiscal and performance priorities, in coordination with Combatant Commanders' intent. Currently, Spiral 6.4 provides continuous global operations across five Combatant Commands (CCMDs) and supports EPAA Phases 1 and 2. The next Spiral (Spiral 8.2-1) has completed development and is currently in verification testing in preparation for scheduled fielding in FY 2017. Spiral 8.2-1 will support Enhanced Homeland Defense capability by providing increased GMD battlespace, Link 16 track reporting of additional sensors, enhanced sensor tasking to meet track quality and discrimination timeliness requirements to support GMD engagements, and space situational awareness tasking support. Spiral 8.2-1 will also provide access to the BMDS OPIR assets and upgraded SBIRS sensor data to enable much earlier cueing for radars and shooters. Spiral 8.2-3 is currently in development and is scheduled for FY 2019 delivery. Spiral 8.2-3 will enable Aegis BMD to provide a five-fold increase in defended area by providing critical sensor management and track reporting improvements for Aegis BMD Engage-on-Remote (EOR) functionality in support of EPAA Phase 3, improve OPIR-based cueing of radars and shooters in all phases of threat engagements, and provide integration with the new Army Integrated Air and Missile Defense Battle Command System (IBCS). C2BMC is conducting requirements analysis for the future Spiral 8.2-5 which will integrate and control the Long Range Discrimination Radar (LRDR) into the BMDS in the 2020 time frame. C2BMC will perform sensor management of the LRDR and fusion of LRDR sensor data into the C2BMC system tracking capability. C2BMC will update interfaces to provide appropriate LRDR-based information to the GMD Fire Control (GFC) and other BMDS elements.

C2BMC also provides the Ballistic Missile Defense (BMD) Communications Network (BCN), which connects an expanding set of sensors and weapons systems, to enable the National Command Authority and the strategic, theater, and tactical level commanders to optimally engage ballistic missile threats including near simultaneous theater, regional and homeland attacks. The BCN provides a robust, end-to-end, high availability, operational communications network infrastructure with diverse paths to rapidly share information across the global Ballistic Missile Defense System (BMDS). The C2BMC system and networks are protected from cyber-attacks by layered defenses that start with circuits comprising the BCN that are isolated from the known networks. Where the BCN and the known networks meet, layers of firewalls, encryption devices, routers and switches each with specific access control lists (ACLs), further protect the internal systems and allow only identified and approved users and systems access to the C2BMC data. Effective network management will coordinate and integrate across diverse equipment platforms, interface with other DoD communications systems, evolve information standards and capabilities, and adhere to the DoD Risk Management Framework (RMF). Defense Information Systems Agency (DISA) services are highly leveraged in providing worldwide communications.

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This Program Element includes support for discrimination improvement efforts, which aim to develop and field an integrated set of Element capabilities to improve BMDS effectiveness and resilience against the evolving threat. The end result will be a BMDS architecture more capable of discriminating and destroying a re-entry vehicle with a high degree of confidence, improving Warfighter shot doctrine and preserving inventory. This effort encompasses Near -term, Mid-term, and Far-term discrimination improvements capability fielding. The discrimination improvements require a coordinated effort between Systems Engineering (PE 0603890C), Ground-based Midcourse Defense (PE 0603882C), BMD Sensors (PE 0603884C), C2BMC, Aegis BMD (PE 0603892C) and Advanced C4ISR (PE 0603179C).

MD40 Program-Wide Support (PWS) consists of essential non-headquarters management efforts providing integrated and efficient support to MDA functions and activities across the entire BMDS.

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	428.277	450.085	461.759	-	461.759
Current President's Budget	420.516	429.853	439.617	-	439.617
Total Adjustments	-7.761	-20.232	-22.142	-	-22.142
• Congressional General Reductions	0.000	-0.378			
• Congressional Directed Reductions	0.000	-19.854			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.634	0.000			
• SBIR/STTR Transfer	-7.127	0.000			
• Other Adjustment	0.000	0.000	-22.142	-	-22.142

Change Summary Explanation

In FY2015, C2BMC received a \$15M mark for Spiral 8.2-3 unjustified growth without baseline. Subsequent to baselining Spiral 8.2-3 in January 2015, program of \$7.239M was restored from within the agency in support of Spiral 8.2-3 Early Development Tasks and sensor-to-host interface, cybersecurity strategy and crypto redesign and hardware redesign in support of hit assessment experimentation.

The FY 2017 adjustment reflects a realignment of Department of Defense priorities.

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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
MD01: <i>Command & Control, Battle Management, Communications (C2BMC)</i>	1,028.662	254.080	260.100	249.662	-	249.662	232.379	240.621	255.093	255.258	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	1	-	1	-	1	-	1		

Note

RDT&E Articles are defined as major Command and Control, Battle Management and Communications (C2BMC) capability increments (identified as a specific Spiral) which are fielded at multiple locations including Combatant Commands and other operational sites.

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests (MIPRs), and civilian salaries on the R-3.

A. Mission Description and Budget Item Justification

Budget Project MD01 includes a phased progression of RDT&E articles. Spiral 6.4, was successfully fielded in FY 2011/FY 2012 in NORTHCOM, PACOM, EUCOM, and CENTCOM to support multi-TPY-2 sensor management, BMDS situational awareness and battle management, and European Phased Adaptive Approach (EPAA) Phase 1 capability declaration. Spiral 6.4 is also the basis of support to EPAA Phase 2 and near-term discrimination improvements. The next spiral (Spiral 8.2-1) has completed development and is currently in verification testing. This capability is scheduled for FY 2017 fielding. Spiral 8.2-1 supports Enhanced Homeland Defense capability by providing increased Ground-based Midcourse Defense (GMD) battlespace, Link 16 track reporting of additional sensors, enhanced sensor tasking to meet track quality and discrimination timeliness requirements to support GMD engagements, and space situational awareness tasking support. Spiral 8.2-1 also provides access to the BMDS Overhead Persistent Infra-Red (OPIR) assets and upgraded Space Based Infra-Red System (SBIRS) sensor data to enable much earlier cueing for radars and shooters. Spiral 8.2-3 is currently in development and is scheduled for an FY 2019 delivery. This capability will enable Aegis BMD to provide a five-fold increase in defended area by providing critical sensor management and track reporting improvements for Aegis BMD Engage-on-Remote (EOR) functionality in support of EPAA Phase 3, improve OPIR-based cueing of radars and shooters in all phases of threat engagements, and provide integration with the new Army IBCS. Spiral 8.2-3 supports Presidential mandate EPAA Phase 3 capability declaration by providing critical sensor management and track reporting improvements to Aegis BMD Engage-on-Remote functionality, improves OPIR-based cueing of sensors and shooters in all phases of threat engagements, as well as integration with the new Army IAMD Battle Command System (IBCS). Spiral 8.2-5 is in requirements analysis and is scheduled to be fielded in the 2020 timeframe. Spiral 8.2-5 will integrate and control the Long Range Discrimination Radar (LRDR) into the BMDS. C2BMC will perform sensor management of the LRDR and fusion of LRDR sensor data into the C2BMC system tracking capability. C2BMC will update interfaces to provide appropriate LRDR-based information to Ground Based Missile Defense (GMD) Fire Control (GFC) and other BMDS elements.

The discrimination improvements effort will develop and field integrated Element capabilities to improve BMD System ability to identify lethal and non-lethal objects. Command and Control, Battle Management and Communications will complete initial SCOUT development and begin final development and operational integration/

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interoperability. SE&I will perform BMDS performance analysis and requirements engineering activities to specify the BMDS requirements and interfaces to achieve the improved capability. SE&I will allocate Near-term performance requirements across BMDS elements. For Mid-term and Far-term, SE&I will establish performance goals for the technology development phase, and develop functional, performance, and interface requirements to address the Mid-term and Far-term threat sets. SE&I will establish ground and flight test requirements for the Near-term, Mid-term, and Far-term phases, and generate threat data to support analysis and testing activities.

Development of C2BMC capabilities in the functional areas of BMDS planning, situational awareness, sensor management, and engagement coordination are fully traceable to baselined BMDS specifications and associated Element specifications. Performance outcomes within these functional areas include:

- Improved formulation of a common threat track from multiple sensors with sufficient data accuracy and timeliness for BMDS weapon Elements to enable successful engagements via Link-16
- Improved Interface with AN/TPY-2 Forward Based Mode (FBM) to provide greater flexibility in meeting C2BMC and Weapons System needs for Engagement Quality Data supporting Remote Engagements (EOR) with Aegis Ballistic Missile Defense (BMD)
- Incorporation of BMDS Overhead Persistent Infra-Red (OPIR) Architecture and upgraded Space Based Infra-Red System (SBIRS) sensor data to enable much earlier cueing of sensor and shooter, improve threat tracking, and provide source information for discrimination
- Integration of the Long Range Discrimination Radar (LRDR) into the BMDS to provide robust homeland and regional defense
- Improved BMDS discrimination logic using multiple sensors' discrimination data to identify lethal objects and reduce the number of interceptors required to achieve successful threat engagement
- Engagement coordination tools to make more efficient use of limited sensor and shooter inventory
- Enhanced BMD planning and situational awareness to improve placement of BMDS assets and maintain warfighter cognizance of the battle space
- Delivery of a Distributed Training System to enable Combatant Commands (CCMD) to support large scale exercises and training events without scheduling downtime of BMDS operations
- Delivery of the Training Support System to provide a flexible scenario, small footprint training system for small scale CCMD training events and schoolhouses

Development activities culminate in three key test events: Simulation-based Verification, Site Activation Testing, and Ballistic Missile Defense System (BMDS)-wide Ground Testing. Simulation-based verification focuses on integration testing with other Ballistic Missile Defense System (BMDS) Elements. Site Activation Testing and successful participation in BMDS Ground Test campaigns verify delivery of fully functioning operational software, which is then made available for deployment.

C2BMC also provides the Ballistic Missile Defense (BMD) Communications Network (BCN), which connects an expanding set of sensors and weapons systems, to enable the National Command Authority and the strategic, theater, and tactical level commanders to optimally engage ballistic missile threats including near simultaneous theater, regional and homeland attacks. The BCN provides a robust, end-to-end, high availability, operational communications network infrastructure with diverse paths to rapidly share information across the global Ballistic Missile Defense System (BMDS). The C2BMC system and networks are protected from cyber-attacks by layered defenses that start with circuits comprising the BCN that are isolated from the known networks. Where the BCN and the known networks meet, layers of firewalls, encryption devices, routers and switches each with specific access control lists (ACLs), further protect the internal systems and allow only identified and approved users and systems access to the C2BMC data. Effective network management will coordinate and integrate across diverse equipment platforms, interface

