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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2020 Missile Defense Agency	<b>Date:</b> March 2019
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<b>Appropriation/Budget Activity</b> 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication
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COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	2,662.039	449.985	507.817	564.206	-	564.206	534.988	502.581	525.742	535.636	Continuing	Continuing
MD01: Command & Control, Battle Management, Communications (C2BMC)	1,799.991	259.457	302.038	346.862	-	346.862	306.370	280.549	300.559	298.605	Continuing	Continuing
MC01: Cyber Operations	7.317	5.421	17.651	14.162	-	14.162	16.173	15.916	12.398	14.377	Continuing	Continuing
MT01: C2BMC Test	240.110	60.607	54.100	64.624	-	64.624	63.956	60.569	61.907	62.943	Continuing	Continuing
MX01: Command & Control, Battle Management, Communications (C2BMC) Development Support	508.427	106.449	112.910	114.876	-	114.876	123.815	123.051	125.377	133.555	Continuing	Continuing
MD40: Program-Wide Support	106.194	18.051	21.118	23.682	-	23.682	24.674	22.496	25.501	26.156	Continuing	Continuing

**Program MDAP/MAIS Code:** 362

**Note**

Increase from FY 2019 to FY 2020 provides an expansion of C2BMC space tasking capability development; additional System Level Discrimination Data Integration and Integrated Threat Characterization development activities; expanded depth and breadth of ground test scope to include Models and Simulation (M&S) development and Verification and Validation for new BMDS M&S environment; integration and testing of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); and addition of Space-based Kill Assessment Sensor operationalization and prototyping for the Robust BMDS Post Intercept Assessment capability. Additionally, the increase reflects the transfer of the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab from PE 0603914C to PE 0603896C to consolidate lab efforts to synergize efforts and gain efficiencies.

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

The Command and Control, Battle Management, and Communications (C2BMC) program is the integrating element of the Ballistic Missile Defense System (BMDS). It is a vital operational system that enables the U.S. President, Secretary of Defense and Combatant Commanders at strategic, regional and operational levels to systematically plan missile defense operations, to collectively see the battle develop, and to dynamically manage designated networked sensors and weapons systems to achieve global and regional mission objectives. 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), Homeland Defense Radar - Hawaii (HDR-H), Pacific Radar, Long Range Discrimination Radar (LRDR), Space-Based Infrared System (SBIRS), and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA). The C2BMC program also works to increase coalition partners' capabilities and investigates concepts and explores system engineering issues associated with innovative space applications for a missile defense intercept and defeat system.

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<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603896C <i>I Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
Previous President's Budget	454.862	475.168	515.239	-	515.239
Current President's Budget	449.985	507.817	564.206	-	564.206
Total Adjustments	-4.877	32.649	48.967	-	48.967
• Congressional General Reductions	-2.000	0.000			
• Congressional Directed Reductions	-3.575	-10.851			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	5.100	43.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	2.230	0.000			
• SBIR/STTR Transfer	-6.632	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	48.967	-	48.967

**Change Summary Explanation**

Net decrease in FY 2018 from PB19 to PB20 reflects the combined effect of enacted congressional adjustments for improved discrimination and Mobile Sensor Integration (MSI) Phase I, reduction for concurrent development efforts, and the C2BMC portion of the congressional general RDT&E reduction.

Increase in FY 2019 from PB19 to PB20 reflects the enacted congressional adjustments for MSI Phase II and Cybersecurity and reductions for S8.2-3 scope adjustment and C2BMC future incremental capabilities.

Increase in FY 2020 from PB19 to PB20 provides enhanced regional and homeland defense capabilities related to hypersonic tracking, advanced discrimination techniques, and integration of discriminating radars in accordance with the BMDS Phased Implementation Plan (PIP). This increase also reflects the transfer of Space-Based Infrared Sensors/BMDS Overhead Persistent Infra-Red (OPIR) Architecture test lab support from PE0603914C to PE0603896C to consolidate and gain efficiencies in lab efforts.

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency										Date: March 2019		
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) MD01 / Command & Control, Battle Management, Communications (C2BMC)			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD01: Command & Control, Battle Management, Communications (C2BMC)	1,799.991	259.457	302.038	346.862	-	346.862	306.370	280.549	300.559	298.605	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Increase from FY 2019 to FY 2020 provides an expansion of C2BMC space tasking capability development; additional System Level Discrimination Data Integration and Integrated Threat Characterization development activities; expanded depth and breadth of ground test scope to include Models and Simulation (M&S) development and Verification and Validation for new BMDS M&S environment; integration and testing of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); and addition of Space-based Kill Assessment Sensor operationalization and prototyping for the Robust BMDS Post Intercept Assessment capability.

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

Provides incremental development, deployment and operational support of C2BMC capabilities required for BMDS planning, situational awareness, sensor management, and engagement coordination. The FY 2019 National Defense Authorization Act (NDAA) section 869 recognized C2BMC for its implementation of this iterative practice and directed C2BMC's inclusion in a Community of Practice to advise on agile or iterative development.

C2BMC delivers capabilities incrementally with each software build (named as a Spiral), adding to or enhancing the capability of the previous build. C2BMC incremental delivery of Spiral 8.2 provides critical Homeland Defense for increased GMD battlespace, improved threat tracking using multiple sensors communicating via Link 16, enhanced sensor tasking to meet track quality and discrimination timeliness requirements, space situational awareness tasking support, and improved cyber capabilities. Enhanced Homeland Defense also integrates the BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) with the BMDS to enhance system level missile-tracking capabilities through earlier cueing of radars and weapon systems.

European Phased Adaptive Approach (EPAA) Phase 3/Engage on Remote (EOR) (Spiral 8.2-3) provides critical sensor management capability, greater engagement flexibility, improved OPIR-based cueing, and enhanced Aegis BMD defended area by enabling Aegis to use Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) data for EOR engagements, providing a five-fold increase in defended area coverage in the CENTCOM/EUCOM area of responsibility compared to individual weapon system organic capability. Spiral 8.2-3 also includes Space Situational Awareness and integrates Mobile Sensor Integration (MSI) Phase 1 and BMDS Overhead Persistent Infra-Red Architecture (BOA) data into the BMDS.

Long Range Discrimination Radar (LRDR) Control for Homeland Defense (Spiral 8.2-5) enables increased homeland and regional defense by providing LRDR sensor management, creation and dissemination of a BMD System track inclusive of LRDR sensor data; hypersonic threat tracking; significant expansion of Space Situational Awareness (SSA) capabilities for the Air Force; implements Link-16 reporting; integration of system level discrimination data; transmission of LRDR-based information

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<p>to GMD Fire Control (GFC) and other BMDS elements; operationalization of Space-based Kill Assessment (SKA) as part of Post Intercept Assessment (PIA); and integration of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) with the BMDS.</p> <p>Future incremental C2BMC capability enhancements will include expanded Regional and Homeland Defense to continue risk reduction, planning, and development efforts including C2BMC tasking of OPIR Enterprise assets, enhanced system-level integrated discrimination functionality with Advanced Discrimination regional weapon system use of Link 16 based system track, AN/TPY-2 tasking improvements to support Aegis Engage on Remote, transmission of advanced discrimination features for regional BMD use, and monitoring of modified Aegis BMD, THAAD, PATRIOT, IBCS peer-to-peer engagement coordination.</p> <p>C2BMC continues to develop incremental improvements to the BMDS to keep pace with emerging threats worldwide by investing in the development, integration and testing of advanced algorithms to improve track and discrimination capabilities, prototyping Robust Post Intercept Assessment (PIA) and enhancing use of space based sensor data from sources such as the Space Based Infra-Red System (SBIRS), using the BMDS OPIR architecture. Related disciplines provide development and deployment support to C2BMC system capabilities. In support of Hypersonic Defense, C2BMC will provide contingency capability to demonstrate, develop and deploy a detection and warning for advanced threats.</p> <p>C2BMC International Partner system engineering ensures friends and allies are integrated to the fullest extent possible with U.S. BMDS capabilities. Collaborative system engineering, testing, and fielding facilitate interoperability with North Atlantic Treaty Organization (NATO) and partner nations such as Israel and Japan. C2BMC works with these nations to define and document international interfaces that are compatible with international standards and traceable to U.S. BMDS requirements. C2BMC participates in test events and live fire exercises hosted by international partners to ensure U.S. missile defense weapons, sensors, and Command and Control (C2) systems are interoperable with international systems. C2BMC maintains and upgrades the U.S./NATO secure data sharing gateways located at Ramstein Air Base, Germany, for missile defense operations and training. C2BMC also supports development of Japan's BMD requirements to ensure interoperability of Japanese and U.S. BMD systems (sensors, shooters, command and control) resulting in an integrated regional, operational, and strategic defense of Japan.</p> <p>C2BMC Modeling and Simulation (M&amp;S) maintains BMDS simulation/stimulation tools and federated models to support development and verification of deployed C2BMC and BOA Spirals. The BMDS C2BMC Model (BCM) is used for Flight Test pre-mission analysis and exercises to represent a second C2 Suite for Cross-Area of Responsibility (XAOR) functionality, Early Digital Product (EDP) for C2BMC performance assessment, and supports development and integration of GMD, AN/TPY-2, and Aegis software and models. The OPIR sensor M&amp;S is used in the Ground Test Integrated System-level Simulation (GTISS) as the stimulus for BOA. The BCM program provides a cost effective means to assess and explore the performance space of the BMDS beyond what can be physically tested via Flight Tests and Target of Opportunity collections.</p> <p>C2BMC develops, integrates, and tests advanced algorithms to improve discrimination capabilities and enhance the use of space-based sensor data. In support of MDA's discrimination improvements effort, C2BMC demonstrates, develops, and deploys multiple techniques to improve BMD System ability to identify lethal and non-lethal objects.</p>		