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with other DoD communications systems, evolve information standards and capabilities, and adhere to the DoD Risk Management Framework (RMF). Defense Information Systems Agency (DISA) services are highly leveraged in providing worldwide communications.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
Title: C2BMC Development and Deployment	195.787	217.293	200.984
Articles:	-	-	1
<p>Description: This activity provides funding for development and deployment of C2BMC capability Spirals that will link sensors and shooters to enable integrated BMDS capabilities. Spiral 8.2-1 supports Enhanced Homeland Defense by providing increased Ground-based Midcourse Defense (GMD) battlespace, Link 16 track reporting of additional sensors, enhanced sensor tasking to meet track quality and discrimination requirements to support GMD engagements. Spiral 8.2-1 also provides access to the BMDS Overhead Persistent Infra-Red (OPIR) assets and upgraded Space Based Infra-Red System (SBIRS) sensor data. Spiral 8.2-1 has completed development and is currently in verification testing to support FY 2017 fielding. Spiral 8.2-3 supports EPAA Phase 3 by providing critical sensor management and track reporting improvements supporting Aegis BMD Engage-on-Remote (EOR) functionality, improvements to OPIR-based cueing of sensors and shooters, and integration with the new Army IAMD Battle Command System (IBCS). Spiral 8.2-3 is currently in development and is scheduled for an FY 2019 delivery. Spiral 8.2-5 will integrate the Long Range Discrimination Radar (LRDR) into the BMDS. Spiral 8.2-5 is in requirements analysis and is scheduled to be fielded in the 2020 time frame. Funding for Spirals includes Prime contractor development, C2BMC Communications, C2BMC Experimentation Lab (X-Lab), and Enterprise Sensors Lab (ESL).</p> <p>FY 2015 Accomplishments:</p> <ul style="list-style-type: none"> - Funding for Spirals included Prime contractor development, C2BMC Communications, C2BMC Experimentation Lab (X-Lab), and Enterprise Sensors Lab (ESL). - Continued Spiral 8.2 engineering and design and BMD Planner, Situational Awareness, Global Engagement Manager (GEM), and BMD Communications Network software development, coding, and integration - Continued maintenance updates for BMDS C2BMC Model (BCM) 6.4, validated by Critical Engagement Conditions (CECs), for Predictive Analysis. CEC/EMEs are the conditions and events where data is obtained from flight and ground tests in order to anchor system models and simulations - Continued development of Spiral 8.2 software, network capability, and hardware procurement in support of Enhanced Homeland Defense and an overall hardware and architecture refresh, new OPIR-based sensor cueing capability to provide increased Ground-based Midcourse Defense (GMD) battlespace. Spiral 8.2-1 infrastructure is required to host the Spiral 8.2-3 Engage on Remote (EOR) software, which supports EPAA Phase 3. - Designed, procured, and integrated Spiral 8.2 test infrastructure and tools at Missile Defense Integration and Operations Center (MDIOC) to support Spiral 8.2 verification testing and distributed testing support which provides significant enhancements in Information Assurance and communications robustness and Link 16 track reporting of additional sensors, enhanced sensor 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<p>tasking to meet track quality and discrimination timeliness requirements to support GMD weapon system engagements, and space situational awareness tasking.</p> <ul style="list-style-type: none"> - Continued maintenance of the Federated Model (FM) for use in Spiral 8.2-1 verification testing; updated FM components for 2015 Leap Second event; replaced DESIM 4.3 with OSM; and integrated into C2BMC development and verification laboratories. - Participated in and analyzed results of ground and flight tests, wargames, and exercises in accordance with the Ballistic Missile Defense System (BMDS) Integrated Master Test Plan (IMTP). - Continued development and testing of new BMDS Overhead Persistent Infrared Architecture (BOA) baseline release to support Spiral 8.2 integration and testing. -- Continued to upgrade the BMD Communications Network capability (development, integration and test) to support European Phase Adaptive Approach (EPAA) - Upgraded DoD teleports to enhance satellite communications (SATCOM) connectivity - Acquired and installed Enterprise Work Stations (EWS), web browsers, and BMD Planners - Continued Cyber Net Defense (CND) requirements for EPAA Phases 1 and 2 - Continued development of the BMDS C2BMC Model (BCM) for Spiral 8.2 modeling and simulation - Continued development of Spiral 8.2 software, hardware, and network capability - Completed development and fielding of new Spiral 6.4 maintenance release to support warfighter improvements - Spiral 8.2 developed the Two-Factor Authentication (Smart-card) and Role Based Access capability on a classified weapon system. Additional improvements to remote administration of the systems, remote monitoring and event response improved the security configuration management of this growing architecture. Automated anti-virus and patch management allows for faster deployment of critical patches and anti-virus signatures keeping the systems secured in a timely manner. - Continued to document international interfaces and traceability to BMDS requirements - Continued EPAA Phase 2 situational awareness displays project IAW bi-lateral agreements - Initiated C2BMC and NATO planning demonstrations - Continued to support NATO live fire events - Continued development of capabilities addressing EPAA Phase 3 requirements resulting in an upgraded Spiral with plan load during operations, record and playback, integration of emerging OPIR assets, and Engage on Remote support with Aegis 5.1. : Baselined Spiral 8.2-3 via Developmental Baseline Review (Jan 2015), issued Request for Proposal, began evaluation of Proposal and postured for contract award in 1QFY16. - Continued requirements allocation and specification for advanced C2BMC technologies to exploit space-based data: updated BOA 6.1 Element Specification to increase feasibility of effective engagements in certain threat conditions; successfully participated in a Joint OPIR Ground (JOG) real-time cueing demonstration yielding a reference implementation of interfaces, messages, and metrics to support requirements development for BMDS interface with the Persistent GEOINT Mission Management Macro Framework. 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Continued site planning, scheduling and hardware acquisition to support planned FY 2017 deployment of C2BMC Spiral 8.2-1 capability. - Completed Discrimination Improvements for Near-term capability development and Element-level testing of BMDS sensor management improvements in the Command, Controls, Battle Management, and Communications. - Continued integration phase for Near-term discrimination improvements ground testing via GTI-06. - Conducted planning, assessment, and specification work to keep pace with emerging threat. - Continued development of software upgrades to C2BMC to report information from multiple sensors to improve identification of lethal targets to fire control. - Continued development of AN/TPY-2 sensor and interface upgrades required to pass sensor generated features to C2BMC needed for improving identification of lethal targets. - Conducted data collection and analysis for final assessment of discrimination technologies candidates planned for Mid-term delivery. - Down selected development ready technologies for the Far-term phase content. - Completed preliminary BMDS functional and performance requirements for Mid-term discrimination improvements capability. - Submitted solicitation to industry for a Broad Agency Announcement (BAA) dealing with Integrated Threat Characterization in support of Aggregated Discrimination and Handover (Far-Term Discrimination Improvements). Evaluated white papers and recommended FY2016 execution plan. - Completed sensor-to-host interface, cybersecurity strategy and crypto redesign and hardware redesign in support of hit assessment experimentation. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Funding for Spirals includes Prime contractor development, C2BMC Communications, C2BMC Experimentation Lab (X-Lab), and Enterprise Sensors Lab (ESL). <p>The increase from FY 2015 to FY 2016 is attributed to increased discrimination improvement efforts to include maturing advanced discrimination and battle management techniques in support of the Mid-term and Far-term capabilities and Spiral 8.2-1 hardware/software development integration.</p> <p>C2BMC International Partner System Engineering</p> <ul style="list-style-type: none"> - Continue to document international interfaces and traceability to BMDS requirements - Continue to conduct C2BMC and North Atlantic Treaty Organization (NATO) planning demonstrations - Continue to support NATO live fire events - Continue EPAA Phase 2 situational awareness displays project in accordance with bi-lateral agreements 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<p>C2BMC Spiral 6.4 Maintenance</p> <ul style="list-style-type: none"> - Complete development and fielding of new Spiral 6.4 maintenance release to support warfighter improvements and required security updates and vulnerability corrective actions <p>C2BMC Spiral 8.2 Development, Verification Testing, and Deployment</p> <ul style="list-style-type: none"> - Spiral 8.2-1 was baselined at a Developmental Baseline Review (DBR) in August 2012 - Continue Spiral 8.2-1 product development to include BMD Planner, Situational Awareness, Global Engagement Manager (GEM), Boost Phase Cue and BMD Communications Network software. - Continue development of Spiral 8.2 software, hardware, and network capability - Enhance Spiral 8.2-1 through prototyping and delivery of critical RMF requirements to include Two-Factor Authentication (Smart-card) capability on a classified weapon system, remote administration of the systems, remote scanning, monitoring and event response, and automated anti-virus and patch management - Continue the design, procurement, and integration of Spiral 8.2-1 test infrastructure and tools at Missile Defense Integration and Operations Center (MDIOC) to support Spiral 8.2-1 verification testing and distributed testing support - Provide pre-test engineering and analyze results of ground and flight tests, wargames, and cyber range / other exercises in accordance with the Ballistic Missile Defense System (BMDS) Integrated Master Test Plan (IMTP) - Continue site planning, scheduling and hardware acquisition to support planned FY 2017 Northern Command (NORTHCOM)/ Pacific Command (PACOM) deployment of the C2BMC Spiral 8.2-1 capability <p>- Initiate Spiral 8.2-3 engineering and design for the development of capabilities addressing European Phased Adaptive Approach (EPAA) Phase 3 requirements for Engage-on-Remote (EOR), integration of BOA 6.1 wideband extended tracking, integration of the Army IBCS program, and two Warfighter Improvement Process upgrades functionality and record and playback functionality). Capability improvements will include modifications to C2BMC track processing, Link-16 track reporting, sensor resource management, and mission planning. Engineering efforts will include planning for initial Spiral 8.2 infrastructure deployment to CENTCOM and EUCOM areas of responsibility (AOR).</p> <p>C2BMC Modeling and Simulation</p> <ul style="list-style-type: none"> - Continue development of the BMDS C2BMC Model for Spiral 8.2 modeling and simulation - Update C2BMC model, validated by Critical Engagement Conditions (CECs) and Empirical Measurement Events (EMEs), for system-level performance assessments. CEC/EMEs are the conditions and events where data is obtained from flight and ground tests in order to anchor system models and simulations - Complete development of S8.2-1 C2BMC Model (BCM 8.2-1) 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Perform initial Verification and Validation of S8.2-1 C2BMC Model with BC-generated referent data - Begin the initial development of S8.2-3 C2BMC Model (BCM 8.2-3) <p>BMDS Overhead Persistent Infrared Architecture (BOA)</p> <ul style="list-style-type: none"> - Continue testing of new BMDS Overhead Persistent Infrared Architecture (BOA) 5.1 baseline release to support Spiral 8.2-1 integration and testing - Demonstrate BOA 5.1 capabilities with BMDS elements in the GTX-07 ground test as a pre-condition for operational fielding in FY 2019 - Complete BOA 6.1 development to extend Overhead Persistent Infrared Radar (OPIR) tracks and complete the requirements verification test and analysis - Install BOA 6.1 in an operationally relevant environment to conduct soak testing with live OPIR feeds - Conduct BOA 6.1 requirements verification and performance characterization to support readiness for operational installation in FY 2019. - - Evaluate Enterprise Sensors Lab (ESL) prototypes that extract dimmer targets from sensor data for inclusion in future BOA spirals - Continue requirements allocation and specification for advanced C2BMC technologies to exploit space-based data <p>Discrimination Improvements</p> <ul style="list-style-type: none"> - Complete Near-term discrimination improvements capability development and Element-level testing of Ballistic Missile Defense System (BMDS) sensor management improvements in the Command and Control, Battle Management and Communications - Complete integration phase of Near-term discrimination improvements testing via the GTI-06 ground test campaign - Conduct data collection and analysis for final assessment of discrimination technology candidates planned for Mid-term discrimination improvements - Continue system maturation and performance characterization of the Simultaneous Correlation of Unambiguous Tracks (SCOUT) Algorithm and the Advanced SCOUT Prototype (ASP) node, a selected component of the MDA initiative for Mid-Term discrimination improvements - Participate in Far-term discrimination improvement threat models specification. - Develop model/prototype of Far-term Discrimination Improvements System Level Discrimination in support of the Far-term discrimination improvements capabilities. - Participate in planning and conduct technology trades and analysis to refine capabilities to mitigate the Far-term discrimination improvements threats. - Conduct System Requirements Review for Far-term discrimination improvements C2BMC capabilities. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<p>Long Range Discrimination Radar (LRDR)</p> <ul style="list-style-type: none"> - Integrate the Long Range Discrimination Radar (LRDR) into the BMDS by performing sensor management of the LRDR and fusion of LRDR sensor data into the C2BMC system tracking capability - Provision Military Satellite Communications (MILSATCOM) and redundant terrestrial communication services from C2BMC to the LRDR - Update interfaces to provide appropriate LRDR-based information to Ground Based Missile Defense (GMD) Fire Control (GFC) and other BMDS elements <p>FY 2017 Plans: The decrease in funding from FY 2016 to FY 2017 is attributed to realigning funds from the Development project (MD01) to Sustainment project (MX01) to better align scope for all Integrated Logistics Support (ILS) to the Parallel Staging Network (PSN) Sustainment.</p> <p>Funding for Spirals includes Prime contractor development, C2BMC Communications, C2BMC Experimentation Lab (X-Lab), and Enterprise Sensors Lab (ESL).</p> <p>C2BMC Spiral 8.2 Development, Verification Testing, and Deployment</p> <ul style="list-style-type: none"> - Spiral 8.2-1 was initially baselined at a Developmental Baseline Review (DBR) in August 2012; Spiral 8.2-1 was re-baselined in January 2015 to add deployment hardware and fielding - Complete verification and deployment of Spiral 8.2-1, supporting Enhanced Homeland Defense -- Complete procurement and delivery of Spiral 8.2-1 hardware for all sites to support deployment --- Develop and field software Cybersecurity patches and any emerging troubleshooting procedures to Spiral 8.2-1 to support required security updates and vulnerability corrective actions -- Complete validation testing at NORTHCOM and PACOM sites to enter system level ground testing for capability declaration --- Initiate fielding of EUCOM and CENTCOM hardware to support EPAA Phase 3 - Continue development, integration, and testing of Spiral 8.2-3 in support of EPAA Phase 3 -- Complete Spiral 8.2-3 critical design review and test readiness review --- Initiate Spiral 8.2-3 software verification testing --- Integrate and test improved OPIR-based cueing of radars and shooters to add the ability to track threats in all phases of flight --- Integrate red/blue force updates into planner to stay current with the latest threat and BMDS element updates - Conduct initial design and development of Spiral 8.2-5, incorporating LRDR functionality (funded in PE 0604873C). <p>C2BMC International Partner System Engineering</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<p>C2BMC international system engineering is vital to ensuring our friends and allies are integrated with the U.S. BMDS capabilities to the fullest extent possible through collaborative system engineering, testing and fielding - Facilitate future interoperability with NATO and partner nations such as Israel and Japan by working with these nations to define and document international interfaces that are compatible with international standards and traceable to U.S. BMDS requirements</p> <ul style="list-style-type: none"> - Manage and execute Agency participation in test events and live fire exercises hosted by international partners to ensure U.S. missile defense weapons, sensors and C2 systems interoperate with international systems - Provide EPAA Phase 3 missile defense situational awareness displays to Poland while maintaining existing situational awareness displays in Romania and Turkey in accordance with bi-lateral agreements with these nations. - Work cooperatively with NATO systems engineers to ensure the technical approach for the new NATO mission to defense European territories and populations from missile defense threats of all ranges remains compatible with the U.S. BMDS - Maintain and upgrade as necessary the U.S. NATO secure data sharing gateways located at Ramstein Air Base, Germany, for missile defense operations and training. - Provide support for Japan BMD requirements to ensure interoperability of Japanese and U.S. BMD systems(sensors, shooters, command and control (C2)) resulting in an integrated regional, operational, and strategic defense of Japan <p>C2BMC Spiral 6.4 Maintenance</p> <ul style="list-style-type: none"> - Develop and field software Cybersecurity patches and any critical software modifications to Spiral 6.4 to support required security updates and vulnerability corrective actions <p>C2BMC Modeling and Simulation</p> <p>To provide confidence in C2BMC performance through the following activities:</p> <ul style="list-style-type: none"> - Maintain BMDS Sim/Stim tool and Federated Model, and C2BMC Model (BCM) to support Spiral 6.4 and Spiral 8.2-1 Operations and Sustainment - Complete Federated Model development and begin BCM development for C2BMC Spiral 8.2-3 development and verification - Develop requirements for Modeling & Simulation support to C2BMC Spiral 8.2-5 development and verification - Develop and maintain C2BMC verification scenarios for all C2BMC Spirals deployed and under development - Provide OPIR modeling simulation for system level ground tests <p>Discrimination Improvements:</p> <ul style="list-style-type: none"> Complete assessment for Near-Term discrimination improvements capability readiness for fielding Complete Mid-Term discrimination improvements systems engineering work and integrate element level design solutions - Complete analysis to support test planning and assessment of the integrated capability Complete SCOUT discrimination capability initial design and begin final design and development Initiate SCOUT operational integration/interoperability 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