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>			<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<b>Title:</b> C2BMC Development and Deployment			232.778	276.121	317.731
<b>Articles:</b>			-	-	-
<p><b>Description:</b> Provides funding for incremental development and deployment of C2BMC capabilities that link sensors and shooters to enable integrated BMDS capabilities, integrate BOA with the BMDS architecture to enhance missile tracking capabilities and enable much earlier cueing of radars and shooters, and fulfill Cybersecurity requirements. The Enterprise Sensors Laboratory (ESL) and Experimentation Laboratory (X-Lab) produce key prototypes for further maturation in the C2BMC capability Spiral development process and enables integrated experimentation for C2BMC, ESL, OPIR products, and other BMDS elements through robust connectivity to simulation frameworks, weapon systems, sensors, and operational assets. Recurring accomplishments include iterative development and procurement cycles for hardware, software, network capability system engineering tasks, and artifacts for technical engineering reviews; participation in test readiness reviews, pre-test engineering and analysis of ground and flight test results, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP); site planning, scheduling and hardware acquisition to support planned deployment of C2BMC Spirals and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) capabilities; updates and maintenance for C2BMC Model (BCM) BMDS simulation/stimulation (federated model) and verification scenarios for all C2BMC Spirals deployed and under development; prototyping and characterizing BOA, Discrimination, operationalization of SKA as part of Post Intercept Assessment (PIA): prototyping Robust PIA and C2BMC capabilities; design, installation and sustainment of operational sharing gateways; and collaboration with international partners to ensure future interoperability.</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2019 Plans:</b></p> <p>Enhanced Homeland Defense (Spiral 8.2-1):</p> <ul style="list-style-type: none"> <li>- Maintain ability to develop/deploy capability in response to emergent operational requirements</li> </ul> <p>EPAA Phase 3 / EOR (Spiral 8.2-3):</p> <ul style="list-style-type: none"> <li>- Complete fielding of hardware and capability to EUCOM, CENTCOM, NORTHCOM, and INDOPACOM and support operation</li> <li>- Complete fielding of BMDS Overhead Persistent Infra-Red Architecture (BOA) 6.1</li> <li>- Provide analysis support for Technical Capability Declaration</li> </ul> <p>LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus:</p> <ul style="list-style-type: none"> <li>- Replan Critical Design Review caused by requirements expansion for Discrimination Data Integration and Integrated Threat Characterization</li> </ul>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2018</b>	<b>FY 2019</b>
<ul style="list-style-type: none"> <li>- Complete development tasks and conduct Critical Design Review</li> <li>- Complete model and simulation development to support requirement verification, ground test events and provide Wideband OPIR modeling and simulation for ground tests</li> <li>- Continue physics-based algorithm improvements for missile typing which are necessary to address emerging threats</li> </ul> <p>C2BMC, regional defense focus:</p> <ul style="list-style-type: none"> <li>- Continue planning and development tasks for Initial Robust BMDS Post Intercept Assessment including Spacebased Kill Assessment (SKA)</li> </ul> <p><b>FY 2020 Plans:</b></p> <p>EPAA Phase 3 / EOR (Spiral 8.2-3):</p> <ul style="list-style-type: none"> <li>- Maintain ability to develop/deploy capability in response to emergent operational requirements</li> </ul> <p>LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus:</p> <ul style="list-style-type: none"> <li>- Continue iterative software coding, unit testing, and interoperability testing of Spiral 8.2-5 capabilities, including LRDR and hypersonic threat detection and tracking</li> <li>- Initiate iterative software coding, unit testing, and interoperability testing for BMDS integration with the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS)</li> <li>- Support developmental testing and preparation of transfer of the LRDR to the Air Force</li> <li>- Continue deployment of hardware and software to provide LRDR BMDS network connectivity and sensor control nodes</li> <li>- Increase Verification and Validation in support of BMDS capability ground testing and participation in BMDS ground tests</li> </ul> <p>C2BMC Additional and Expanded Regional and Homeland Defense focus:</p> <ul style="list-style-type: none"> <li>- Design and prototype the next incremental capability addressing Additional Homeland Defense and Mid-Term Discrimination requirements, inclusive of C2BMC Generation of BMD System Track (with System Level Discrimination Data Integration) for GMD Homeland Defense Engagements and Expanded Regional and Homeland Defense, inclusive of the integration of the Homeland Defense Radar-Hawaii (HDR-H) and an expanded interface with the OPIR enterprise, which yields additional raid handling capacity, enhanced Aegis BMD engage on capability, and expanded hypersonic defense tracking and reporting</li> <li>- Continue operationalization of Space-based Kill Assessment (SKA) as part of PIA</li> <li>- Continue planning and prototyping tasks for Robust BMDS Post Intercept Assessment (PIA)</li> <li>- Initiate design and development of accredited models and simulations (M&amp;S) for C2BMC and BOA spirals for participation in End-to-end Digital Integrated System Simulation (EDISS)</li> </ul>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
- Continue design and development of Ground Test Integrated System-level Simulation (GTISS)				
<b><i>FY 2019 to FY 2020 Increase/Decrease Statement:</i></b> Increase from FY 2019 to FY 2020 provides an expansion of C2BMC space tasking capability development; additional System Level Discrimination Data Integration and Integrated Threat Characterization development activities; expanded depth and breadth of ground test scope to include Models and Simulation (M&S) development and Verification and Validation for new BMDS M&S environment; integration and testing of the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); and addition of Space-based Kill Assessment Sensor operationalization; and prototyping for the Robust BMDS Post Intercept Assessment capability.				
<b><i>Title:</i></b> C2BMC Communications		23.679	25.917	29.131
<b><i>Articles:</i></b>		-	-	-
<b><i>Description:</i></b> The BMD Communications Network (BCN) ties together an expanding set of sensors and weapons systems to enable the National Command Authority and the commanders at the strategic, theater and tactical levels to optimally engage missile threats. Recurring accomplishments include the following: <ul style="list-style-type: none"> <li>- Provide GMD Communications Network (GCN) Long Haul Communications Transport (LHCT) services and a robust, end-to-end, high availability, operational communications network (COMNET) infrastructure with diverse paths that quickly and unambiguously share information across the global BMDS</li> <li>- Participate in and analyze results from events scheduled in the BMDS IMTP</li> <li>- Provide engineering and deployment support of C2BMC Deployable Interface Nodes</li> <li>- Provide BMDS communications via leased DISA circuits, and resolve real-time operational issues through DISA's Network Operations and Security Center</li> <li>- Provide effective network management to coordinate and integrate information across diverse equipment platforms, interface with other DoD communications systems, evolve information standards and capabilities, and adhere to the DoD Risk Management Framework (RMF)</li> <li>- Upgrade BCN capability by supporting all DoD teleports to enhance satellite communications</li> </ul> Specific and/or unique accomplishments for each FY are as follows:				
<b><i>FY 2019 Plans:</i></b> <ul style="list-style-type: none"> <li>- Acquire network circuits to support the Ground-Based Midcourse Defense Communication Network Modernization</li> <li>- Conduct Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration and installations</li> </ul>				
<b><i>FY 2020 Plans:</i></b>				

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<ul style="list-style-type: none"> <li>- Complete installation of hardware circuits for the Ground-Based Midcourse Defense Communication Network Modernization</li> <li>- Continue Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration and installations</li> <li>- Conduct technical refresh for End-of-Life SATCOM terminals on SBX by transitioning to Military Satellite Communications (MILSATCOM) terminals</li> <li>- Acquire network circuits to support the threat based communication network modernization</li> </ul> <p><b><i>FY 2019 to FY 2020 Increase/Decrease Statement:</i></b> Increase in FY 2019 to FY 2020 provides GMD Communication Network (GCN) modernization efforts to meet emerging threats and SBX SATCOM terminal end-of-life replacements and MILSAT upgrade.</p> <p><b><i>Title:</i></b> United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEON)</p> <p align="right"><b><i>Articles:</i></b></p> <p><b><i>Description:</i></b> Provides funding for development and deployment of C2BMC portion of the USINDOPACOM Joint Emergent Operational Needs Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement-MSE) ballistic missile defense system that expands engagement options and increases coverage area. Specific and/or unique accomplishment for each FY are as follows:</p> <p><b><i>FY 2019 Plans:</i></b> N/A</p> <p><b><i>FY 2020 Plans:</i></b> N/A</p> <p><b><i>FY 2019 to FY 2020 Increase/Decrease Statement:</i></b> Decrease in FY 2019 reflects the completion of C2BMC efforts supporting the USINDOPACOM communication node.</p>	3.000 -	0.000 -	0.000 -
<b>Accomplishments/Planned Programs Subtotals</b>	259.457	302.038	346.862