Continue Far-term discrimination improvements and countermeasures mitigation capability development - Define decision logic improvement solutions which are mature enough to begin initial preliminary design			
<p>Title: C2BMC Experimentation Lab (X-Lab)</p> <p align="right">Articles:</p>	5.287	5.051	4.270
<p>Description: The C2BMC Experimentation Lab (X-Lab) explores, prototypes, and demonstrates future C2BMC technologies within C2BMC and as an integrated component with other BMDS elements. Through the collection and analysis of metrics that demonstrate C2BMC performance utilizing representative Suite hardware and software, the lab assesses prospective technologies' impact on the BMDS and characterizes C2BMC Spiral performance in advance of formal deliveries as a risk reduction activity. The lab hosts fielded, in-development, and prototype spiral capabilities and enables flight and ground test participation for C2BMC, ESL, and OPIR products with robust connectivity to stimulation frameworks, weapon systems, sensors, and operational assets.</p> <p>FY 2015 Accomplishments: The C2BMC Experimentation Lab (X-Lab) prototypes and demonstrates new C2BMC capabilities. -Demonstrated algorithms and data distribution architectures for transmitting system tracks that included features. This enabled weapon systems to form Target Object Maps that allowed an engagement beyond line of sight of the organic radar to utilize the full extent of the physical range of the interceptor (Engage-on-Remote) - Developed and evaluated interfaces and data distribution architectures that implemented a common cueing protocol with the Joint Overhead Persistent Infra-Red (OPIR) Ground (JOG), Space Based Infra-Red System (SBIRS), and MDA system architectures to yield improved efficiency in cueing, increase battlespace for Homeland Defense, and decrease C2BMC sustainment costs . - Characterized the performance of engineering releases of C2BMC Spiral 8.2 to mitigate risks early in the development and integration processes through pairwise and hardware-in-the-loop developmental testing activities.</p> <p>FY 2016 Plans: The decrease in funding from FY 2015 to FY 2016 is attributed to transition of SBIRS Increment 2 from development to operations. The C2BMC Experimentation Lab (X-Lab) prototypes and demonstrates new C2BMC capabilities. The FY 2016 focus will be: - Evaluate the efficacy of virtualization when applied to the C2BMC mission node, in terms of mission performance and the potential for reduction of Operations and Sustainment (O&S) costs - Evaluate Engage-on Remote performance in a series of flight and ground tests</p>	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Evaluate prototype advanced sensor and hit assessment technologies - Evaluate multi-sensor source track fusion to improve efficiency in cueing, increase battlespace for Homeland Defense, and decrease C2BMC performance risks - Evaluate interfaces and data distribution architectures that implement a common cueing protocol with the Joint Overhead Persistent Infra-Red (OPIR) Ground (JOG), Space Based Infra-Red System (SBIRS), and MDA system architectures to improve efficiency in cueing, increase battlespace for Homeland Defense, and decrease C2BMC sustainment costs - Assess Link-16 engagement coordination capabilities for planning and managing the execution of Link-16 remote engagements, to include Engage-on Remote - Assess alternative approaches for coordinating strategic sensor task planning, execution and coordination with missile defense regional COCOM tasking priorities - Characterize the performance of engineering releases of C2BMC Spiral 8.2-1 to mitigate risks early in the development and integration processes - Implement systems and network connection security requirements to mitigate connectivity risks early in the development process <p>FY 2017 Plans: The decrease in funding from FY2016 to FY2017 is attributed to the decision to change the functional allocation of interface requirements from X-Lab to the Enterprise Sensor Lab (ESL).</p> <p>The X-Lab will provide the following:</p> <ul style="list-style-type: none"> - Characterize the performance of engineering releases of C2BMC Spiral 8.2-3 and Spiral 8.2-5 to mitigate risks early in the development and integration processes - Assess Link-16 engagement coordination capabilities for planning and managing the execution of Link-16 remote engagements, to include Engage-on-Remote (EOR), and evaluate in a series of flight and ground tests - Assess alternative approaches for coordinating strategic sensor task planning, execution and coordination with missile defense regional CCMD tasking priorities - Evaluate prototype advanced sensors and post intercept assessment/hit assessment technologies - Evaluate interfaces and data distribution architectures that implement multi-sensor source track fusion and a common cueing protocol with the Joint Overhead Persistent Infra-Red (OPIR) Ground (JOG), Space Based Infra-Red System (SBIRS), and BMDS system architectures to improve cueing efficiency, increase Homeland Defense battlespace, and decrease C2BMC sustainment costs. - Characterize prototype system virtualization technology for impacts to mission performance and the potential for reduction of Operations and Sustainment (O&S) costs 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
- Implement systems and network connection security requirements to mitigate connectivity risks early in the development process			
Title: Enterprise Sensors Lab (ESL)	13.190	13.799	16.306
Articles:	-	-	-
<p>Description: In support of EPAA Phase 3 and the improved utilization of OPIR data, the Enterprise Sensors Lab (ESL) and supporting activities prototype and demonstrate algorithms that fuse space, airborne, and terrestrial-based sensor data to provide three-dimensional (3-D) tracks of threat missiles to enable sensor cueing and Launch/Engage-on-Remote (LOR/EOR) using all sensors. Additionally, in support of Homeland Defense, ESL extracts features in support of post intercept assessment with a goal of enabling a shoot-look-shoot capability and discrimination assessment feedback.</p> <p>FY 2015 Accomplishments: The Enterprise Sensors Lab (ESL) prototypes and demonstrates algorithms that fuse space, airborne, and terrestrial-based sensor data to provide three-dimensional (3-D) tracks of threat missiles to enable sensor cueing and Launch/Engage-on-Remote (LOR/EOR) using all sensors. Additionally, ESL extracts features in support of hit assessment with a goal of enabling a shoot-assess-shoot capability. - Executed deferred FY 2014 efforts including critical independent analysis, algorithm development, and source data product tasks. provided independent analysis of ESL algorithms to support BOA 6.1 CDR entrance criteria; continued maturation of algorithms to improve missile typing, post-boost tracking, and OPIR sensor cueing; provided consistent data feeds from multiple sources enabling experimentation and test activities to remain on schedule and achieve objectives; developed prototype algorithms to exploit the Discrimination Sensor Technology (DST) airborne sensor infrared data and provide track reporting in support of the Aegis Weapon System Critical Experiment - Incorporated the Space Based Infra-Red System (SBIRS) Geosynchronous Earth Orbit Scanner Wideband Data into ESL Baseline Release (EBR) 6.1.2 to form a more accurate 3-D track; initiated soak testing in the developmental environment to provide performance characterization feedback prior to transition into the end-state operational product, the BMDS OPIR Architecture (BOA) 6.1 software build; incorporated the SBIRS GEO Starer Wideband Data into EBR 6.1.3 to yield improved 3-D tracks and initiated developmental testing - Enhanced prototype algorithms to extract dimmer targets from sensor data to improve tracking and enable additional sensor cueing opportunities: demonstrated utility of algorithms using multiple Targets of Opportunity data collection events.</p> <p>FY 2016 Plans: The Enterprise Sensors Lab (ESL) and supporting activities prototype and demonstrate algorithms that fuse space, airborne, and terrestrial-based sensor data to provide three-dimensional (3-D) tracks of threat missiles to enable sensor cueing and Launch/Engage-on-Remote (LOR/EOR) using all sensors. Additionally, ESL extracts features in support of hit assessment with a goal of enabling a shoot-look-shoot capability</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Continue to incorporate the Space Based Infra-Red System (SBIRS) Geosynchronous Earth Orbit (GEO) Scanner Wideband and other new Overhead Persistent Infra-Red (OPIR) sensors data feeds to form a more accurate 3-D track - Initiate integration of SBIRS GEO Starer Wideband sensor data to form a more accurate 3-D track - Prototype hit assessment algorithms based on a fusion of enterprise sensor data to enable a shoot-look-shoot capability - Prototype algorithms for fusing joint Infrared/Radio Frequency systems measurement data real-time to enhance 3-D tracking of threat missiles - Continue to enhance prototype algorithms to extract dimmer targets from sensor data to extend the length of the track and enable additional sensor cueing opportunities <p>FY 2017 Plans: The increase in funding from FY2016 to FY2017 is attributed to the decision to change the functional allocation of interface requirements from X-Lab to the Enterprise Sensor Lab (ESL) and to accommodate increased Targets of Opportunity and flight test analysis for wideband data exploitation and aggregated discrimination capability experimentation.</p> <p>ESL provides the following:</p> <ul style="list-style-type: none"> - Continue integration of SBIRS GEO Starer Wideband and Future sensor data to form a more accurate 3-D track in both boost and early mid-course phases of threat flyout to improve cueing of other BMDS sensors - Continue prototyping post-intercept assessment algorithms based on a fusion of enterprise sensor data to enable shoot-assess-shoot capability - Continue prototyping algorithms for fusing joint Infrared/Radio Frequency systems measurement data real-time to enhance 3-D tracking of threat missiles - Continue to enhance prototype algorithms to extract dimmer targets from sensor data to extend the length of the track and enable additional sensor cueing opportunities - Continue to develop and mature OPIR Enterprise tasking and cueing capability to most effectively exploit available OPIR data to support full spectrum of missile kill chain 			
<p>Title: C2BMC Communications</p> <p align="right">Articles:</p> <p>Description: The Ballistic Missile Defense (BMD) Communications Network (BCN) ties together an expanding set of sensors and weapons systems enabling the National Command Authority and the commanders at the strategic, theater and tactical levels to optimally engage ballistic missile threats including near simultaneous theater, regional and homeland attacks. The BCN provides a robust, end-to-end, high availability, operational communications network (COMNET) infrastructure with diverse paths that quickly and unambiguously share information across the global Ballistic Missile Defense System (BMDS).</p>	39.816	23.957	28.102
	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<p><i>FY 2015 Accomplishments:</i></p> <ul style="list-style-type: none"> - Provided Ground-Based Midcourse Defense (GMD) Communications Network (GCN) Long Haul Communications Transport (LHCT) Services Completed engineering support to AN/GSC-52B SATCOM terminal, Modernization Enterprise Terminal (MET), at Ramstein AFB for connectivity via Indian Ocean Defense Satellite Communication System (DSCS). Completed installation, checkout, testing, and turnover of terminal to the Air Force. - Continued network and communications support for C2BMC 6.4 in the European Command (EUCOM), Strategic Command (STRATCOM), Northern Command (NORTHCOM), Pacific Command (PACOM), and Central Command (CENTCOM) - Continued engineering and deployment support of C2BMC Deployable Interface Nodes (CDINs) (C2BMC Element funded software capability and project management) - Participated in and analyze results of ground and flight tests, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP) - Resolved real-time operational issues through the C2BMC Control Center (CCC) (includes BMDS Network Operations and Security Center (BNOSC)) - Provided global BMDS communications via leased Defense Information Systems Agency (DISA) circuit - Provided SME support to fielded C2BMC locations to ensure continued performance and operations - Provided sustaining engineering support for fielded network equipment - Provided support of AN/TPY-2 radar communications nodes to ensure continued performance and operations including installation of new AN/TPY-2 radar communications node at a site in Japan and installation and support of AN/GSC-52B SATCOM terminals, Modernization of Enterprise Terminal-Transportable (MET-T), at a site in Japan - Continued acquisition of network circuits to support planned FY 2017 S8.2 capability deployment - Developed fielding plans for protected Anti-Jam (AJ) /Anti-Scintillation (AS) Wideband Network System (PAAWNS) to missile defense locations worldwide - Installed improved LHCT at AN/TPY-2 radar locations in CENTCOM, EUCOM, and PACOM, -Installed LHCT for AEGIS Ashore Romania in support of EPAA Phase II <p><i>FY 2016 Plans:</i></p> <p>The decrease between FY 2015 and FY 2016 funding was due to the planned FY 2015 completion of the following: Site K SATCOM installation and checkout, Site KCS deployment and activation, Aegis Ashore (Romania) terrestrial fiber communication trunks, Japanese Host Nation Interface (HNI) changes to add a connection to Commander, Naval Forces Japan (CNFJ), Shariki transition from ATM to optical network interface, and the Shariki circuit leases transfer to the Army.</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Provide Ground-Based Midcourse Defense (GMD) Communications Network (GCN) Long Haul Communications Transport (LHCT) Services - Continue engineering support to AN/GSC-52B SATCOM terminal, Modernization Enterprise Terminal (MET), at Ramstein Air Force Base (AFB) for connectivity via Indian Ocean Defense Satellite Communication System (DSCS) - Continue network, communications and risk management support for C2BMC Spiral 6.4 in the European Command (EUCOM), Strategic Command (STRATCOM), Northern Command (NORTHCOM), Pacific Command (PACOM), and Central Command (CENTCOM) - Continue engineering and deployment support of C2BMC Deployable Interface Nodes (CDINs) (C2BMC Element funded software capability and project management) - Participate in and analyze results of ground and flight tests, wargames, cyber range /other exercises in accordance with the BMDS Integrated Master Test Plan (IMTP) - Resolve real-time operational issues through the C2BMC Control Center (CCC) (includes BMDS Network Operations and Security Center (BNOSC)) - Provide global BMDS communications via leased Defense Information Systems Agency (DISA) circuit - Provide Subject Matter Expert (SME) support to fielded C2BMC locations to ensure continued performance and operations - Provide sustaining engineering support for fielded network equipment to include required security maintenance - Provide support of Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) radar communications nodes to ensure continued performance and operations including installation of new AN/TPY-2 radar communications node at a site in Japan and installation and support of AN/GSC-52B SATCOM terminals, Modernization of Enterprise Terminal-Transportable (MET-T), at a site in Japan - Acquire network circuits to support planned FY 2017 Spiral 8.2 capability deployment - Continue fielding of Protected Anti-Jam (AJ) / Anti-Scintillation (AS) Wideband Network System (PAAWNS) to missile defense locations worldwide - Continue to upgrade the BMD Communications Network capability (development, integration and test) to support European Phase Adaptive Approach (EPAA) - Continue to upgrade DoD teleports to enhance satellite communications (SATCOM) connectivity - Continue Cyber Net Defense (CND) requirements for Homeland Defense EPAA Phases 1 and 2 <p>FY 2017 Plans: Ballistic Missile Defense Communications Network (BCN) provides the following:</p> <ul style="list-style-type: none"> - Provide Ground-Based Midcourse Defense (GMD) Communications Network (GCN) Long Haul Communications Transport (LHCT) Services 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Continue engineering support to AN/GSC-52B SATCOM terminal, Modernization Enterprise Terminal (MET), at Ramstein Air Base via the Indian Ocean Defense Satellite Communication System (DSCS) - Continue network, communications, and Cybersecurity support for C2BMC Spiral 6.4 in the European Command (EUCOM), Strategic Command (STRATCOM), Northern Command (NORTHCOM), Pacific Command (PACOM), and Central Command (CENTCOM) - Continue engineering and deployment support of C2BMC Deployable Interface Nodes (CDINs) (C2BMC Element funded software capability and project management) - Participate in and analyze results of ground and flight tests, wargames, cyber range, and other exercises in accordance with the BMDS Integrated Master Test Plan (IMTP) - Resolve real-time operational issues through the C2BMC Control Center, including the BMDS Network Operations and Security Center (BNOSC) - Provide global BMDS communications via leased Defense Information Systems Agency (DISA) circuits - Provide Subject Matter Expert (SME) support to fielded C2BMC locations to ensure continued performance and operations - Provide sustaining engineering support for fielded network equipment to include required security - Acquire network circuits to support planned Spiral 8.2-1 capability deployment - Continue fielding of Protected Anti-Jam / Anti-Scintillation Wideband Network System (PAAWNS) to missile defense locations worldwide - Continue to upgrade the BCN capability supporting all EPAA phases- Continue to upgrade DoD teleports to enhance satellite communications (SATCOM) connectivity - Continue Cyber Net Defense (CND) requirements for Homeland Defense EPAA Phases 1 and 2 			
Accomplishments/Planned Programs Subtotals	254.080	260.100	249.662