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

<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u> <u>Base</u>	<u>FY 2020</u> <u>OCO</u>	<u>FY 2020</u> <u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing

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

<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
• 0604672C: <i>Homeland Defense Radar-Hawaii</i>	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: <i>Pacific Discriminating Radar</i>	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The 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. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>
<p>the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling 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, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in 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. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).</p> <p><b><u>E. Performance Metrics</u></b> N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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) MD01 / Command & Control, Battle Management, Communications (C2BMC)					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 - Independent Performance Assessment and Analysis -Various	MIPR	Various : Huntsville, AL, Colorado Springs, CO; NCR	0.000	1.864	Oct 2017	2.952	Oct 2018	2.938	Oct 2019	-		2.938	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Aggregated Discrim	Various	Various : Various	10.490	9.301	Oct 2017	15.064	Oct 2018	14.902	Oct 2019	-		14.902	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BMDS C2BMC Model (BCM) - EDISS Integration	SS/CPIF	Lockheed Martin : Huntsville, AL, Colorado Springs, CO; NCR	0.000	0.000		0.000		3.107	Oct 2019	-		3.107	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS	C/CPAF	SciTec : Newark, NJ	0.000	0.250	Sep 2018	0.000		0.711	Oct 2019	-		0.711	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS -GOV	MIPR	Sandia National Labs : Albuquerque, NM	0.000	0.000		0.600	Nov 2018	2.523	Nov 2019	-		2.523	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS -NGC	SS/CPAF	Northrop Grumman Space and Mission Systems : Azusa, CA	0.000	0.000		0.697	Nov 2018	3.722	Nov 2019	-		3.722	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA Simulation Development and Integration- EDISS	SS/CPAF	Northrup Grumman Space and Mission Systems : Boulder, CO	0.000	0.000		0.000		6.355	Oct 2019	-		6.355	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Hardware/Software Development, Integration & Test (I&T)	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	672.298	108.162	Dec 2017	85.153	Dec 2018	158.287	Dec 2019	-		158.287	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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) MD01 / Command & Control, Battle Management, Communications (C2BMC)					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 - C2BMC Integration	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	160.198	3.688	Nov 2017	13.412	Nov 2018	6.819	Nov 2019	-		6.819	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid- Term Discrim-SCOUT	SS/CPFF	Northrop Grumman Space and Mission Systems : Huntsville, AL	34.028	7.231	Oct 2017	6.905	Oct 2018	7.978	Oct 2019	-		7.978	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid- Term Discrim-SCOUT OGA	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	2.400	0.717	Nov 2017	0.970	Nov 2018	0.713	Nov 2019	-		0.713	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Contract Support Services (CSS)	C/CPFF	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	252.893	23.810	Nov 2017	25.766	Nov 2018	26.022	Nov 2019	-		26.022	Continuing	Continuing	Continuing
C2BMC Development and Deployment - ESL/BOA Development	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	23.109	14.620	Oct 2017	8.884	Oct 2018	9.507	Oct 2019	-		9.507	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Federally Funded Research & Development Centers / University Affiliated Research Center	MIPR	MITRE, IDA, ORNL, Aerospace, JHU/APL, GTRI : Arlington, VA/ Huntsville, AL/ Colorado Springs, CO	161.615	19.251	Oct 2017	20.514	Oct 2018	19.741	Oct 2019	-		19.741	Continuing	Continuing	Continuing
C2BMC Development and Deployment - IT User Services - IRES	C/CPAF	Jacobs Technical, Inc : AL, AK, CA, CO, HI, NM, VA	0.000	1.823	Mar 2018	5.989	Mar 2019	6.166	Mar 2020	-		6.166	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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) MD01 / Command & Control, Battle Management, Communications (C2BMC)					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 - IT User Services - NGC	SS/CPFF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	4.898	4.368	Oct 2017	0.000		0.000		-		0.000	0.000	9.266	0.000
C2BMC Development and Deployment - Independent Performance Assessment and Analysis	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	0.000	4.359	Nov 2017	5.907	Nov 2018	2.411	Nov 2019	-		2.411	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Joint Early Warning Lab (JEWL)	C/CPAF	Jacobs Technical, Inc : Colorado Springs, CO	0.000	0.000		1.502	Mar 2019	1.548	Mar 2020	-		1.548	Continuing	Continuing	Continuing
C2BMC Development and Deployment - MDA Civilian, Travel & PCS	Various	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	149.679	19.196	Oct 2017	23.925	Oct 2018	21.953	Oct 2019	-		21.953	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Mobile Sensor Integration Phase II	Various	Various : AL; CO; FL; OH; MA; VA	0.000	0.000		33.500	Apr 2019	0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Models & Simulation	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO; NCR	0.000	2.358	Oct 2017	4.933	Oct 2018	8.926	Oct 2019	-		8.926	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment	C/CPFF	SciTec : Newark, NJ	0.000	1.105	Nov 2017	6.290	Nov 2018	1.578	Nov 2019	-		1.578	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment Hardware	C/CPAF	Northrop Grumman Space and Missile Systems : Colorado Springs, CO	0.000	0.713	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post	SS/CPIF	Lockheed Martin Team : Huntsville,	0.000	0.000		0.550	Nov 2018	1.200	Nov 2019	-		1.200	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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) MD01 / Command & Control, Battle Management, Communications (C2BMC)					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Intercept Assessment Integration		AL/Colorado Springs, CO													
C2BMC Development and Deployment - Post Intercept Assessment Prototyping	C/CPFF	Corvid : Huntsville, AL	0.000	2.089	Jun 2018	3.947	Nov 2018	2.035	Nov 2019	-		2.035	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Prior year C2BMC Development and Deployment no longer funded in the FYDP	Various	Various : Various	1.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Specialized Warfighter Development Program Management	SS/CPAF	Northrup Grumman Space and Mission Systems : Huntsville, AL	0.000	2.031	Mar 2018	0.000		3.500	Mar 2020	-		3.500	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Spiral Development	MIPR	Sandia, MDA Various : AL; CA; CO; NCR, NM	6.000	1.466	Oct 2017	5.394	Oct 2018	4.106	Oct 2019	-		4.106	Continuing	Continuing	Continuing
C2BMC Development and Deployment - X Lab	SS/CPIF	Lockheed Martin : Huntsville, AL	0.000	4.376	Oct 2017	3.267	Oct 2018	0.983	Oct 2019	-		0.983	Continuing	Continuing	Continuing
C2BMC Communications - Communication Equipment and Fielding	MIPR	DISA, PMDCATS, SPAWAR : Springfield, VA	133.302	13.634	Jan 2018	13.529	Jan 2019	14.721	Jan 2020	-		14.721	Continuing	Continuing	Continuing
C2BMC Communications - Communication Leases	MIPR	DISA : Arlington, VA	44.185	8.424	Oct 2017	10.142	Oct 2018	11.550	Oct 2019	-		11.550	Continuing	Continuing	Continuing
C2BMC Communications - Networks Development and Deployment	SS/CPFF	Lockheed Martin Team : Colorado Springs, CO	26.877	1.621	Nov 2017	2.246	Nov 2018	2.860	Nov 2019	-		2.860	Continuing	Continuing	Continuing
C2BMC Communications - Prior year C2BMC Communications no longer funded in the FYDP	Various	Various : Various	117.019	0.000		0.000		0.000		-		0.000	7.115	124.134	0.000

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Missile Defense Agency													<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 0400 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>						<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>			

  

<b>Product Development (\$ in Millions)</b>				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEON) - C2BMC Hardware/ Software Development, Integration & Test (I&T)	SS/CPFF	Lockheed Martin : Huntsville, AL	0.000	3.000	Apr 2018	0.000		0.000		-		0.000	0.000	3.000	0.000
<b>Subtotal</b>			1,799.991	259.457		302.038		346.862		-		346.862	Continuing	Continuing	N/A

**Remarks**  
N/A

  

<b>Support (\$ in Millions)</b>				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

  

<b>Test and Evaluation (\$ in Millions)</b>				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**  
N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Missile Defense Agency												<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 0400 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>					<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>				

  

Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

  

<b>Remarks</b> N/A															
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	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	1,799.991	259.457		302.038		346.862		-		346.862	Continuing	Continuing	N/A

  

<b>Remarks</b> 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. Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.													
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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency														Date: March 2019															
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) MD01 / Command & Control, Battle Management, Communications (C2BMC)									
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 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024							
MD01 Command & Control, Battle Management, Communications (C2BMC)										◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇					
Spiral 8.2-1 NORTHCOM/INDOPACOM Capability Declaration										△																			
USFK JEON User Node Delivery												△																	
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration													△																
Spiral 8.2-3 NORTHCOM/INDOPACOM Capability Declaration														△															
Spiral 8.2-5 Homeland Defense Capability Declaration NORTHCOM/INDOPACOM																	△												
Spiral 8.2-5 Homeland Defense Capability Declaration EUCOM/CENTCOM																		△											
Expanded Regional and Homeland Defense Capability Declaration																						△							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Missile Defense Agency			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC)</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
MD01 Command & Control, Battle Management, Communications (C2BMC)	1	2018	4	2024
Spiral 8.2-1 NORTHCOM/INDOPACOM Capability Declaration	2	2018	2	2018
USFK JEON User Node Delivery	4	2018	4	2018
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration	1	2019	1	2019
Spiral 8.2-3 NORTHCOM/INDOPACOM Capability Declaration	3	2019	3	2019
Spiral 8.2-5 Homeland Defense Capability Declaration NORTHCOM/INDOPACOM	3	2021	3	2021
Spiral 8.2-5 Homeland Defense Capability Declaration EUCOM/CENTCOM	1	2022	1	2022
Expanded Regional and Homeland Defense Capability Declaration	1	2024	1	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency										Date: March 2019		
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) MC01 / Cyber Operations			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MC01: Cyber Operations	7.317	5.421	17.651	14.162	-	14.162	16.173	15.916	12.398	14.377	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Decrease from FY 2019 to FY 2020 reflects the FY 2019 congressional plus up for continued upgrade of hardware and software and includes DoD required cyber tools, policies and procedures to improve C2BMC network defense against cyber threats and enhance cybersecurity posture.

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

Command and Control, Battle Management, and Communications (C2BMC) Cyber Operations sustain the 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) Plan of Action and Milestones (POA&Ms) for MDA C2BMC mission systems. Activities in this Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA).

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

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<b>Title:</b> Network/System Certification and Accreditation (C&A)	5.421	17.651	14.162
<b>Articles:</b>	-	-	-
<p><b>Description:</b> This activity maintains the Assessment and Authorization (A&amp;A) and Certification and Accreditation (C&amp;A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and Plan of Action and Milestones (POA&amp;Ms) on all Missile Defense Agency (MDA) information systems. This activity prepares and submits C&amp;A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) / Security Controls Assessor and the AO. Leverages Cross Domain Solution (CDS) as single authority implementing standard security policies for C2BMC across the BMDS. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems.</p> <ul style="list-style-type: none"> <li>- Conduct cybersecurity design, engineering, and architecture planning for C2BMC information technology systems</li> <li>- Plan and test the cybersecurity controls for C2BMC systems</li> <li>- Conduct Security Controls Assessment testing continuous monitoring of C2BMC mission systems and provide POA&amp;Ms to mitigate cybersecurity vulnerabilities.</li> </ul> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2019 Plans:</b></p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MC01 / <i>Cyber Operations</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2018</b>	<b>FY 2019</b>
- Continue purchase of hardware/software upgrades and implementation of Windows Server 2016  <b><i>FY 2020 Plans:</i></b> - Implement DoD required Endpoint Security Solution to replace current Host Based Security Solution - Continue upgrade and implementation of DoD required Secure Host Baselines for required operating systems - Plan and test virtualization and artificial intelligence capability solutions in relation to cyber resiliency  <b><i>FY 2019 to FY 2020 Increase/Decrease Statement:</i></b> Decrease from FY 2019 to FY 2020 reflects the FY 2019 congressional plus up for continued upgrade of hardware and software and includes DoD required cyber tools, policies and procedures to improve C2BMC network defense against cyber threats and enhance cybersecurity posture.			
<b>Accomplishments/Planned Programs Subtotals</b>		5.421	17.651
<b>C. Other Program Funding Summary (\$ in Millions)</b>			
N/A			
<b>Remarks</b>			
<b>D. Acquisition Strategy</b>			
<p>The 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. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling 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, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in 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. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MC01 / <i>Cyber Operations</i>
<p>option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).</p> <p><b><u>E. Performance Metrics</u></b> N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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) MC01 / Cyber Operations					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Network/System Certification and Accreditation (C&A) - Civ Cyber Labor	Various	MDA Other : Various	0.559	0.369	Oct 2017	0.192	Oct 2018	0.387	Oct 2019	-		0.387	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Consolidated Contractor Support	Various	MDA : Huntsville, AL; Colorado Springs, CO, NCR	0.000	1.025	Oct 2017	0.838	Oct 2018	1.287	Oct 2019	-		1.287	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Core C2BMC	SS/CPAF	Lockheed Martin : Colorado Springs, CO / Huntsville, AL	0.000	2.438	Jan 2018	10.708	Jan 2019	9.343	Jan 2020	-		9.343	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - IA/ CND Network/System C&A	MIPR	Army, Air Force : Various	6.076	0.255	Oct 2017	0.000		0.000		-		0.000	0.000	6.331	0.000
Network/System Certification and Accreditation (C&A) - Information Assurance	C/CPAF	Jacobs Technology : Colorado Springs, CO	0.000	1.252	Mar 2018	5.163	Mar 2019	3.008	Mar 2020	-		3.008	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Lab Infrastructure	SS/CPAF	Northrop Grumman : Colorado Springs, CO	0.682	0.082	Mar 2018	0.750	Mar 2019	0.137	Mar 2020	-		0.137	Continuing	Continuing	Continuing
Subtotal			7.317	5.421		17.651		14.162		-		14.162	Continuing	Continuing	N/A
Remarks N/A															
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			7.317	5.421		17.651		14.162		-		14.162	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Missile Defense Agency							<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 0400 / 4			<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>			<b>Project (Number/Name)</b> MC01 / <i>Cyber Operations</i>			
	<b>Prior Years</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Remarks</b> Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.									

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency														Date: March 2019																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency			Date: March 2019
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) MC01 / Cyber Operations	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC01 Cyber Operations	1	2018	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency										Date: March 2019		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>				Project (Number/Name) MT01 / <i>C2BMC Test</i>			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MT01: <i>C2BMC Test</i>	240.110	60.607	54.100	64.624	-	64.624	63.956	60.569	61.907	62.943	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Increase from FY 2019 to FY 2020 reflects the transfer of the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab from PE 0603914C to PE 0603896C to consolidate lab efforts to synergize efforts and gain efficiencies.

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

**TESTING:**

Command and Control, Battle Management and Communications (C2BMC) Test supports system flight and ground testing, wargames, and exercises as detailed in the Missile Defense Agency (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:**