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0603177C: <i>Discrimination Sensor Technology</i>	35.223	28.200	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	13.061	9.876	3.626	-	3.626	0.000	0.000	0.000	0.000	0	26.563
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	161.298	212.230	206.834	-	206.834	231.105	197.018	250.227	260.613	Continuing	Continuing

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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	863.965	1,269.913	862.080	-	862.080	701.311	585.079	600.710	535.614	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	260.347	228.392	230.077	-	230.077	144.893	141.815	171.644	158.421	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	761.646	830.647	959.066	-	959.066	841.738	700.596	592.940	528.744	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	29.530	28.605	32.129	-	32.129	33.869	34.884	36.203	36.821	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	7.560	21.507	20.690	-	20.690	15.670	11.641	11.796	11.992	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.972	47.939	54.750	-	54.750	53.894	55.524	58.100	59.029	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	64.610	71.266	68.787	-	68.787	73.329	70.423	85.881	74.189	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	354.414	281.740	293.441	-	293.441	337.537	322.334	346.134	351.933	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	447.424	527.563	563.576	-	563.576	471.059	431.349	454.830	462.429	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Command and Control, Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Spiral 8.2-1 will be fielded in FY 2017, fielding of Spiral 8.2-3 in FY 2019, and completion of system deployment with Spiral 8.2-5 in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, 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 worldwide on-site operations and maintenance

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>

support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency												Date: February 2016			
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>						

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - Aggregated Discrim	Various	Various : Various	0.000	0.000		0.000		10.490	Oct 2016	-		10.490	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA Development	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	0.000	6.573		6.221		10.315	Oct 2016	-		10.315	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Hardware/Software Development, Integration & Test (I&T)	SS/IDIQ	Lockheed Martin Team : Arlington, VA	326.090	104.035		123.492		106.213	Dec 2016	-		106.213	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Integration	Various	Services DISA Agency : -	147.549	6.549		0.000		0.000		-		0.000	0	154.098	0
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT	SS/CPFF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	0.000	9.751		19.377		4.900	Oct 2016	-		4.900	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT OGA	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	0.000	1.200		1.200		0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Contract Support Services	SS/FFP	Cobham Analytic Solutions, Paradigm, CACI, CSC : Arlington, VA/ Huntsville, AL	180.801	22.561		24.505		25.026	Oct 2016	-		25.026	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Federally Funded Research & Development Centers /	MIPR	MITRE, IDA, ORNL, Aerospace, JHU/APL, GTRI : Arlington, VA/ Huntsville, AL/	108.849	16.470		14.891		15.405	Oct 2016	-		15.405	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency											Date: February 2016				
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>						

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
University Affiliated Research Center		Colorado Springs, CO													
C2BMC Development and Deployment - IT User Services	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	0.000	0.000		4.898	Oct 2015	0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - MDA Civilian, Travel & PCS	Various	- : Arlington, VA/ Huntsville, AL/ Colorado Springs, CO	82.787	22.548		22.709		21.635	Oct 2016	-		21.635	Continuing	Continuing	Continuing
C2BMC Development and Deployment - OPIR Integration	SS/CPAF	Lockheed Martin : Arlington, VA	0.000	0.000		0.000		1.000	Oct 2016	-		1.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Sensor to Host Interface	C/CPFF	JHU/APL : Laurel, MD	0.000	6.100		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Spiral Development	Various	Sandia, MDA Other : Various	0.000	0.000		0.000		6.000	Oct 2016	-		6.000	Continuing	Continuing	Continuing
C2BMC Experimentation Lab (X-Lab) - X-Lab	SS/CPAF	Various / Northrop Grumman Mission Systems : Colorado Springs, CO	36.141	5.287		5.051		4.270	Oct 2016	-		4.270	Continuing	Continuing	Continuing
Enterprise Sensors Lab (ESL) - ESL	SS/CPAF	Sandia, Perdue, SciTech, DISA, Army, Navy, AMRDEC : Various	0.000	0.000		0.000		8.875	Oct 2016	-		8.875	Continuing	Continuing	Continuing
Enterprise Sensors Lab (ESL) - Enterprise Sensor Lab	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	17.461	13.190		13.799		7.431	Oct 2016	-		7.431	Continuing	Continuing	Continuing
C2BMC Communications - Communication Equipment and Fielding	SS/CR	DISA, PMDCATS, SPAWAR : Various	81.281	25.945		13.192		12.884	Oct 2016	-		12.884	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2BMC Communications - BNOSC	SS/CPAF	Lockheed Martin Team / JRDC : Colorado Springs, CO	16.391	3.353		3.071		4.062	Oct 2016	-		4.062	Continuing	Continuing	Continuing
C2BMC Communications - C2BMC Integration	Various	Services : DISA Agency	0.000	0.000		0.000		3.450	Oct 2016	-		3.450	Continuing	Continuing	Continuing
C2BMC Communications - Communication Leases	SS/CR	DISA : Arlington, VA	21.292	7.993		7.194		7.706	Oct 2016	-		7.706	Continuing	Continuing	Continuing
C2BMC Communications - EUCOM Communications	MIPR	USAFE : Ramstein, DE	10.020	2.525		0.500		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			1,028.662	254.080		260.100		249.662		-		249.662	-	-	-

Remarks

N/A

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Remarks

N/A

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>
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Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Remarks
N/A

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,028.662	254.080	260.100	249.662	-	249.662	-	-	-

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity +
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✦

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
MD01 Command & Control, Battle Management, Communications (C2BMC)					✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦				
Spiral 8.2-1 NORTHCOM/PACOM Capability Declaration												△																
Spiral 8.2-1/Spiral 8.2-3 CENTCOM Capability Declaration																△												
Spiral 8.2-1/Spiral 8.2-3 EUCOM Capability Declaration																△												
Spiral 8.2-3 NORTHCOM/PACOM Capability Declaration																				△								

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD01 Command & Control, Battle Management, Communications (C2BMC)	1	2016	4	2020
Spiral 8.2-1 NORTHCOM/PACOM Capability Declaration	4	2017	4	2017
Spiral 8.2-1/Spiral 8.2-3 CENTCOM Capability Declaration	1	2019	1	2019
Spiral 8.2-1/Spiral 8.2-3 EUCOM Capability Declaration	1	2019	1	2019
Spiral 8.2-3 NORTHCOM/PACOM Capability Declaration	3	2019	3	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency										Date: February 2016		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>				Project (Number/Name) MC01 / <i>Cyber Operations</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
MC01: <i>Cyber Operations</i>	0.655	0.819	0.543	0.905	-	0.905	0.942	0.979	1.018	1.058	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The funds in this project sustain Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA Command and Control, Battle Management and Communications (C2BMC) mission systems. It maintains the Assessment and Authorization (A&A)/Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&M on all MDA information systems.

This project supports the monitoring and tracking of Cybersecurity, mitigations detailed in Information Technology security POA&Ms. Activities include preparation of A&A /C&A documentation and certification recommendations to the MDA Senior Information Assurance Officer (SIAO)/Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
Title: Network/System Certification and Accreditation (C&A)	0.819	0.543	0.905
Articles:	-	-	-
Description: This activity sustains the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments, and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Command and Control, Battle Management and Communications (C2BMC) mission systems. It maintains the Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&M on all MDA information systems.			
This project supports the monitoring and tracking of Cybersecurity, mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V)			

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

FY 2015 Accomplishments:

- Conducted cybersecurity / information assurance engineering and architecture planning for C2BMC information technology systems.
- Planned and tested the IA controls for Ballistic Missile Defense System (BMDS) C2BMC systems.
- Developed C2BMC DIACAP / RMF certification and accreditation packages.
- Conducted Controls Validation Testing (CVT) of C2BMC mission systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies.
- Conducted annual information assurance/cybersecurity reviews on the C2BMC enclaves to assess compliance in implementing and maintaining IA controls.

FY 2016 Plans:

- Conduct cyber security / information assurance (IA) engineering and architecture planning for C2BMC information technology systems.
- Plan and test the information assurance (IA) controls for Ballistic Missile Defense System (BMDS) C2BMC systems.
- Develop C2BMC Risk Management Framework (RMF) certification and accreditation packages.
- Conduct Controls Validation Testing (CVT) of C2BMC mission systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies.
- Conduct annual information assurance reviews on the C2BMC enclaves to assess compliance in implementing and maintaining IA controls.

FY 2017 Plans:

- Conduct cybersecurity design, engineering, and architecture planning for C2BMC information technology systems
- Plan and test the cybersecurity controls for Ballistic Missile Defense System (BMDS) C2BMC systems
- Develop C2BMC Risk Management Framework (RMF) assessment and authorization packages
- Conduct Security Controls Assessment (SCA) Testing Continuous Monitoring of C2BMC mission systems and provide Plan of Action and Milestones to mitigate cybersecurity vulnerabilities
- Conduct annual cybersecurity reviews on the C2BMC enclaves to assess risk and compliance in implementing and maintaining RMF controls

FY 2015	FY 2016	FY 2017

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency	Date: February 2016
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
- Conduct cybersecurity network defense management to assess risk of site systems connected to C2BMC systems			
Accomplishments/Planned Programs Subtotals	0.819	0.543	0.905

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Command and Control, Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Spiral 8.2-1 will be fielded in FY 2017, fielding of Spiral 8.2-3 in FY 2019, and completion of system deployment with Spiral 8.2-5 in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, 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 worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency											Date: February 2016				
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MC01 / <i>Cyber Operations</i>				

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network/System Certification and Accreditation (C&A) - Civ Cyber Labor	Various	MDA Other : Various	0.000	0.211		0.000		0.348		-		0.348	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - IA/ CND Network/System C&A	C/CPFF	Torch Technologies : Various	0.655	0.608		0.543		0.557	Jul 2017	-		0.557	Continuing	Continuing	Continuing
Subtotal			0.655	0.819		0.543		0.905		-		0.905	-	-	-

Remarks
N/A

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.655	0.819	0.543	0.905	-	0.905	-	-	-

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity +
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✦

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
MC01 Cyber Operations					✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦				

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC01 Cyber Operations	1	2016	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency										Date: February 2016		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MT01 / <i>C2BMC Test</i>		
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
MT01: <i>C2BMC Test</i>	76.296	51.890	56.318	52.727	-	52.727	55.665	53.188	55.129	56.207	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

TESTING

Command and Control, Battle Management and Communications (C2BMC) supports system flight and ground testing, wargames, and exercises as detailed in the MDA Integrated Master Test Plan (IMTP) to ensure C2BMC capabilities delivered are consistent with the Prioritized Capabilities List and are interoperable with other Ballistic Missile Defense System (BMDS) components.

LAB INFRASTRUCTURE

C2BMC gains efficiencies and minimizes laboratory resource requirements (footprint, personnel, and hardware) by utilizing the C2BMC test bed infrastructure as the laboratory environment supporting System Test, Development, and Sustainment. For System Ground and Flight Test, the labs are used for pre-test analysis, test execution and post-test analysis. For Development, the labs are utilized for software verification and validation testing and system integration testing. For Sustainment, the labs are used to assist with root cause determination for issues discovered on the fielded system and validation of any required software patches.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
Title: Integrated Master Test Plan	51.890	56.318	52.727
Articles:	-	-	-
Description: This activity funds C2BMC participation in BMDS flight and ground testing in accordance with the BMDS Integrated Master Test Plan (IMTP).			
FY 2015 Accomplishments:			
Participated in and analyze results of ground and flight tests, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP)			
- Continued to plan, collect data, assess, examine, and report on C2BMC spiral integration testing			
- Supported interoperability and integration of the BMDS program elements			
- Supported the field testing of the European and Central Command Deployments			
- Supported European Phased Adaptive Approach (EPAA) Phase 2-3 Situational Awareness (SA) Node deployments			
- Continued to provide infrastructure, network, and troubleshooting support to:			