MDA 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)**

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<b>Title:</b> Integrated Master Test Plan	60.607	54.100	64.624
<b>Articles:</b>	-	-	-
<b>Description:</b> This activity funds C2BMC participation in BMDS flight and ground testing, wargames and exercises, and resources in accordance with the BMDS IMTP. Recurring accomplishments include: Test Execution: - 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 and flight tests in accordance with the BMDS IMTP. Support all phases of the MDA Ground Test Concept of Operations (CONOPS) and the MDA Flight Test CONOPS. Provide Flight Test Predictive Analysis support. Generate, test, and distribute federated model compatible scenarios for Ground Test and Flight Test Experimentation test support. Use BMDS C2BMC Model (BCM) to support exercise integration testing activities including test case and scenario checkout.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2018</b>	<b>FY 2019</b>
<p>- Utilize the Enterprise Sensors Laboratory (ESL) to plan, coordinate, and provide test operations to demonstrate prototype algorithms through flight tests, ground tests and real-world targets of opportunity. The development plans for algorithm improvements focus on track and measurement level sensor data fusion and feature extraction to improve 3-d track formation utilizing a variety of space, airborne, and terrestrial-based sensors. Results from the tests and experiments are provided back to the algorithms development activity to enable algorithm refinement.</p> <p>- Utilize the C2BMC Experimentation Laboratory (X-Lab) to plan, coordinate, and provide test operations to demonstrate maturing C2BMC technologies and software builds within an integrated C2BMC environment through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds. The development plans for C2BMC improvements focus on the BMDS Post Intercept Assessment (PIA) capability, architecture improvements, and C2BMC algorithm improvements to mitigate development risk. Results from the tests and experiments are provided back to the C2BMC and X-Lab development activity.</p> <p>- Utilize the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab to plan, coordinate, and provide test operations to demonstrate maturing SBIRS and BOA software builds within an integrated system test environment through flight tests and ground tests.</p> <p>Wargame and Exercises:</p> <p>- Participate in wargames and exercises using current and future C2BMC architectures to support all requesting combatant commands, NATO partners, and Host Nations allowing warfighters to validate Ballistic Missile Defense (BMD) Techniques, Tactics, and Procedures (TTP) specific to all designated Areas of Operations (AOs) to include current and future C2BMC architectures.</p> <p>Resources:</p> <p>- Continue the development and upgrades in the C2BMC Testbed (CTB) to support flight and ground tests. Continue Cyber Testing in the CTB to support continuous C2BMC spiral development. Continue C2BMC and NATO planning demonstrations and support to NATO live fire events. Provide Situational Awareness (SA) Node sustainment for the BMDS increment development to support ongoing planning and cooperation in the development and enhancement of interoperability between U.S. BMD systems and the NATO BMD systems. Provide infrastructure, network, and troubleshooting support to C2BMC Command Center (CCC), to include the BMDS Network Operations and Security Center (BNOSC), System Test and Operations Center (STOC), C2BMC System Support Center (CSSC), BMDS Communications Network (BCN), the Distributed Training system (DTS) and Space Based Infrared Sensors/BMDS Overhead Persistent Infra-Red (OPIR) Architecture Lab.</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>		<b>FY 2018</b>	<b>FY 2019</b>
<p>Specific and/or unique accomplishments for each FY are as follows:</p> <p><b>FY 2019 Plans:</b>  Test Execution:  - Integrate and test the BMDS OPIR Architecture to enable wideband processing  - Integrate and test INDOPACOM JEON advanced threat capability for regional and homeland defense  - Integrate and test additional OPIR coverage with the new Highly Elliptical Orbits (HEOs) and Geosynchronous Earth Orbits (GEOs) to increase raid size and improve threat typing  - Participate in flight and ground test events to support the Spiral 8.2-5 and Homeland Defense including LRDR, mid-term discrimination and Redesigned Kill Vehicle (RKV) integration by testing the following capabilities: C2BMC generation of BMD System Track (discrimination results by C2BMC selection); GMD RKV into the BMDS; SBX Forward-Based Discrimination; Aegis BMD boost phase cues of SBX; Long Range Discrimination Radar (LRDR) Integration into BMDS; Active Sensor Bias Monitoring &amp; Reporting; Existing Sensor Data Interfaces &amp; LRDR Data for Risk Reduction; and Cyber Security Enhancements  - Complete LRDR for Homeland Defense (Spiral 8.2-5) upgrades at the Missile Defense Integration and Operation Center (MDIOC), CO. providing support for test and training  - Complete analysis associated with NATO Ensemble Test 7 and deliver results to NATO participants per NATO Communications and Information Agency agreement</p> <p><b>FY 2020 Plans:</b>  - Participate in flight and ground test events to support the BMDS Spiral 8.2-5 and Homeland Defense including LRDR, mid-term discrimination and RKV integration by testing the following capabilities: C2BMC generation of initial BMD System Track (discrimination results by enhanced C2BMC selection); GMD RKV integrated into BMDS; Long Range Discrimination Radar (LRDR) Integration into BMDS; Initial GMD use of LRDR data; Initial Active Sensor Bias Monitoring &amp; Reporting; Retain Existing Sensor Data Interfaces and provide LRDR Data for Risk Reduction for GMD; Initial Hypersonic Tracking and Reporting; Initial Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) Integration into BMDS; and Cyber Security Enhancements Risk Management Functions  - In flight test events: Assess ability to satisfy Aegis remote engagement logic using space sensors and other C2BMC assets. Collect data for Post Intercept Assessment (PIA)/ Space-based Kill Assessment (SKA) algorithm development. Demonstrate Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) Forward Base Mode (FBM) ability to execute a cued acquisition tasked by C2BMC based on BMDS Overhead Persistent Infra-Red Architecture (BOA) tracks, and demonstrate C2BMC ability to construct system tracks</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<p>- In ground test events: Assess C2BMC incremental capability to perform PIA; assess Advanced Threat Processing (ATP) alternatives for C2BMC system track typing, correlation, and launch event association processes in the presence of advances threats. Demonstrate interoperability with Aegis and collect data to assess Aegis Engage-on-Remote (EoR) capability. Provide Aegis BL 9.C2 EoR and improved sensor processing with BOA 6.1; ensure message traffic is being sent and received between C2BMC and Aegis Ashore Poland and assess message accountability. Assess interoperability of C2BMC S8.2-5, hypersonic threats, AN/TPY-2 FBM CX 4.0, LRDR 1.0, GS 8, XBR 4.1, RKV 2.0, and Terminal High Altitude Area Defense (THAAD) 4.0; assess C2BMC planning, monitoring, and tasking capabilities effect on Homeland Defense performance; assess SKA and PIA algorithms</p> <p>- Continue LRDR node integration, testing, and training with new C2BMC Spiral 8.2-5 Homeland Defense baseline changes at the Missile Defense Integration and Operation Center (MDIOC)</p> <p>- Consolidate and synergize Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab efforts to plan, coordinate, and provide test operations for BMDS system flight tests and ground tests</p> <p><b><i>FY 2019 to FY 2020 Increase/Decrease Statement:</i></b> Increase from FY 2019 to FY 2020 reflects the transfer of the Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab from PE 0603914C to PE 0603896C to consolidate lab efforts to synergize efforts and gain efficiencies.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	60.607	54.100	64.624

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

<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency								<b>Date:</b> March 2019			
<b>Appropriation/Budget Activity</b> 0400 / 4				<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>				<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>			

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

<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u> <u>Base</u>	<u>FY 2020</u> <u>OCO</u>	<u>FY 2020</u> <u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
• 0604672C: <i>Homeland Defense Radar-Hawaii</i>	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: <i>Pacific Discriminating Radar</i>	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The 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. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling 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, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in 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),

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>
<p>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. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).</p> <p><b><u>E. Performance Metrics</u></b> N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Subtotal			-	-		-		-		-		-	-	-	N/A
Remarks N/A															
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Subtotal			-	-		-		-		-		-	-	-	N/A
Remarks N/A															
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Integrated Master Test Plan - BMDS Level Testing GOV	MIPR	Army/Air Force : Various	2.517	4.683	Oct 2017	3.651	Oct 2018	6.485	Oct 2019	-		6.485	Continuing	Continuing	Continuing
Integrated Master Test Plan - Consolidated Contractor Support	Various	MDA : Huntsville, AL; Colorado Springs, CO; NCR	0.000	0.000		0.000		0.336	Oct 2019	-		0.336	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure Support	MIPR	Various : VA; OH; AL; NM; CA	11.780	1.532	Oct 2017	2.178	Oct 2018	2.210	Oct 2019	-		2.210	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure/BOA Infrastructure-BMDS Level Testing	SS/CPAF	Northrop Grumman Corporation : Colorado Springs, CO	38.376	4.408	Oct 2017	2.480	Oct 2018	1.487	Mar 2020	-		1.487	Continuing	Continuing	Continuing

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Missile Defense Agency												<b>Date:</b> March 2019			
<b>Appropriation/Budget Activity</b> 0400 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>						<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>			

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Integrated Master Test Plan - FFRDC	MIPR	Institute for Defense Analyses (IDA) : Alexandria, VA	0.000	0.000		0.000		0.700	Oct 2019	-		0.700	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS Level Testing	SS/IDIQ	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	96.736	25.888	Jul 2018	18.213	Jul 2019	21.692	Jul 2020	-		21.692	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing - Element/System Test Lab Facilities	C/CPAF	Northrop Grumman Corporation : Colorado Springs, CO	0.000	6.186	Mar 2018	5.005	Mar 2019	12.945	Mar 2020	-		12.945	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing (Element/System Test Lab Facilities)	C/CPAF	Jacobs Technology, Inc : Huntsville, AL; Colorado Springs, CO	0.000	17.910	Mar 2018	22.573	Mar 2019	18.769	Mar 2020	-		18.769	0.000	59.252	0.000
Integrated Master Test Plan - Prior year IMTP no longer funded in the FYDP	Various	Various : Various	90.701	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
<b>Subtotal</b>			240.110	60.607		54.100		64.624		-		64.624	Continuing	Continuing	N/A

**Remarks**

N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

**Remarks**

N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Missile Defense Agency										<b>Date:</b> March 2019				
<b>Appropriation/Budget Activity</b> 0400 / 4				<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>				<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>						
		<b>Prior Years</b>	<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>		240.110	60.607		54.100		64.624		-		64.624	Continuing	Continuing	N/A
<b>Remarks</b> Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.														

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency										Date: March 2019																			
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 ▲ Significant Event Planned △					Milestone Decision Complete ★ Milestone Decision Planned ☆					Element Test Complete ◆ Element Test Planned ◇					System Level Test Complete ● System Level Test Planned ○					Complete Activity ◆ Planned Activity ◇									
										FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024							
GT-19 Sprint 2 (JEON) (BMDS Ground Test)															◇														
GTD-07b (N/P) (BMDS Ground Test)															◇														
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)															△														
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)															△														
FTT-23 (TH, DT Intercept Flight Test)															△														
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)															△														
Warfighter TP 07b (BMDS Ground Test)															◇														
GTI-07c (N/P) (BMDS Ground Test)															◇														
FTX-39 (LTPO, DT Target Only Flight Test)															△														
(EX) EPOCH PLANEX 21															△														
(EX) JUNIPER COBRA 20															◇	◇													
(EX) GLOBAL LIGHTNING 20															◇	◇													
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)															△														
FTM-33 (AEGIS SBT, DT/OT Intercept Flight Test)															△														
FTP-21 (LTPO, DT Intercept Flight Test)															△														
FTP-27 E1 (LTPO, DT/OT Flight Test)															△														
GT-20 Sprint (JEON) (BMDS Ground Test)															◇														
GT-20 Sprint (BL 5.4) (BMDS Ground Test)															◇														
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)															△														
FTP-27 E2 (LTPO, DT/OT Flight Test)															△														
(EX) EAGLE RESOLVE 20															△														
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19															△														
(EX) KEY RESOLVE 20															△														
(EX) EUROPEAN TEST BED 20															△														