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<p>-- C2BMC Command Center (CCC) (Includes BMDS Network Operations and Security Center (BNOSC))</p> <p>-- System Test and Operations Center (STOC)</p> <p>-- Ballistic Missile Defense System (BMDS) Communications Network (BCN)</p> <p>-- Distributed Multi-Echelon Distributed Training system (DMETS) Infrastructure</p> <p>-- Distributed Training system (DTS)</p> <p>- Continued build-out of Spiral 8.2 Testbed for IMTP scheduled events</p> <p>- Continued C2BMC and NATO planning demonstrations</p> <p>- Continued to support NATO live fire events</p> <p>- Continued development and upgrades for Cyber Testing in the C2BMC Testbed (CTB)</p> <p>- FTO-02 : Conducted pre-mission requirements & planning, test readiness and execution activities</p> <p>-- FTO-02 E1 was a "no test" due to a target extraction failure that prevented target ignition. The test was re-planned as FTO-02 E1a and is planned for execution in FY16. Due to a failure review board (FRB) for the IRBM target, FTT-18 was delayed for execution in FY 2016.</p> <p>-- FTO-02 E2 was initially delayed due to weather from 4QFY15 into 1QFY16, but then was characterized as a "no test" due to a target extraction deployment malfunction. The test was re-planned as FTO-02 E2a and successfully executed on 1 November 2015.</p> <p>Enterprise Sensors Laboratory (ESL):</p> <p>-Demonstrated prototype algorithms for track and measurement level sensor data fusion and feature extraction through flight tests, ground tests and real-world targets of opportunities before incorporation into formal C2BMC spiral builds. Project MT01 funds test operations for the capabilities established in the Enterprise Sensors Laboratory and described in Project MD01.</p> <p>-Planned, coordinated, and provided test operations utilizing ESL prototypes to produce data to enable assessments of track accuracy improvements resulting from incorporation of Space Based Infra-Red System (SBIRS) Geosynchronous Earth Orbit Scanner Wideband and other new Overhead Persistent Infra-Red (OPIR) sensor data feeds</p> <p>-Planned, coordinated, and provided test operations utilizing ESL prototypes to produce data to enable characterization of the capability to extract information from observations of dim upper stages of threat systems.. ESL provided post-test analysis of prototype algorithm performance for select events and targets of opportunity.</p> <p>-Compiled and provided test and demonstration results back to the algorithms development activity in Project MD01 to enable algorithm refinement.</p> <p>Specific FY15 testing accomplishments:</p> <p>-Flight Test Other-20 (FTX-20): ESL demonstrated first time live data fusion, cueing, and formation of Launch on Remote (LoR) quality tracks and with live Discrimination Sensor Technology (DST) Reaper-borne sensors and exercised OPIR cueing.</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<p>-Flight Test Maritime (FTM-25): ESL and C2BMC X-Lab demonstrated an Aegis simulated LoR engagement with live DST Reaper-borne sensors and exercised OPIR cueing.</p> <p>-FTX-19: ESL demonstrated reverse cueing capability and OPIR wideband data utility</p> <p>Glory Trip 214 (GT-214) and GT-215: ESL demonstrated improved track fusion and cueing capability</p> <p>-Ground Test Integrated 06b part 1 (GTI-06b pt. 1): ESL utilized the Ground Test environment to soak (continually run software in a relevant environment to yield data for performance analysis) ESL Baseline Release 5.1 as a risk reduction task in support of C2BMC software development activities.</p> <p>C2BMC Experimentation Lab (X-Lab):</p> <ul style="list-style-type: none"> - Demonstrated maturing C2BMC technologies and software builds through flight tests (FTM-25, FTM-26, FTO-02 E1 & E2, and FTX-20), ground tests (GTI-06 pt. 1), and real-world targets of opportunities before incorporation into formal C2BMC spiral builds. Project MT01 funded the test operations for the capabilities established in the X-Lab facility and described in Project MD01. -Planned, coordinated, and provided test operations utilizing maturing C2BMC technologies to produce data to enable evaluation of architecture schemas for system track data distribution and common cueing protocols across the Joint OPIR Ground (JOG), Space Based Infra-Red System (SBIRS), and MDA system architectures. (FTM-25, FTM-26, FTO-02 E1 & E2, FTX-20, GTI-06 pt. 1). -Compiled and provided test and demonstration results back to the development activity in Project MD01 for architecture refinement activities for future Spiral builds. -Hosted and tested Spiral 8.2-1 engineering releases in an operationally relevant environment to provide developmental test feedback in Project MD01 for continued refinement and performance evaluation of the Spiral 8.2-1 software. <p>Wargames</p> <p>C2BMC participated in 6 major wargame exercises supporting all five combatant commands, NATO partners, and Host Nations allowing warfighters to validate Ballistic Missile Defense Techniques, Tactics, and Procedures specific to individual Areas of Operations.</p> <p>Program, Planning & Operations</p> <p>M&S participation in System Test and Exercise Events</p> <ul style="list-style-type: none"> - Provided Predictive Analysis support to three Flight Tests and one Ground Test. - Used the BMDS C2BMC Model (BCM) to enable exercise integration testing activities - Integrated Master Assessment Plan (IMAP): 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<p>- Continue development of Spiral 8.2 assessment requirements (Assessment Objectives, Assessment Sub-Objectives, and Critical Assessment Conditions) to capture engineering, test, and analysis data to support S8.2 Technical Capability Declaration, and drive BMDS system test objectives and test resourcing in the BMDS Integrated Master Test Plan (IMTP).</p> <p>FY 2016 Plans: Flight Test Execution: Participate in and analyze results of flight tests in accordance with the BMDS Integrated Master Test Plan (IMTP)</p> <p>Enterprise Sensors Laboratory (ESL) and supporting activities: -Demonstrate prototype algorithms for track and measurement level sensor data fusion and feature extraction through flight tests, ground tests and real-world targets of opportunities before incorporation into formal C2BMC spiral builds. -Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable assessments of track accuracy improvements resulting from incorporation of Space Based Infra-Red System (SBIRS) Geosynchronous Earth Orbit (GEO) Scanner Wideband, SBIRS GEO Starer Wideband, and other new Overhead Persistent Infra-Red (OPIR) sensor data feeds -Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable effectiveness evaluations of sensor data fusion enabled through the incorporation of radio frequency data into the existing ESL Infrared three-dimension (3-D) track formulation processes. -Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable characterization of the capability to extract information from observations of dim upper stages of threat systems and the ability to exploit features extracted from available sensor resource data. -Compile and provide test and demonstration results back to the algorithms development activity in Project MD01 to enable algorithm refinement</p> <p>C2BMC Experimentation Lab (X-Lab): - Demonstrate maturing C2BMC technologies and software builds through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds. -Plan, coordinate, and provide test operations utilizing maturing C2BMC technologies to produce data to enable evaluation of architecture schemas for system track data distribution and common cueing protocols across the Joint OPIR Ground (JOG), Space Based Infra-Red System (SBIRS), and Missile Defense Agency (MDA) system architectures. -Host and test Spiral 8.2 engineering releases -Compile and provide test and demonstration results back to the development activity in Project MD01 for architecture refinement activities and Spiral 8.2 performance evaluation</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<p>Ground Test Execution: Participate in and analyze results of ground tests in accordance with the BMDS Integrated Master Test Plan (IMTP)</p> <p>Enterprise Sensors Laboratory (ESL):</p> <ul style="list-style-type: none"> -Demonstrate prototype algorithms for track and measurement level sensor data fusion and feature extraction through flight tests, ground tests and real-world targets of opportunities before incorporation into formal C2BMC spiral builds. -Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable assessments of track accuracy improvements resulting from incorporation of Space Based Infra-Red System (SBIRS) Geosynchronous Earth Orbit (GEO) Scanner Wideband and other new Overhead Persistent Infra-Red (OPIR) sensor data feeds -Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable effectiveness evaluations of sensor data fusion enabled through the incorporation of radio frequency data into the existing ESL Infrared three-dimension track formulation processes. -Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable characterization of the capability to extract information from observations of dim upper stages of threat systems and the ability to exploit features extracted from available sensor resource data. -Compile and provide test and demonstration results back to the algorithms development activity in Project MD01 to enable algorithm refinement <p>C2BMC Experimentation Lab (X-Lab):</p> <ul style="list-style-type: none"> - Demonstrate maturing Command and Control, Battle Management and Communications (C2BMC) technologies and software builds through flight tests, ground tests and real-world targets of opportunities before incorporation into formal C2BMC spiral builds. -Plan, coordinate, and provide test operations utilizing maturing C2BMC technologies to produce data to enable evaluation of architecture schemas for system track data distribution and common cueing protocols across the Joint OPIR Ground (JOG), Space Based Infra-Red System (SBIRS), and Missile Defense Agency (MDA) system architectures. -Host and test Spiral 8.2 engineering releases -Compile and provide test and demonstration results back to the development activity in Project MD01 for architecture refinement activities and Spiral 8.2 performance evaluation <p>Resources: Participate in and analyze results of ground and flight tests, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP)</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Plan, collect data, assess, examine, and report on Command and Control, Battle Management and Communications (C2BMC) spiral integration testing - Support interoperability and integration of the BMDS program elements - Support European Phased Adaptive Approach (EPAA) Phase 2 Situational Awareness (SA) Node deployments - Provide infrastructure, network, and troubleshooting support to: <ul style="list-style-type: none"> -- C2BMC Command Center (CCC) (Includes BMDS Network Operations and Security Center (BNOSC)) -- System Test and Operations Center (STOC) -- C2BMC System Support Center (CSSC) -- Ballistic Missile Defense System (BMDS) Communications Network (BCN) -- Distributed Multi-Echelon Distributed Training system (DMETS) Infrastructure -- Distributed Training system (DTS) - Continue C2BMC and North Atlantic Treaty Organization (NATO) planning demonstrations - Continue to support NATO live fire events - Continue development and upgrades for Cyber Testing in the C2BMC Testbed (CTB) <p>Wargames & Exercises: Participate in and analyze results of wargames and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP)</p> <p>Program, Planning & Operations:</p> <ul style="list-style-type: none"> - Complete definition of Key Test Points for C2BMC Model (BCM 8.2-1) Verification and Validation - Allocate C2BMC Modeling and Simulation (M&S) data collection requirements of Critical Engagement Conditions (CEC) and Key Test Points (KTP) to Flight and Ground Test events - Perform initial development of S8.2-3 CEC and KTP for inclusion in IMTP <p>FY 2017 Plans: The decrease in funding from FY 2016 to FY 2017 is attributed to an adjustment from the IMTP Test Program.</p> <p>Flight Test Execution:</p> <ul style="list-style-type: none"> - Provide support for the design, pre-event count down, execution, and pre- and post- analysis for BMDS level flight tests. - Participate in and analyze results of flight tests in accordance with the BMDS Integrated Master Test Plan (IMTP). 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<p>- Support the four phases of MDA's Flight Test Concept of Operations (CONOPS): 1) Requirements Planning; 2) Readiness; 3) Execution; 4) Test Analysis and Reporting.</p> <p>-Integrate and test the BMDS Overhead Persistent Infra-Red (OPIR) Architecture to enable earlier sensor and weapon cueing of sensor and shooter, improve threat tracking, and provide source information for discrimination processing.</p> <p>Enterprise Sensors Laboratory (ESL) and supporting activities:</p> <ul style="list-style-type: none"> - Demonstrate prototype algorithms for track and measurement level sensor data fusion and feature extraction through flight tests, ground tests and real-world targets of opportunities before incorporation into formal C2BMC spiral builds - Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable assessments of track accuracy improvements resulting from incorporation of Space Based Infra-Red System (SBIRS) Geosynchronous Earth Orbit (GEO) Scanner Wideband, SBIRS GEO Starer Wideband, and other new Overhead Persistent Infra-Red (OPIR) sensor data feeds - Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable effectiveness evaluations of sensor data fusion enabled through the incorporation of radio frequency data into the existing ESL Infrared three-dimension (3-D) track formulation processes - Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable characterization of the capability to extract information from observations of dim upper stages of threat systems and the ability to exploit features extracted from available sensor resource data - Compile and provide test and demonstration results back to the algorithms development activity in Project MD01 to enable algorithm refinement <p>C2BMC Experimentation Lab (X-Lab):</p> <ul style="list-style-type: none"> - Demonstrate maturing C2BMC technologies and software builds through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds - Plan, coordinate, and provide test operations utilizing maturing C2BMC technologies to produce data to enable evaluation of architecture schemas for system track data distribution and common cueing protocols across the Joint OPIR Ground (JOG), Space Based Infra-Red System (SBIRS), and BMDS system architectures - Plan, coordinate, and support test operations utilizing maturing C2BMC technologies to develop a BMD Post Intercept Assessment capability - Host and test Spiral 8.2 engineering releases - Compile and provide test and demonstration results back to the development activity in Project MD01 for architecture refinement activities and Spiral 8.2 performance evaluation <p>Ground Test Execution:</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Assess BMDS interoperability, integration, and functionality in lab and distributed environments, leveraging a complex set of scenarios to test the limits of the C2BMC system. - Participate in and analyze results of ground tests in accordance with the BMDS Integrated Master Test Plan (IMTP). -Support the four phases of the MDA Ground Test CONOPS: 1) Requirements and Scenarios, 2) Planning and Integration; 3) Execution; 4) Test and Analysis. -Integrate and test of the BMDS Overhead Persistent Infra-Red (OPIR) Architecture to enable earlier cueing of sensor and shooter, improve threat tracking, and provide source information for discrimination processing. - Support Phased Adaptive Approach (PAA) Phase 3: deployment of Near-Term Discrimination Improvements Inc 3 and Enhanced Homeland Defense Inc 4 <p>Enterprise Sensors Laboratory (ESL):</p> <ul style="list-style-type: none"> - Demonstrate prototype algorithms for track and measurement level sensor data fusion and feature extraction through flight tests, ground tests and real-world targets of opportunities before incorporation into formal C2BMC spiral builds. - Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable assessments of track accuracy improvements resulting from incorporation of Space Based Infra-Red System (SBIRS) Geosynchronous Earth Orbit (GEO) Scanner Wideband and other new Overhead Persistent Infra-Red (OPIR) sensor data feeds - Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable effectiveness evaluations of sensor data fusion enabled through the incorporation of radio frequency data into the existing ESL Infrared three-dimension track formulation processes. - Plan, coordinate, and provide test operations utilizing ESL prototypes to produce data to enable characterization of the capability to extract information from observations of dim upper stages of threat systems and the ability to exploit features extracted from available sensor resource data. - Compile and provide test and demonstration results back to the algorithms development activity in Project MD01 to enable algorithm refinement <p>C2BMC Experimentation Lab (X-Lab): - Demonstrate maturing Command and Control, Battle Management and Communications (C2BMC technologies and software builds through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds.</p> <ul style="list-style-type: none"> - Plan, coordinate, and provide test operations utilizing maturing C2BMC technologies to produce data to enable evaluation of architecture schemas for system track data distribution and common cueing protocols across the Joint OPIR Ground (JOG), Space Based Infra-Red System (SBIRS), and BMDS system architectures. - Plan, coordinate, and provide test operations utilizing maturing C2BMC technologies to develop a BMD Post Intercept Assessment capability. 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<p>- Host and test Spiral 8.2 engineering releases.</p> <p>- Compile and provide test and demonstration results back to the development activity in Project MD01 for architecture refinement activities and Spiral 8.2 performance evaluation.</p> <p>Resources:</p> <ul style="list-style-type: none"> - Plan, collect data, assess, examine, and report on Command and Control, Battle Management and Communications (C2BMC) spiral integration testing. - Support interoperability and integration of the BMDS program elements. - Support European Phased Adaptive Approach (EPAA) Phase 2 Situational Awareness (SA) Node deployments - Provide infrastructure, network, and troubleshooting support to: <ul style="list-style-type: none"> -- C2BMC Command Center (CCC) (including the BMDS Network Operations and Security Center (BNOSC)) -- System Test and Operations Center (STOC) -- C2BMC System Support Center (CSSC) -- Ballistic Missile Defense System (BMDS) Communications Network (BCN) -- Distributed Multi-Echelon Distributed Training system (DMETS) Infrastructure -- Distributed Training system (DTS) -- Continue C2BMC and North Atlantic Treaty Organization (NATO) planning demonstrations --- Continue to support NATO live fire events - Continue development and upgrades for Cyber Testing in the C2BMC Testbed (CTB) <p>Wargames & Exercises:</p> <ul style="list-style-type: none"> - Participate in and analyze results of wargames and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP) <p>Program, Planning & Operations:</p> <ul style="list-style-type: none"> - Develop Critical Engagement Conditions (CEC) and Key Test Points (KTP) for BMDS C2BMC Model (BCM) C2BMC Spiral 8.2-3 for inclusion in the IMTP - Allocate C2BMC Modeling and Simulation (M&S) data collection requirements of Critical Engagement Conditions (CEC) and Key Test Points (KTP) to Flight and Ground Test events. - Provide Flight Test Predictive Analysis support. - Generate, test, and distribute Federated Model compatible scenarios for Ground Test and Flight Test Experimentation test support. 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
- Use BCM to support exercise integration testing activities including test case and scenario checkout.			
Accomplishments/Planned Programs Subtotals	51.890	56.318	52.727