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency										Date: March 2019											
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 ◆													
Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇													
					FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024				
(EX) RESILIENT SHIELD 20										△											
(EX) STEADFAST ALLIANCE 20										◇	◇										
(EX) PACIFIC SENTRY 20										◇	◇	◇									
(EX) Joint Live, Virtual, and Constructive 2019/20-2										◇	◇	◇	◇								
GTD-07b (AA) (BMDS Ground Test)										◇											
(EX) GLOBAL RESPONSE EXERCISE 09										△											
(WG) Demonstration, Table-top Exercises & Experiments 20										◇	◇	◇									
(WG) BMDS Wargames 21										◇	◇	◇	◇	◇							
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)											△										
FTO-03 (OTA, OT Intercept Flight Test)											△										
(EX) AIR AND MISSILE DEFENSE EXERCISE 21											△										
(EX) ULCHI FREEDOM GUARDIAN 20											△										
(EX) GLOBAL RESPONSE EXERCISE 10											△										
GM BVT-03+ (GM, DT Interceptor Only Flight Test)											△										
GTI-08 (N/P) (BMDS Ground Test)											◇	◇									
(WG) Multi-National Missile Defense Conference (MNC) 20											◇	◇									
(EX) VIGILANT SHIELD 21											◇	◇									
(EX) KEEN SWORD 21											◇	◇									
(EX) GLOBAL THUNDER 21											◇	◇									
(EX) EPOCH PLANEX 22												△									
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20												△									
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)												◇	◇								
(EX) GLOBAL LIGHTNING 21												◇	◇								
(EX) AUSTERE CHALLENGE 21												◇	◇	◇	◇						

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency										Date: March 2019																			
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 ▲		Significant Event Planned △		Milestone Decision Complete ★		Milestone Decision Planned ☆		Element Test Complete ◆		Element Test Planned ◇		System Level Test Complete ●				System Level Test Planned ○				Complete Activity ◆				Planned Activity ◇					
					FY 2018		FY 2019		FY 2020		FY 2021				FY 2022				FY 2023				FY 2024						
(WG) NIMBLE TITAN 22															◇	◇	◇	◇	◇	◇	◇								
GTD-08 (N/P) (BMDS Ground Test)																	◇												
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)																	△												
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)																	△												
FTT-21 (TH, DT Intercept Flight Test)																	△												
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20																	△												
(EX) KEY RESOLVE 21																	△												
(EX) Joint Project Optic Windmill 2021																	◇												
(EX) EUROPEAN TEST BED 21																	△												
(EX) RESILIENT SHIELD 21																	△												
(EX) STEADFAST ARMOUR 21																	◇	◇											
(EX) PACIFIC SENTRY 21																	◇	◇	◇										
Warfighter TP 08 (BMDS Ground Test)																	◇												
GTI-ISR (21) (BMDS Ground Test)																	◇												
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)																	◇												
FTP-28 (LTPO, OT Intercept Flight Test)																	△												
(WG) Huntsville Wargames 21																	△												
(WG) Demonstration, Table-top Exercises & Experiments 21																	◇	◇	◇										
(EX) Joint Live, Virtual, and Constructive 2021/22-1																	◇	◇	◇										
FTP-25 (LTPO, OT Intercept Flight Test)																		△											
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)																		△											
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)																		△											
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)																		△											
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)																		△											

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency														Date: March 2019																			
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 ▲ Significant Event Planned △				Milestone Decision Complete ★ Milestone Decision Planned ☆				Element Test Complete ◆ Element Test Planned ◇				System Level Test Complete ● System Level Test Planned ○				Complete Activity ◆ Planned Activity ◇																	
														FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024							
(WG) Space & Missile Defense Symposium 21																																	
(EX) AIR AND MISSILE DEFENSE EXERCISE 22																																	
(EX) ULCHI FREEDOM GUARDIAN 21																																	
(WG) Multi-National Missile Defense Conference (MNC) 21																																	
(EX) VIGILANT SHIELD 22																																	
(EX) KEEN EDGE 22																																	
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21																																	
(EX) EPOCH PLANEX 23																																	
GTD-09 (E/C) (BMDS Ground Test)																																	
(EX) JUNIPER COBRA 22																																	
(EX) GLOBAL LIGHTNING 22																																	
GM CTV-03+ (GM, DT Interceptor Only Flight Test)																																	
(EX) EAGLE RESOLVE 22																																	
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21																																	
(EX) KEY RESOLVE 22																																	
(EX) EUROPEAN TEST BED 22																																	
(EX) RESILIENT SHIELD 22																																	
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)																																	
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)																																	
(EX) STEADFAST ALLIANCE 22																																	
(EX) PACIFIC SENTRY 22																																	
(EX) Joint Live, Virtual, and Constructive 2021/22-2																																	
FTX-28 E1 (TH, DT Target Only Flight Test)																																	
FTX-28 E2 (TH, DT Target Only Flight Test)																																	

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency														Date: March 2019															
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 ◆									
Significant Event Planned △					Milestone Decision Planned ☆					Element Test Planned ◇					System Level Test Planned ○					Planned Activity ◇									
										FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024							
FTX-28 E3 (TH, DT Target Only Flight Test)																			△										
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)																			◇										
(WG) Demonstration, Table-top Exercises & Experiments 22																			◇	◇	◇								
(WG) BMDS Wargames 23																			◇	◇	◇	◇	◇						
(EX) ULCHI FREEDOM GUARDIAN 22																			△										
(EX) AIR AND MISSILE DEFENSE EXERCISE 23																			△										
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																			△										
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)																			◇										
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)																			△										
(WG) Multi-National Missile Defense Conference (MNC) 22																			◇	◇									
(EX) VIGILANT SHIELD 23																			◇	◇									
(EX) KEEN SWORD 23																			◇	◇									
(EX) GLOBAL THUNDER 22																			◇	◇									
FTG-17 (GM, DT Intercept Flight Test)																				△									
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22																				△									
(EX) GLOBAL RESPONSE EXERCISE 11																				△									
(EX) GLOBAL RESPONSE EXERCISE 12																				△									
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)																				◇									
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)																				△									
(EX) GLOBAL LIGHTNING 23																				◇	◇								
(EX) AUSTERE CHALLENGE 23																				◇	◇	◇	◇						
(WG) NIMBLE TITAN 24																				◇	◇	◇	◇	◇					
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22																					△								
(EX) Joint Project Optic Windmill 2023																					◇								

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency															Date: March 2019														
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 ▲ Significant Event Planned △					Milestone Decision Complete ★ Milestone Decision Planned ☆					Element Test Complete ◆ Element Test Planned ◇					System Level Test Complete ● System Level Test Planned ○					Complete Activity ◆ Planned Activity ◇									
										FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024							
(EX) EUROPEAN TEST BED 23																				△									
(EX) KEY RESOLVE 23																				△									
(EX) RESILIENT SHIELD 23																				△									
GTD-10 (E/C) (BMDS Ground Test)																				◇									
(EX) STEADFAST ARMOUR 23																				◇	◇								
(EX) PACIFIC SENTRY 23																				◇	◇	◇							
(EX) PACIFIC SENTRY 24																				◇	◇	◇							
(WG) Huntsville Wargames 23																					△								
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)																					◇								
GTI-ISR (23) (BMDS Ground Test)																					◇								
FTT-24 (TH, DT Intercept Flight Test)																					△								
(EX) Joint Live, Virtual, and Constructive 2023/24-1																					◇	◇	◇						
(WG) Demonstration, Table-top Exercises & Experiments 23																						◇	◇	◇					
(WG) Space & Missile Defense Symposium 23																							△						
(EX) ULCHI FREEDOM GUARDIAN 23																						△							
(EX) AIR AND MISSILE DEFENSE EXERCISE 24																						△							
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)																						△							
FS-23 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)																						△							
FS-23 E2 (AEGIS 5.1, DT Target Only Flight Test)																						△							
FS-23 E3 (AEGIS 5.1, DT Target Only Flight Test)																						△							
FS-23 E4 (AEGIS 5.1, DT Intercept Flight Test)																						△							
(WG) Multi-National Missile Defense Conference (MNC) 23																							◇	◇					
(EX) GLOBAL THUNDER 23																							◇	◇					
(EX) VIGILANT SHIELD 24																							◇	◇					

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency															Date: March 2019									
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 ▲		Significant Event Planned △		Milestone Decision Complete ★		Milestone Decision Planned ☆		Element Test Complete ◆		Element Test Planned ◇		System Level Test Complete ●				System Level Test Planned ○				Complete Activity ◆		Planned Activity ◇		
					FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024							
GTD-11 (N/P) (BMDS Ground Test)																			◇	◇				
(EX) KEEN EDGE 24																			◇	◇	◇			
Warfighter TP 11 (BMDS Ground Test)																			◇	◇	◇	◇		
Warfighter TP 13 (BMDS Ground Test)																			◇	◇	◇	◇		
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23																			△					
FTG-18 (GM, DT/OT Intercept Flight Test)																			△					
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)																			△					
(EX) JUNIPER COBRA 24																			◇	◇				
(EX) GLOBAL LIGHTNING 24																			◇	◇				
(EX) EAGLE RESOLVE 24																				△				
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23																				△				
(EX) EUROPEAN TEST BED 24																				△				
(EX) KEY RESOLVE 24																				△				
(EX) RESILIENT SHIELD 24																				△				
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)																				◇				
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)																				△				
(EX) STEADFAST ALLIANCE 24																				◇	◇			
(EX) Joint Live, Virtual, and Constructive 2023/24-2																				◇	◇	◇		
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)																					◇			
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)																					△			
(WG) Demonstration, Table-top Exercises & Experiments 24																					◇	◇		
(WG) BMDS Wargames 25																					◇	◇		
(EX) ULCHI FREEDOM GUARDIAN 24																						△		
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)																						◇		

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency												Date: March 2019																							
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 ◆																			
Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇																			
												FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024											
(EX) GLOBAL THUNDER 24																										◇									
(WG) Multi-National Missile Defense Conference (MNC) 24																											◇								

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Missile Defense Agency			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	

## Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
(EX) AIR AND MISSILE DEFENSE EXERCISE 18	1	2018	1	2018
(EX) EPOCH PLANEX 19	1	2018	1	2018
(EX) GLOBAL LIGHTNING 18	1	2018	2	2018
Enterprise Sensor Lab Infrastructure Support	1	2018	4	2024
Warfighter TP 07a (BMDS Ground Test)	2	2018	2	2018
(EX) EUROPEAN TEST BED 18	2	2018	2	2018
(EX) STEADFAST ALLIANCE 18	2	2018	3	2018
(EX) PACIFIC SENTRY 18	2	2018	4	2018
JFTM-05 E1 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
JFTM-05 E2 (JAPAN, DT Intercept Flight Test)	4	2018	4	2018
PACIFIC DRAGON-18 (AEGIS 5.0, DT Tracking Exercise Flight Test)	4	2018	4	2018
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 18	4	2018	4	2018
(EX) AIR AND MISSILE DEFENSE EXERCISE 19	4	2018	4	2018
(EX) ULCHI FREEDOM GUARDIAN 18	4	2018	4	2018
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	1	2019	1	2019
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
Israeli Cooperative Intercept Flight Test - FY 2019	1	2019	4	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
GT-18 Sprint 3 (N/P) (BMDS Ground Test)	2	2019	2	2019
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	3	2019	3	2019
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency			Date: March 2019	
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	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Missile Defense Agency				<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>		<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
		<b>Start</b>		<b>End</b>	
<b>Events</b>	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>	
(EX) KEY RESOLVE 20	2	2020	2	2020	
(EX) EUROPEAN TEST BED 20	2	2020	2	2020	
(EX) RESILIENT SHIELD 20	2	2020	2	2020	
(EX) STEADFAST ALLIANCE 20	2	2020	3	2020	
(EX) PACIFIC SENTRY 20	2	2020	4	2020	
(EX) Joint Live, Virtual, and Constructive 2019/20-2	2	2020	1	2021	
GTD-07b (AA) (BMDS Ground Test)	3	2020	3	2020	
(EX) GLOBAL RESPONSE EXERCISE 09	3	2020	3	2020	
(WG) Demonstration, Table-top Exercises & Experiments 20	3	2020	1	2021	
(WG) BMDS Wargames 21	3	2020	3	2021	
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020	
FTO-03 (OTA, OT Intercept Flight Test)	4	2020	4	2020	
(EX) AIR AND MISSILE DEFENSE EXERCISE 21	4	2020	4	2020	
(EX) ULCHI FREEDOM GUARDIAN 20	4	2020	4	2020	
(EX) GLOBAL RESPONSE EXERCISE 10	4	2020	4	2020	
GM BVT-03+ (GM, DT Interceptor Only Flight Test)	4	2020	4	2020	
GTI-08 (N/P) (BMDS Ground Test)	4	2020	1	2021	
(WG) Multi-National Missile Defense Conference (MNC) 20	4	2020	1	2021	
(EX) VIGILANT SHIELD 21	4	2020	1	2021	
(EX) KEEN SWORD 21	4	2020	1	2021	
(EX) GLOBAL THUNDER 21	4	2020	1	2021	
(EX) EPOCH PLANEX 22	1	2021	1	2021	
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20	1	2021	1	2021	
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	1	2021	2	2021	
(EX) GLOBAL LIGHTNING 21	1	2021	2	2021	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Missile Defense Agency				<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>		<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
		<b>Start</b>		<b>End</b>	
<b>Events</b>	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>	
(EX) AUSTERE CHALLENGE 21	1	2021	4	2021	
(WG) NIMBLE TITAN 22	1	2021	4	2022	
GTD-08 (N/P) (BMDS Ground Test)	2	2021	2	2021	
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021	
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)	2	2021	2	2021	
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021	
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20	2	2021	2	2021	
(EX) KEY RESOLVE 21	2	2021	2	2021	
(EX) Joint Project Optic Windmill 2021	2	2021	2	2021	
(EX) EUROPEAN TEST BED 21	2	2021	2	2021	
(EX) RESILIENT SHIELD 21	2	2021	2	2021	
(EX) STEADFAST ARMOUR 21	2	2021	3	2021	
(EX) PACIFIC SENTRY 21	2	2021	4	2021	
Warfighter TP 08 (BMDS Ground Test)	3	2021	3	2021	
GTI-ISR (21) (BMDS Ground Test)	3	2021	3	2021	
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021	
FTP-28 (LTPO, OT Intercept Flight Test)	3	2021	3	2021	
(WG) Huntsville Wargames 21	3	2021	3	2021	
(WG) Demonstration, Table-top Exercises & Experiments 21	3	2021	1	2022	
(EX) Joint Live, Virtual, and Constructive 2021/22-1	3	2021	1	2022	
FTP-25 (LTPO, OT Intercept Flight Test)	4	2021	4	2021	
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	4	2021	4	2021	
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)	4	2021	4	2021	
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)	4	2021	4	2021	
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)	4	2021	4	2021	

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency			Date: March 2019	
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	
	Start		End	
Events	Quarter	Year	Quarter	Year
(WG) Space & Missile Defense Symposium 21	4	2021	4	2021
(EX) AIR AND MISSILE DEFENSE EXERCISE 22	4	2021	4	2021
(EX) ULCHI FREEDOM GUARDIAN 21	4	2021	4	2021
(WG) Multi-National Missile Defense Conference (MNC) 21	4	2021	1	2022
(EX) VIGILANT SHIELD 22	4	2021	1	2022
(EX) KEEN EDGE 22	4	2021	2	2022
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21	1	2022	1	2022
(EX) EPOCH PLANEX 23	1	2022	1	2022
GTD-09 (E/C) (BMDS Ground Test)	1	2022	1	2022
(EX) JUNIPER COBRA 22	1	2022	2	2022
(EX) GLOBAL LIGHTNING 22	1	2022	2	2022
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
(EX) EAGLE RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21	2	2022	2	2022
(EX) KEY RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN TEST BED 22	2	2022	2	2022
(EX) RESILIENT SHIELD 22	2	2022	2	2022
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)	2	2022	2	2022
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2022	2	2022
(EX) STEADFAST ALLIANCE 22	2	2022	3	2022
(EX) PACIFIC SENTRY 22	2	2022	4	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-2	2	2022	1	2023
FTX-28 E1 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E2 (TH, DT Target Only Flight Test)	3	2022	3	2022
FTX-28 E3 (TH, DT Target Only Flight Test)	3	2022	3	2022