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0603177C: <i>Discrimination Sensor Technology</i>	35.223	28.200	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	13.061	9.876	3.626	-	3.626	0.000	0.000	0.000	0.000	0	26.563
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	863.965	1,269.913	862.080	-	862.080	701.311	585.079	600.710	535.614	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	260.347	228.392	230.077	-	230.077	144.893	141.815	171.644	158.421	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	395.927	404.780	401.594	-	401.594	404.993	409.481	427.603	434.868	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	761.646	830.647	959.066	-	959.066	841.738	700.596	592.940	528.744	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	29.530	28.605	32.129	-	32.129	33.869	34.884	36.203	36.821	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	7.560	21.507	20.690	-	20.690	15.670	11.641	11.796	11.992	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.972	47.939	54.750	-	54.750	53.894	55.524	58.100	59.029	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	64.610	71.266	68.787	-	68.787	73.329	70.423	85.881	74.189	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	354.414	281.740	293.441	-	293.441	337.537	322.334	346.134	351.933	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	447.424	527.563	563.576	-	563.576	471.059	431.349	454.830	462.429	Continuing	Continuing

Remarks

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D. Acquisition Strategy

The Command and Control, Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Spiral 8.2-1 will be fielded in FY 2017, fielding of Spiral 8.2-3 in FY 2019, and completion of system deployment with Spiral 8.2-5 in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, 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 worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Remarks
N/A

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Integrated Master Test Plan - BMDS Level Testing GOV	TBD	Army/Air Force : Various	0.000	0.000		0.000		2.517	Oct 2016	-		2.517	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure	SS/CPAF	Northrop-Grumman Corporation : Colorado Springs, CO	1.100	5.435		6.687		22.275	Oct 2016	-		22.275	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure Support	MIPR	Various : VA; OH; AL; NM; CA	4.570	1.591		2.085		3.534	Oct 2016	-		3.534	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS Level Testing	SS/IDIQ	Lockheed Martin Team : Arlington, VA; Huntsville,	32.808	18.910		21.404		23.614	Jul 2017	-		23.614	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

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Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		AL; Colorado Springs, CO													
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing (Element/System Test Lab Facilities)	SS/CPAF	Northrop-Grumman Corporation : Colorado Springs, CO	37.818	25.954		26.142		0.787	Oct 2016	-		0.787	Continuing	Continuing	Continuing
Subtotal			76.296	51.890		56.318		52.727		-		52.727	-	-	-

Remarks
N/A

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Remarks
N/A

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	76.296	51.890	56.318	52.727	-	52.727	-	-	-

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
FTX-20 (AEGIS 5.0, Target Only Flight Test)	▲																											
FTM-25 (AEGIS 5.0, Intercept Flight Test)	✦																											
Warfighter TP 04e (BMDS Ground Test)			✦																									
GTI-06 Part 1 (BMDS Ground Test)			✦																									
(EX) European Air & Missile Defense Exercise Alliance 15			▲																									
GTI-06 Part 3 (BMDS Ground Test)				✦																								
(EX) EPOCH PLANEX 17			▲																									
(WG) Huntsville Wargames 15			▲																									
(EX) Arabian Gulf Shield (AGS) Event 3 15			▲																									
(WG) Space & Missile Defense Symposium 15			▲																									
FTT-18 (TH, Intercept Flight Test)												△																
GM CTV-02 Plus (GM, Intercept Flight Test)							△																					
(EX) Fleet Synthetic Training-Joint 16							△																					
(EX) Key Resolve 16							△																					
GTI-ISR (16) (BMDS Ground Test)								✦																				
(EX) European Air & Missile Defense Exercise Alliance 16							△																					
SFTM-01 (AEGIS 5.1, Intercept Flight Test)									△																			
GTD-06 Part 2 (BMDS Ground Test)									✦																			
(EX) Joint Air Defense Exercise Series 16									△																			
(WG) BMDS Wargames 17									✦	✦	✦	✦																
(WG) Nimble Titan Year 1 18									✦	✦	✦	✦																
(EX) EPOCH PLANEX 18										△																		
(EX) Arabian Gulf Shield (AGS) Event 1 17										△																		
(EX) Global Response Exercise (GREx) 16										△																		
FTG-15 (GM, Intercept Flight Test)										△																		
FTM-27 (AEGIS SBT, Intercept Flight Test)										△																		
Israeli Cooperative Intercept Flight Test - FY 2017											✦	✦	✦	✦														
(EX) Fleet Synthetic Training-Joint 17												△																
(EX) Arabian Gulf Shield (AGS) Event 2 17												△																

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
(EX) Key Resolve 17										▲																		
FTT-15 (TH, Intercept Flight Test)										▲	▲																	
SFTM-02 (AEGIS 5.1, Intercept Flight Test)										▲																		
Warfighter TP 06 (BMDS Ground Test)										✦																		
(EX) Austere Challenge 17										✦	✦	✦	✦	✦	✦													
(EX) Steadfast Alliance 17										✦	✦																	
(EX) European Air & Missile Defense Exercise Alliance 17										▲																		
GTI-07a (BMDS Ground Test)										✦																		
(WG) Demonstration, Table-top Exercises & Experiments 17										✦	✦	✦																
(EX) KEEN Edge 18										✦	✦	✦	✦															
(EX) Joint Air Defense Exercise Series 17										✦																		
(WG) Huntsville Wargames 17										▲																		
(EX) Arabian Gulf Shield (AGS) Event 3 17										▲																		
(WG) Space & Missile Defense Symposium 17										▲																		
FTM-24 (AEGIS 5.0, Intercept Flight Test)										▲																		
GTD-07a (BMDS Ground Test)										✦																		
(EX) Air and Missile Defense Exercise Series 18																					▲							
(EX) EPOCH PLANEX 19																					▲							
(EX) Arabian Gulf Shield (AGS) Event 1 18																					▲							
(EX) Vigilant Shield/Global Thunder 17																					▲							
FTG-11 (IOT&E) (GM, Intercept Flight Test)																					▲							
FTM-29 (AEGIS 5.1, Intercept Flight Test)																					▲							
Warfighter TP 07a (BMDS Ground Test)																					✦							
GTX-07b (BMDS Ground Test)																					✦							
(EX) Global Lightning 18																					✦	✦						
(EX) Arabian Gulf Shield (AGS) Event 2 18																					▲							
(EX) Key Resolve 18																					▲							
(EX) Host Nation 18																					✦	✦						
(EX) Global Response Exercise (GREx) 18																					✦	✦						
(EX) Steadfast Alliance 18																					✦	✦						
(EX) European Air & Missile Defense Exercise Alliance 18																										▲		

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency

Date: February 2016

Appropriation/Budget Activity
0400 / 4

R-1 Program Element (Number/Name)
PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*

Project (Number/Name)
MT01 / *C2BMC Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity Planned Activity ✦
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
FTO-03 E1 (OTA, Intercept Flight Test)																												
GTI-07b (BMDS Ground Test)													△															
(WG) Demonstration, Table-top Exercises & Experiments 18													✦	✦	✦													
(EX) Joint Air Defense Exercise Series 18													△															
(WG) Huntsville Wargames 18													△															
(EX) Arabian Gulf Shield (AGS) Event 3 18													△															
(EX) Ulchi Freedom Guardian 18													△															
(WG) Space & Missile Defense Symposium 18													△															
(WG) BMDS Wargames 19													✦	✦	✦	✦												
(WG) Nimble Titan Year 1 20													✦	✦	✦	✦												
(EX) Air and Missile Defense Exercise Series 19																△												
(EX) EPOCH PLANEX 20																△												
(EX) Arabian Gulf Shield (AGS) Event 1 19																△												
(EX) Vigilant Shield/Global Thunder 18																△												
FTM-31 (AEGIS SBT, Intercept Flight Test)																△												
FTM-33 (AEGIS SBT, Intercept Flight Test)																△												
FTO-03 E2 (OTA, Intercept Flight Test)																△												
GTD-07b Part 1 (BMDS Ground Test)																✦												
GTI-ISR (18) (BMDS Ground Test)																△												
(EX) Global Lightning 19																✦	✦											
(EX) EPOCH PLANEX 21																✦	✦	✦	✦	✦								
(EX) Fleet Synthetic Training-Joint 18																	△											
(EX) Fleet Synthetic Training-Joint 19																	△											
(EX) Arabian Gulf Shield (AGS) Event 2 19																	△											
(EX) Key Resolve 19																	△											
GTD-07b Part 2 (BMDS Ground Test)																✦												
(EX) Austere Challenge 19																✦	✦	✦	✦	✦	✦							
(EX) Steadfast Alliance 19																✦	✦											
(EX) European Air & Missile Defense Exercise Alliance 19																	△											
FTG-17 (DT/OT) (GM, Intercept Flight Test)																	△											
FTM-32 (AEGIS SBT, Intercept Flight Test)																	△											

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Warfighter TP 07b (BMDS Ground Test)																												
GTX-08 Part 1 (BMDS Ground Test)																												
(WG) Demonstration, Table-top Exercises & Experiments 19																												
(EX) KEEN Edge 20																												
(EX) Joint Air Defense Exercise Series 19																												
(WG) Huntsville Wargames 19																												
(EX) Arabian Gulf Shield (AGS) Event 3 19																												
(EX) Ulchi Freedom Guardian 19																												
(WG) Space & Missile Defense Symposium 19																												
FTT-19 (TH, Intercept Flight Test)																												
FTX-23 (AEGIS 5.1, Target Only Flight Test)																												
FTM-35 (AEGIS 5.1, Intercept Flight Test)																												
FEV-02 (FTM-DST 2) (AEGIS 5.0, Intercept Flight Test)																												
(EX) Air and Missile Defense Exercise Series 20																												
(EX) Arabian Gulf Shield (AGS) Event 1 20																												
(EX) Global Lightning 20																												
(EX) Arabian Gulf Shield (AGS) Event 2 20																												
(EX) Global Response Exercise (GREx) 20																												
(EX) Key Resolve 20																												
FTG-18 (GM, Intercept Flight Test)																												
(EX) Steadfast Alliance 20																												
(EX) Host Nation 20																												
(EX) European Air & Missile Defense Exercise Alliance 20																												
FTT-16 (TH, Intercept Flight Test)																												
FTX-25 (SN, Target Only Flight Test)																												
GTI-08 (BMDS Ground Test)																												
(WG) Demonstration, Table-top Exercises & Experiments 20																												
(WG) Huntsville Wargames 20																												
(EX) Arabian Gulf Shield (AGS) Event 3 20																												
(EX) Ulchi Freedom Guardian 20																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
(WG) Space & Missile Defense Symposium 20																												
FTM-30 (AEGIS 5. 1, Intercept Flight Test)																												
GTD-08 Part 1 (BMDs Ground Test)																												
(WG) BMDs Wargames 21																												
(WG) Nimble Titan Year 2 22																												
(EX) EPOCH PLANEX 22																												
(EX) Joint Air Defense Exercise Series 20																												
(EX) Air and Missile Defense Exercise Series 21																												
(EX) Arabian Gulf Shield (AGS) Event 1 21																												
(EX) Vigilant Shield/GlobalThunder 20																												
GTD-08 Part 2 (BMDs Ground Test)																												
(EX) Global Lightning 21																												
(EX) Arabian Gulf Shield (AGS) Event 2 21																												
(EX) Fleet Synthetic Training-Joint 21																												
(EX) Key Resolve 21																												
(EX) Austere Challenge 21 (Continues into FY 2022)																												
(EX) Steadfast Alliance 21																												
Warfighter TP 08 (BMDs Ground Test)																												
(EX) European Air & Missile Defense Exercise Alliance 21																												
FTX-26 (SN, Target Only Flight Test)																												
FTO-04 (OTA, Intercept Flight Test)																												
FTM-37 (IOT&E) (AEGIS 5.1, Intercept Flight Test)																												
FTM-38 (AEGIS 5.0, Intercept Flight Test)																												
(WG) Demonstration, Table-top Exercises & Experiments 21																												
(EX) KEEN Edge 22																												
(WG) Huntsville Wargames 21																												
(EX) Arabian Gulf Shield (AGS) Event 3 21																												
(EX) Ulchi Freedom Guardian 21																												
(WG) Space & Missile Defense Symposium 21																												
FTT-21 (TH, Intercept Flight Test)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FTX-20 (AEGIS 5.0, Target Only Flight Test)	1	2015	1	2015
FTM-25 (AEGIS 5.0, Intercept Flight Test)	1	2015	1	2015
Warfighter TP 04e (BMDS Ground Test)	3	2015	3	2015
GTI-06 Part 1 (BMDS Ground Test)	3	2015	3	2015
(EX) European Air & Missile Defense Exercise Alliance 15	3	2015	3	2015
GTI-06 Part 3 (BMDS Ground Test)	4	2015	4	2015
(EX) EPOCH PLANEX 17	4	2015	4	2015
(WG) Huntsville Wargames 15	4	2015	4	2015
(EX) Arabian Gulf Shield (AGS) Event 3 15	4	2015	4	2015
(WG) Space & Missile Defense Symposium 15	4	2015	4	2015
FTT-18 (TH, Intercept Flight Test)	3	2017	3	2017
GM CTV-02 Plus (GM, Intercept Flight Test)	2	2016	2	2016
(EX) Fleet Synthetic Training-Joint 16	2	2016	2	2016
(EX) Key Resolve 16	2	2016	2	2016
GTI-ISR (16) (BMDS Ground Test)	3	2016	3	2016
(EX) European Air & Missile Defense Exercise Alliance 16	3	2016	3	2016
SFTM-01 (AEGIS 5.1, Intercept Flight Test)	4	2016	4	2016
GTD-06 Part 2 (BMDS Ground Test)	4	2016	4	2016
(EX) Joint Air Defense Exercise Series 16	4	2016	4	2016
(WG) BMDS Wargames 17	4	2016	3	2017
(WG) Nimble Titan Year 1 18	4	2016	3	2017

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
(EX) EPOCH PLANEX 18	1	2017	1	2017
(EX) Arabian Gulf Shield (AGS) Event 1 17	1	2017	1	2017
(EX) Global Response Exercise (GREx) 16	1	2017	1	2017
FTG-15 (GM, Intercept Flight Test)	1	2017	1	2017
FTM-27 (AEGIS SBT, Intercept Flight Test)	1	2017	1	2017
Israeli Cooperative Intercept Flight Test - FY 2017	1	2017	4	2017
(EX) Fleet Synthetic Training-Joint 17	2	2017	2	2017
(EX) Arabian Gulf Shield (AGS) Event 2 17	2	2017	2	2017
(EX) Key Resolve 17	2	2017	2	2017
FTT-15 (TH, Intercept Flight Test)	3	2017	3	2017
SFTM-02 (AEGIS 5.1, Intercept Flight Test)	2	2017	2	2017
Warfighter TP 06 (BMDS Ground Test)	2	2017	2	2017
(EX) Austere Challenge 17	2	2017	3	2018
(EX) Steadfast Alliance 17	2	2017	3	2017
(EX) European Air & Missile Defense Exercise Alliance 17	3	2017	3	2017
GTI-07a (BMDS Ground Test)	3	2017	3	2017
(WG) Demonstration, Table-top Exercises & Experiments 17	3	2017	1	2018
(EX) KEEN Edge 18	3	2017	2	2018
(EX) Joint Air Defense Exercise Series 17	4	2017	4	2017
(WG) Huntsville Wargames 17	4	2017	4	2017
(EX) Arabian Gulf Shield (AGS) Event 3 17	4	2017	4	2017
(WG) Space & Missile Defense Symposium 17	4	2017	4	2017
FTM-24 (AEGIS 5.0, Intercept Flight Test)	4	2017	4	2017
GTD-07a (BMDS Ground Test)	4	2017	4	2017
(EX) Air and Missile Defense Exercise Series 18	1	2018	1	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
(EX) EPOCH PLANEX 19	1	2018	1	2018
(EX) Arabian Gulf Shield (AGS) Event 1 18	1	2018	1	2018
(EX) Vigilant Shield/Global Thunder 17	1	2018	1	2018
FTG-11 (IOT&E) (GM, Intercept Flight Test)	1	2018	1	2018
FTM-29 (AEGIS 5.1, Intercept Flight Test)	1	2018	1	2018
Warfighter TP 07a (BMDS Ground Test)	1	2018	1	2018
GTX-07b (BMDS Ground Test)	1	2018	1	2018
(EX) Global Lightning 18	1	2018	2	2018
(EX) Arabian Gulf Shield (AGS) Event 2 18	2	2018	2	2018
(EX) Key Resolve 18	2	2018	2	2018
(EX) Host Nation 18	2	2018	3	2018
(EX) Global Response Exercise (GREx) 18	2	2018	3	2018
(EX) Steadfast Alliance 18	2	2018	3	2018
(EX) European Air & Missile Defense Exercise Alliance 18	3	2018	3	2018
FT0-03 E1 (OTA, Intercept Flight Test)	3	2018	3	2018
GTI-07b (BMDS Ground Test)	3	2018	4	2018
(WG) Demonstration, Table-top Exercises & Experiments 18	3	2018	1	2019
(EX) Joint Air Defense Exercise Series 18	4	2018	4	2018
(WG) Huntsville Wargames 18	4	2018	4	2018
(EX) Arabian Gulf Shield (AGS) Event 3 18	4	2018	4	2018
(EX) Ulchi Freedom Guardian 18	4	2018	4	2018
(WG) Space & Missile Defense Symposium 18	4	2018	4	2018
(WG) BMDS Wargames 19	4	2018	3	2019
(WG) Nimble Titan Year 1 20	4	2018	3	2019
(EX) Air and Missile Defense Exercise Series 19	1	2019	1	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
(EX) EPOCH PLANEX 20	1	2019	1	2019
(EX) Arabian Gulf Shield (AGS) Event 1 19	1	2019	1	2019
(EX) Vigilant Shield/Global Thunder 18	1	2019	1	2019
FTM-31 (AEGIS SBT, Intercept Flight Test)	1	2019	1	2019
FTM-33 (AEGIS SBT, Intercept Flight Test)	1	2019	1	2019
FT0-03 E2 (OTA, Intercept Flight Test)	1	2019	1	2019
GTD-07b Part 1 (BMDS Ground Test)	1	2019	1	2019
GTI-ISR (18) (BMDS Ground Test)	1	2019	1	2019
(EX) Global Lightning 19	1	2019	2	2019
(EX) EPOCH PLANEX 21	1	2019	1	2020
(EX) Fleet Synthetic Training-Joint 18	2	2019	2	2019
(EX) Fleet Synthetic Training-Joint 19	2	2019	2	2019
(EX) Arabian Gulf Shield (AGS) Event 2 19	2	2019	2	2019
(EX) Key Resolve 19	2	2019	2	2019
GTD-07b Part 2 (BMDS Ground Test)	2	2019	2	2019
(EX) Austere Challenge 19	2	2019	3	2020
(EX) Steadfast Alliance 19	2	2019	3	2019
(EX) European Air & Missile Defense Exercise Alliance 19	3	2019	3	2019
FTG-17 (DT/OT) (GM, Intercept Flight Test)	3	2019	3	2019
FTM-32 (AEGIS SBT, Intercept Flight Test)	3	2019	3	2019
Warfighter TP 07b (BMDS Ground Test)	3	2019	3	2019
GTX-08 Part 1 (BMDS Ground Test)	3	2019	3	2019
(WG) Demonstration, Table-top Exercises & Experiments 19	3	2019	1	2020
(EX) KEEN Edge 20	3	2019	2	2020
(EX) Joint Air Defense Exercise Series 19	4	2019	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
(WG) Huntsville Wargames 19	4	2019	4	2019
(EX) Arabian Gulf Shield (AGS) Event 3 19	4	2019	4	2019
(EX) Ulchi Freedom Guardian 19	4	2019	4	2019
(WG) Space & Missile Defense Symposium 19	4	2019	4	2019
FTT-19 (TH, Intercept Flight Test)	4	2019	4	2019
FTX-23 (AEGIS 5.1, Target Only Flight Test)	4	2019	4	2019
FTM-35 (AEGIS 5.1, Intercept Flight Test)	4	2019	4	2019
FEV-02 (FTM-DST 2) (AEGIS 5.0, Intercept Flight Test)	4	2019	4	2019
(EX) Air and Missile Defense Exercise Series 20	1	2020	1	2020
(EX) Arabian Gulf Shield (AGS) Event 1 20	1	2020	1	2020
(EX) Global Lightning 20	1	2020	2	2020
(EX) Arabian Gulf Shield (AGS) Event 2 20	2	2020	2	2020
(EX) Global Response Exercise (GREx) 20	2	2020	2	2020
(EX) Key Resolve 20	2	2020	2	2020
FTG-18 (GM, Intercept Flight Test)	2	2020	2	2020
(EX) Steadfast Alliance 20	2	2020	3	2020
(EX) Host Nation 20	3	2020	3	2020
(EX) European Air & Missile Defense Exercise Alliance 20	3	2020	3	2020
FTT-16 (TH, Intercept Flight Test)	3	2020	3	2020
FTX-25 (SN, Target Only Flight Test)	3	2020	3	2020
GTI-08 (BMDS Ground Test)	3	2020	4	2020
(WG) Demonstration, Table-top Exercises & Experiments 20	3	2020	1	2021
(WG) Huntsville Wargames 20	4	2020	4	2020
(EX) Arabian Gulf Shield (AGS) Event 3 20	4	2020	4	2020
(EX) Ulchi Freedom Guardian 20	4	2020	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
(WG) Space & Missile Defense Symposium 20	4	2020	4	2020
FTM-30 (AEGIS 5. 1, Intercept Flight Test)	4	2020	4	2020
GTD-08 Part 1 (BMDS Ground Test)	4	2020	4	2020
(WG) BMDS Wargames 21	4	2020	3	2021
(WG) Nimble Titan Year 2 22	4	2020	3	2021
(EX) EPOCH PLANEX 22	1	2021	1	2021
(EX) Joint Air Defense Exercise Series 20	1	2021	1	2021
(EX) Air and Missile Defense Exercise Series 21	1	2021	1	2021
(EX) Arabian Gulf Shield (AGS) Event 1 21	1	2021	1	2021
(EX) Vigilant Shield/GlobalThunder 20	1	2021	1	2021
GTD-08 Part 2 (BMDS Ground Test)	1	2021	1	2021
(EX) Global Lightning 21	1	2021	2	2021
(EX) Arabian Gulf Shield (AGS) Event 2 21	2	2021	2	2021
(EX) Fleet Synthetic Training-Joint 21	2	2021	2	2021
(EX) Key Resolve 21	2	2021	2	2021
(EX) Austere Challenge 21 (Continues into FY 2022)	2	2021	3	2022
(EX) Steadfast Alliance 21	2	2021	3	2021
Warfighter TP 08 (BMDS Ground Test)	2	2021	3	2021
(EX) European Air & Missile Defense Exercise Alliance 21	3	2021	3	2021
FTX-26 (SN, Target Only Flight Test)	3	2021	3	2021
FT0-04 (OTA, Intercept Flight Test)	3	2021	3	2021
FTM-37 (IOT&E) (AEGIS 5.1, Intercept Flight Test)	3	2021	3	2021
FTM-38 (AEGIS 5.0, Intercept Flight Test)	3	2021	3	2021
(WG) Demonstration, Table-top Exercises & Experiments 21	3	2021	1	2022
(EX) KEEN Edge 22	3	2021	2	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency **Date:** February 2016

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Events	Start		End	
	Quarter	Year	Quarter	Year
(WG) Huntsville Wargames 21	4	2021	4	2021
(EX) Arabian Gulf Shield (AGS) Event 3 21	4	2021	4	2021
(EX) Ulchi Freedom Guardian 21	4	2021	4	2021
(WG) Space & Missile Defense Symposium 21	4	2021	4	2021
FTT-21 (TH, Intercept Flight Test)	4	2021	4	2021
GTX-09 (BMDS Ground Test)	4	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency										Date: February 2016		
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
MX01: <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>	215.379	89.235	93.097	116.552	-	116.552	104.221	115.994	120.027	125.174	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

OPERATIONS AND SUSTAINMENT

Command and Control, Battle Management and Communications (C2BMC) Program Operations and Sustainment (O&S) consists of 1) sustaining C2BMC operational capability worldwide; 2) on-site sub-systems maintenance for all C2BMC including Combatant Commanders (CCMD) suites, Global Engagement Manager (GEM) suites, planners, remote Enterprise Work Stations (EWS), and GEM Work Stations (GWS), web browsers, and communication site(s) associated with the Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) radar(s); 3) the C2BMC Control Center that provides real-time resolution of operational issues; 4) vendor support which includes coordination and resolution of problems that occur with Commercial-off-the-Shelf (COTS) equipment; 5) training of operator, maintenance personnel, and testers (approximately 700 per year); 6) hardware and software maintenance and upgrade installation to ensure continuity of C2BMC operations.

On-site support provides:

- Assistance to the System Administrator of each Combatant Command (CCMD) - Prime contractor support to operational users
- Maintenance of hardware and software
- Security support for the C2BMC equipment, hardware and software and auxiliary communication capabilities 24 hours a day, 7 days a week, 365 days a year through network and equipment operations monitoring
- Support to operators and testers during test, exercises, and wargames

Off-site support provides:

- Integrated logistics support planning and management
- Hardware and software maintenance and logistics functions that are beyond the capability of on-site support personnel
- Inventory and spares management
- Sustaining engineering support from the prime contractor and government activities
- Maintenance of software licenses and vendor support agreements

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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- Hardware and software maintenance agreements
- Vendor depot support services
- C2BMC Control Center (CCC) (help desk) in Colorado Springs, CO provides:
 - Real-time resolution of operational issues
 - The schedule for maintenance, systems upgrades, tests, exercises, and wargames, coordinated across all users
 - Collection of data regarding system/sub-system failures and prioritization of corrective actions
 - Review of hardware/software problems and coordination of Commercial-Off-the-Shelf (COTS developer/vendor service calls
- Training support includes:
 - Developing and maintaining operator, maintenance personnel, and testers training material for C2BMC components/capabilities
 - Training tailored to each deployment and/or test
 - Training curriculum/courses provided for Ballistic Missile Defense (BMD) Planner, Situational Awareness, Global Engagement Manager (GEM), and the C2BMC Executive Course
 - Warfighter sustainment training and skill proficiency
 - Assistance to warfighter in development and execution of the Radar Management Course
 - New equipment training to end-users and training organizations

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<p>Title: Operations and Support</p> <p style="text-align: right;">Articles:</p> <p>Description: N/A</p> <p>FY 2015 Accomplishments: Maintained C2BMC training suites <ul style="list-style-type: none"> - Sustained Global Engagement Manager (GEM) trainers - Developed curriculum for and train operators, maintenance personnel, and testers - Resolved real-time operational issues through the C2BMC Control Center (CCC) (includes Ballistic Missile Defense System (BMDS) Network Operation and Security Center (BNOSC)) - Provided global BMDS communications via leased Defense Information Systems Agency (DISA) circuit lines - Provided and support communications circuits for fielded C2BMC locations - Provided integrated logistics support planning and management and sustaining engineering support for fielded hardware and software, including support to Navy Maritime Operations Centers where C2BMC equipment resides - Provided operations support of Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) radar communications nodes </p>	68.226	71.192	91.771
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Provided operations and sustainment personnel to support test and special operations for AN/TPY-2 at 6 deployed operational and test sites - Supported Host Nation operations, demonstrations, and tests - Provided sustainment training/skills proficiency to C2BMC operators - Upgraded and maintain computer network defense and network monitoring in the CCC (including the BNOSC) - Operated the CCC (including the BNOSC) 24 hours a day, 7 days a week, 365 days a year - Provided sustainment of the BCN Teleport Gateway (BTG) at the DoD teleports: Lago Patria, IT; Ramstein, GE; Fort Buckner, JP; Camp Roberts, CA; Wahiawa, HI; Northwest, VA - Supported the installation and integration of the second Modernization of Enterprise Terminal (MET) in EUCOM - Continued round-the-clock sustainment for Communications capabilities with Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) - Continued on-site C2BMC support of fielded sites for hardware and software - Continued C2BMC operator training for fielded capabilities - Continued sustaining engineering support and integrated logistics support for fielded hardware and software - Provided engineering support to the SBIRS Increment 2 interface to ensure continued communications between the BMDS and GMD - Deployed Campus Communications, Transportable Radar Communications Center, and Hardened Transportable Terminal to Site KCS - Provided operations and sustainment personnel to Site KCS for the TRCC/HTT - Performed required monthly cybersecurity scans and mitigation requirements - Transitioned DMETs and the C2BMC Ticketing System from Defense Information Assurance Certification and Accreditation Process (DIACAP) to Risk Management Framework (RMF) to meet the DoDI 8510.01 mandate. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> -Maintain C2BMC training suites - Sustain Global Engagement Manager (GEM) trainers - Develop curriculum for and train operators, maintenance personnel, and testers - Resolve real-time operational issues through the C2BMC Control Center (CCC) (includes Ballistic Missile Defense System (BMDS) Network Operation and Security Center (BNOSC)) - Provide global BMDS communications via leased Defense Information Systems Agency (DISA) circuit lines - Provide and support communications circuits for fielded C2BMC locations - Provide integrated logistics support planning and management and sustaining engineering support for fielded hardware and software, including support to Navy Maritime Operations Centers where C2BMC equipment resides 			

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Provide operations support of Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) radar communications nodes - Provide operations and sustainment personnel to support test and special operations for AN/TPY-2 at deployed operational and test sites - Support Host Nation operations, demonstrations, and tests - Provide sustainment training/skills proficiency to C2BMC operators - Upgrade and maintain computer network defense and network monitoring in the CCC (including the BNOSC) - Operate the CCC (including the BNOSC) 24 hours a day, 7 days a week, 365 days a year - Provide sustainment of the BCN Teleport Gateway (BTG) at the DoD teleports: Lago Patria, IT; Ramstein, GE; Fort Buckner, JP; Camp Roberts, CA; Wahiawa, HI; Northwest, VA - Support the installation and integration of the second Modernization of Enterprise Terminal (MET) in European Command (EUCOM) - Continue round-the-clock sustainment for Communications capabilities with Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) - Continue on-site C2BMC support of fielded sites for hardware and software - Continue C2BMC operator training for fielded capabilities - Continue sustaining engineering support and integrated logistics support for fielded hardware and software - Provide engineering support to the SBIRS Increment 2 interface to ensure continued communications between the Ballistic Missile Defense System (BMDS) and Ground Based Midcourse Defense (GMD) - Sustain required monthly cyber security scans and mitigation requirements <p>FY 2017 Plans: The increase in funding from FY 2016 to FY 2017 is attributed to realigning funds from the Development project (MD01) to Sustainment project (MX01) to better align resources with scope of work. Additionally, funding increased to meet requirement to support both Spiral 6.4 and Spiral 8.2-1 operations</p> <ul style="list-style-type: none"> - Maintain operational Spiral 6.4 in NORTHCOM/PACOM/EUCOM/CENTCOM and fielded Spiral 8.2-1 in NORTCOM/PACOM: <ul style="list-style-type: none"> -- C2BMC training suites -- On-site C2BMC support for hardware and software -- C2BMC operator training -- Sustaining engineering support and integrated logistics support -- Required monthly cybersecurity scans and mitigation requirements - Sustain Global Engagement Manager (GEM) trainers 			

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Update curriculum for and train operators, maintenance personnel, and testers - Operate the CCC (including the BNOSC) 24 hours a day, 7 days a week, 365 days a year - Resolve real-time operational issues through the C2BMC Control Center (CCC) includes (includes Ballistic Missile Defense System (BMDS) Network Operation and Security Center (BNOSC)- Upgrade and maintain computer network defense and network monitoring in the CCC (including the BNOSC) - Provide global BMDS communications via leased Defense Information Systems Agency (DISA) circuit lines - Provide and support communications circuits for fielded C2BMC locations - Provide integrated logistics support planning and management and sustaining engineering support for fielded hardware and software, including support to Navy Maritime Operations Centers where C2BMC equipment resides - Provide operations support of Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) radar communications nodes - Provide operations and sustainment personnel to support test and special operations for AN/TPY-2 at deployed operational and test sites - Support Host Nation operations, demonstrations, and tests - Provide sustainment of the BCN Teleport Gateway (BTG) at the DoD teleports: Lago Patria, IT; Ramstein, GE; Fort Buckner, JP; Camp Roberts, CA; Wahiawa, HI; Northwest, VA - Continue round-the-clock sustainment for Communications capabilities with Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) - Provide engineering support to the SBIRS Increment 2 interface to ensure continued communications between the Ballistic Missile Defense System (BMDS) and Ground Based Midcourse Defense (GMD) - Transition BTG and Spiral 6.4 Distributed Training System (DTS) from DIACAP to RMF to meet the DoDI 8510.01 mandate. 			
<p>Title: Concurrent, Test, Training, and Operations (CTTO)</p> <p align="right">Articles:</p> <p>Description: N/A</p> <p>FY 2015 Accomplishments:</p> <ul style="list-style-type: none"> - Sustain deployed C2BMC Spiral 6.4 Training Support System (TSS). - Operate and Sustain C2BMC Spiral 6.4 Tri-Node (Tri-Node includes PACOM, NORTHCOM, and STRATCOM) Distributed Training System (DTS) system. Distributed Training System Tri-Node was formerly known as the Distributed Multi-Echelon Training System (DMETS). - Operate and Sustain C2BMC Spiral 6.4 EUCOM and CENTCOM Distributed Training System (DTS). - Continue providing BMD training events across the Unified Combatant Commands while maintaining the existing architecture. 	21.009 -	21.905 -	24.781 -

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
<ul style="list-style-type: none"> - Monitor and coordinate the execution of Agency Modeling and Simulation development efforts: key dependencies for the successful execution of CTTO. - Development of C2BMC Spiral 8.2 Training Systems. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Sustain deployed C2BMC Spiral 6.4 Training Support System (TSS) - Operate and Sustain C2BMC Spiral 6.4 Tri-Node (Tri-Node includes PACOM, NORTHCOM, and STRATCOM) Distributed Training System (DTS) system. Distributed Training System Tri-Node was formerly known as the Distributed Multi-Echelon Training System (DMETS). - Operate and Sustain C2BMC Spiral 6.4 European Command (EUCOM) and Central Command (CENTCOM) Distributed Training System (DTS) - Continue providing BMD training events across the Unified Combatant Commands while maintaining the existing architecture - Development of C2BMC Spiral 8.2 Training Systems <p>FY 2017 Plans:</p> <p>The increase in funding from FY 2016 to FY 2017 is attributed to refined cost estimates.</p> <ul style="list-style-type: none"> - Sustain deployed C2BMC Spiral 6.4 Training Support System (TSS) - Operate and Sustain C2BMC Spiral 6.4 Tri-Node (Tri-Node includes PACOM, NORTHCOM, and STRATCOM) Distributed Training System (DTS) system. Distributed Training System Tri-Node was formerly known as the Distributed Multi-Echelon Training System (DMETS). - Operate and Sustain C2BMC Spiral 6.4 European Command (EUCOM) and Central Command (CENTCOM) Distributed Training System (DTS) - Continue providing BMD training events across the Unified Combatant Commands while maintaining the existing architecture - Deploy and sustain C2BMC Spiral 8.2-1 TSS - Deploy C2BMC Spiral 8.2-1 DTS - Train warfighters for Spiral 8.2-1 system ground tests - Develop/design Spiral 8.2-3 and Spiral 8.2-5 DTS and TSS 			
Accomplishments/Planned Programs Subtotals	89.235	93.097	116.552

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency **Date:** February 2016

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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0603177C: <i>Discrimination Sensor Technology</i>	35.223	28.200	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	13.061	9.876	3.626	-	3.626	0.000	0.000	0.000	0.000	0	26.563
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	161.298	212.230	206.834	-	206.834	231.105	197.018	250.227	260.613	Continuing	Continuing
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	863.965	1,269.913	862.080	-	862.080	701.311	585.079	600.710	535.614	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	260.347	228.392	230.077	-	230.077	144.893	141.815	171.644	158.421	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	395.927	404.780	401.594	-	401.594	404.993	409.481	427.603	434.868	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	761.646	830.647	959.066	-	959.066	841.738	700.596	592.940	528.744	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	29.530	28.605	32.129	-	32.129	33.869	34.884	36.203	36.821	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	7.560	21.507	20.690	-	20.690	15.670	11.641	11.796	11.992	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.972	47.939	54.750	-	54.750	53.894	55.524	58.100	59.029	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	64.610	71.266	68.787	-	68.787	73.329	70.423	85.881	74.189	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	354.414	281.740	293.441	-	293.441	337.537	322.334	346.134	351.933	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	447.424	527.563	563.576	-	563.576	471.059	431.349	454.830	462.429	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Command and Control, Battle Management and Communications (C2BMC) acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency	Date: February 2016
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contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Spiral 8.2-1 will be fielded in FY 2017, fielding of Spiral 8.2-3 in FY 2019, and completion of system deployment with Spiral 8.2-5 in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, 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 worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Operations and Support - Indirect Support	MIPR	DISA DECC/DISA TECC : Various	21.411	6.803		7.959		6.890	Oct 2016	-		6.890	Continuing	Continuing	Continuing
Operations and Support - O&S - Unit Personnel, Control System Improvement Sustaining Support	Various	Army, Navy, Air Force : Various	0.000	0.000		0.000		0.912	Oct 2016	-		0.912	Continuing	Continuing	Continuing
Operations and Support - O&S Sustainment Training Support	SS/CPAF	Northrup Grumman : Boeing	0.000	0.000		0.000		1.747	Nov 2016	-		1.747	Continuing	Continuing	Continuing
Operations and Support - Teleport Sustainment	MIPR	SPAWAR : San Diego, CA	4.844	0.000		0.000		0.000		-		0.000	0	4.844	0
Operations and Support - Unit Personnel, Control System Improvement Sustaining Support	SS/IDIQ	Lockheed Martin Team : Arlington, VA	146.570	61.423		63.233		82.222	Dec 2016	-		82.222	Continuing	Continuing	Continuing
Operations and Support - Warfighter Training	IA	Lockheed Martin Team : Arlington, VA	2.661	0.000		0.000		0.000		-		0.000	2.661	5.322	2.661
Concurrent, Test, Training, and Operations (CTTO) - CTTO/Training Enhancements	Various	Army : Various	0.000	0.000		0.000		8.238	Dec 2016	-		8.238	Continuing	Continuing	Continuing
Concurrent, Test, Training, and Operations (CTTO) - Concurrent Test, Training And Operations	SS/CPAF	Northrop Grumman : Boeing	3.175	0.700		0.735		0.000		-		0.000	Continuing	Continuing	Continuing
Concurrent, Test, Training, and Operations (CTTO) - Concurrent Test, Training And Operations/Training Enhancements	SS/IDIQ	Lockheed Martin Team Arlington, VA : Huntsville, Al, Colorado Springs, CO	36.718	16.659		17.337		16.543	Dec 2016	-		16.543	Continuing	Continuing	Continuing
Concurrent, Test, Training, and Operations (CTTO) -	SS/FPAF	COLSA ARC : Huntsville, AL	0.000	3.650		3.833		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Concurrent Test, Training, Test and Operations															
Subtotal			215.379	89.235		93.097		116.552		-		116.552	-	-	-

Remarks

N/A

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Remarks

N/A

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Remarks

N/A

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	215.379	89.235	93.097	116.552	-	116.552	-	-	-

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021							
	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				
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	1	2016	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency										Date: February 2016		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MD40 / <i>Program-Wide Support</i>		
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	48.769	24.492	19.795	19.771	-	19.771	19.991	21.981	23.334	24.368	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016 and FY 2017, Program Wide Support reflects proportional changes as a result of budget changes to the Ballistic Missile Defense Command and Control, Battle Management & Communication program. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and / or civilian salaries on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians, and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation and, provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2015	FY 2016	FY 2017
Title: Program Wide Support	24.492	19.795	19.771
Articles:	-	-	-
Description: N/A			
FY 2015 Accomplishments: See paragraph A: Mission Description and Budget Item Justification			
FY 2016 Plans: See paragraph A: Mission Description and Budget Item Justification			
FY 2017 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017
- See paragraph A: Mission Description and Budget Item Justification			
Accomplishments/Planned Programs Subtotals	24.492	19.795	19.771

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	1.955	0.000		0.000		0.395	Jul 2017	-		0.395	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AK/AL/CA/CO/HI/MD/VA/NJ/NY/OCONUS	0.013	3.098		0.000		0.000		-		0.000	0.015	3.126	0
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, HI, VA	2.088	0.000		0.000		1.571	Nov 2016	-		1.571	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	22.388	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	19.525	21.394		6.218	Nov 2015	0.819	Oct 2016	-		0.819	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services Civilian Salaries, Travel, Training	Allot	Various : Multi: AL, CA, CO, VA	2.800	0.000		13.577	Nov 2015	16.477	Nov 2016	-		16.477	2.800	35.654	0
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, VA etc.	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities Maintenance SRM	MIPR	Various : Multi: AK, CA, CO, AL, MD, NJ, VA	0.000	0.000		0.000		0.509	Jan 2017	-		0.509	Continuing	Continuing	Continuing
Subtotal			48.769	24.492		19.795		19.771		-		19.771	-	-	-

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	48.769	24.492	19.795	19.771	-	19.771	-	-	-

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Missile Defense Agency **Date:** February 2016

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity +
 Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✦

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
MD40 Program-Wide Support					✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦				

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Missile Defense Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2016	4	2020