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Missile Defense Agency				<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>		<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
		<b>Start</b>		<b>End</b>	
<b>Events</b>	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>	
GTI-11 Sprint 1 (N/P) (BMDS Ground Test)	3	2022	3	2022	
(WG) Demonstration, Table-top Exercises & Experiments 22	3	2022	1	2023	
(WG) BMDS Wargames 23	3	2022	3	2023	
(EX) ULCHI FREEDOM GUARDIAN 22	4	2022	4	2022	
(EX) AIR AND MISSILE DEFENSE EXERCISE 23	4	2022	4	2022	
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	4	2022	4	2022	
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	4	2022	4	2022	
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022	
(WG) Multi-National Missile Defense Conference (MNC) 22	4	2022	1	2023	
(EX) VIGILANT SHIELD 23	4	2022	1	2023	
(EX) KEEN SWORD 23	4	2022	1	2023	
(EX) GLOBAL THUNDER 22	4	2022	1	2023	
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023	
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22	1	2023	1	2023	
(EX) GLOBAL RESPONSE EXERCISE 11	1	2023	1	2023	
(EX) GLOBAL RESPONSE EXERCISE 12	1	2023	1	2023	
GTI-11 Sprint 2 (N/P) (BMDS Ground Test)	1	2023	1	2023	
FTM-37 (OT) (AEGIS 5.1, OT Intercept Flight Test)	1	2023	1	2023	
(EX) GLOBAL LIGHTNING 23	1	2023	2	2023	
(EX) AUSTERE CHALLENGE 23	1	2023	4	2023	
(WG) NIMBLE TITAN 24	1	2023	4	2024	
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22	2	2023	2	2023	
(EX) Joint Project Optic Windmill 2023	2	2023	2	2023	
(EX) EUROPEAN TEST BED 23	2	2023	2	2023	
(EX) KEY RESOLVE 23	2	2023	2	2023	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Missile Defense Agency				<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>		<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
		<b>Start</b>		<b>End</b>	
<b>Events</b>	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>	
(EX) RESILIENT SHIELD 23	2	2023	2	2023	
GTD-10 (E/C) (BMDS Ground Test)	2	2023	2	2023	
(EX) STEADFAST ARMOUR 23	2	2023	3	2023	
(EX) PACIFIC SENTRY 23	2	2023	4	2023	
(EX) PACIFIC SENTRY 24	2	2023	4	2023	
(WG) Huntsville Wargames 23	3	2023	3	2023	
GTI-11 Sprint 3 (N/P) (BMDS Ground Test)	3	2023	3	2023	
GTI-ISR (23) (BMDS Ground Test)	3	2023	3	2023	
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023	
(EX) Joint Live, Virtual, and Constructive 2023/24-1	3	2023	1	2024	
(WG) Demonstration, Table-top Exercises & Experiments 23	3	2023	1	2024	
(WG) Space & Missile Defense Symposium 23	4	2023	4	2023	
(EX) ULCHI FREEDOM GUARDIAN 23	4	2023	4	2023	
(EX) AIR AND MISSILE DEFENSE EXERCISE 24	4	2023	4	2023	
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023	
FS-23 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	4	2023	4	2023	
FS-23 E2 (AEGIS 5.1, DT Target Only Flight Test)	4	2023	4	2023	
FS-23 E3 (AEGIS 5.1, DT Target Only Flight Test)	4	2023	4	2023	
FS-23 E4 (AEGIS 5.1, DT Intercept Flight Test)	4	2023	4	2023	
(WG) Multi-National Missile Defense Conference (MNC) 23	4	2023	1	2024	
(EX) GLOBAL THUNDER 23	4	2023	1	2024	
(EX) VIGILANT SHIELD 24	4	2023	1	2024	
GTD-11 (N/P) (BMDS Ground Test)	4	2023	1	2024	
(EX) KEEN EDGE 24	4	2023	2	2024	
Warfighter TP 11 (BMDS Ground Test)	4	2023	3	2024	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Missile Defense Agency				<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>		<b>Project (Number/Name)</b> MT01 / <i>C2BMC Test</i>	
		<b>Start</b>		<b>End</b>	
<b>Events</b>	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>	
Warfighter TP 13 (BMDS Ground Test)	4	2023	4	2025	
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23	1	2024	1	2024	
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024	
FTX-38 (AEGIS 5.1, DT Target Only Flight Test)	1	2024	1	2024	
(EX) JUNIPER COBRA 24	1	2024	2	2024	
(EX) GLOBAL LIGHTNING 24	1	2024	2	2024	
(EX) EAGLE RESOLVE 24	2	2024	2	2024	
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23	2	2024	2	2024	
(EX) EUROPEAN TEST BED 24	2	2024	2	2024	
(EX) KEY RESOLVE 24	2	2024	2	2024	
(EX) RESILIENT SHIELD 24	2	2024	2	2024	
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	2	2024	2	2024	
FTM-40 (AEGIS 5.1, DT/OT Intercept Flight Test)	2	2024	2	2024	
(EX) STEADFAST ALLIANCE 24	2	2024	3	2024	
(EX) Joint Live, Virtual, and Constructive 2023/24-2	2	2024	1	2025	
GTI-13 Sprint 1 (N/P) (BMDS Ground Test)	3	2024	3	2024	
FTM-41 (AEGIS 5.1, DT Target Only Flight Test)	3	2024	3	2024	
(WG) Demonstration, Table-top Exercises & Experiments 24	3	2024	1	2025	
(WG) BMDS Wargames 25	3	2024	3	2025	
(EX) ULCHI FREEDOM GUARDIAN 24	4	2024	4	2024	
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	4	2024	4	2024	
(EX) GLOBAL THUNDER 24	4	2024	1	2025	
(WG) Multi-National Missile Defense Conference (MNC) 24	4	2024	1	2025	

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>

### Note

FY 2020 USFK JEON tests are funded in PE 0603914C BMD Test.

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency										Date: March 2019		
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) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MX01: Command & Control, Battle Management, Communications (C2BMC) Development Support	508.427	106.449	112.910	114.876	-	114.876	123.815	123.051	125.377	133.555	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

N/A

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

C2BMC Development Support provides operations engineering, integrated logistics, warfighter integration, deployment, and disposal of the current operational system and/or systems fielded in STRATCOM, NORTHCOM, INDOPACOM, EUCOM, and CENTCOM and the operation of the C2BMC Control Center. This activity provides continuous support of the development, deployment, sustainment of the C2BMC training systems, and updates training material to stay current with fielded capabilities.

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

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<b>Title:</b> Operations Engineering	91.023	95.455	92.212
<b>Articles:</b>	-	-	-
<b>Description:</b> This activity funds C2BMC support of current operational, test, and training systems. Recurring efforts include: <ul style="list-style-type: none"> <li>- On-site maintenance, help-desk support, and developer reach-back support to ensure operational availability</li> <li>- C2BMC Command Center (CCC) 24 hours a day, 365 days a year operations providing system and network monitoring, system administration, and network defense against cyber-attacks</li> <li>- Integrated logistics support by providing a secure supply chain; reliability, availability, and maintainability (RAM) engineering; obsolescence engineering; and sparing to ensure operational availability</li> <li>- Cybersecurity engineering providing C2BMC Commercial-off-the-shelf (COTS) software/hardware updates and CCC upgrades that address system vulnerabilities, field quarterly updates to reduce system component vulnerability to cyber-attacks</li> <li>- Information System Security Officers (ISSOs) ensuring C2BMC compliance with latest cybersecurity requirements and policies</li> <li>- System modifications driven by Warfighter Involvement Process (WIP), Continuous Improvement Process (CIP), RAM and obsolescence engineering, and external systems such as Space-Based Infrared Sensors (SBIRS), Ground-based Midcourse Defense (GMD) Fire Control (GFC), Aegis, Terminal High Altitude Area Defense (THAAD), Navy Link Monitoring and Management Tool (LMMT), AN/TPY-2, standard Army communications, Defense Information Systems Agency (DISA) fiber networks, and Allied/Coalition interfaces</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 0400 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>		<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>			<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<ul style="list-style-type: none"> <li>- Combatant command (CCMD) integration providing C2BMC training, on-site Subject Matter Experts (SMEs), and surge SME support for real-world events, flight tests, ground tests, exercises, cyber assessments, and wargames</li> <li>- Facility modifications required to house current or future C2BMC equipment and transportation for moving C2BMC equipment</li> <li>- Integrated product support for tactical satellite communications (SATCOM) used in flight tests, hardened SATCOM, and associated shelters</li> <li>- Provide transportation for flight test equipment and SME support and analysis for numerous test, exercise, and real world events</li> <li>- Provide recurring proficiency training to CCMDs and keep training material and systems consistent with operational capabilities</li> </ul> <p>Specific and/or unique accomplishments for each FY are as follow:</p> <p><b>FY 2019 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete decommission of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM, and INDOPACOM</li> <li>- Maintain MRBM Defense/EPAA Phase 1 and 2 in EUCOM/CENTCOM and Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/INDOPACOM</li> <li>- Initiate decommissioning activities for MRBM Defense/EPAA Phase 1 and 2 in EUCOM/CENTCOM</li> <li>- Initiate sustainment of EPAA Phase 3/EOR (Spiral 8.2-3) deployed to EUCOM, CENTCOM, NORTHCOM, and INDOPACOM</li> </ul> <p><b>FY 2020 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue sustainment of fielded EPAA Phase 3/EOR (Spiral 8.2-3) deployed to EUCOM, CENTCOM, NORTHCOM, and INDOPACOM</li> <li>- Complete decommissioning activities for Medium Range Ballistic Missile (MRBM) Defense/European Phased Adaptive Approach (EPAA) Phase 1 and 2 in EUCOM and CENTCOM</li> <li>- Initiate deployment activities for Long Range Discrimination Radar (LRDR) for Homeland Defense (Spiral 8.2-5)</li> </ul> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> N/A</p>					
<p><b>Title:</b> Concurrent Test, Training, and Operations (CTTO)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This element provides the development and sustainment of all C2BMC Training Support System (TSS), EPAA Phase 3/EOR (Spiral 8.2-3), LRDR for Homeland Defense (Spiral 8.2-5) and Distributed Training System (DTS) for INDOPACOM, NORTHCOM, EUCOM, and CENTCOM. C2BMC connects all BMDS Elements through virtual and physical networks to facilitate integrated test, training, and operations within two coexistent realms - Operations and Certification. This enables the warfighter to become proficient on current and future software versions at the operational console; increases the developer's capacity to</p>			15.426 -	17.455 -	22.664 -

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>	

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
perform a variety of tests and upgrades on the operational BMDS; and decreases recall-to-mission operations times from weeks and days to hours and minutes. Recurring accomplishments include sustaining current training systems for BMDS training events for the Unified Combatant Command developing the next generation training systems, to include the integration of Red Force / Blue Force capability, to keep current with the operational system capabilities.			
Specific and/or unique accomplishments for each FY are as follows:			
<b><i>FY 2019 Plans:</i></b> - Initiate development on BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS			
<b><i>FY 2020 Plans:</i></b> - Continue development and verification testing on BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS - Initiate deployment of BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS - Initiate development on BMDS Homeland Defense Radar - Hawaii (HDR-H) TSS and DTS			
<b><i>FY 2019 to FY 2020 Increase/Decrease Statement:</i></b> Increase in funding from FY 2019 to FY 2020 provides TSS and DTS training system enhancements/new modeling capability for the Homeland Defense Radar - Hawaii (HDR-H) and incorporating core C2BMC algorithm changes and new defense designs elements.			
<b>Accomplishments/Planned Programs Subtotals</b>	106.449	112.910	114.876

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

<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	454.147	388.273	302.761	-	302.761	234.679	227.921	179.248	197.459	Continuing	Continuing
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,153.263	803.359	1,156.506	-	1,156.506	829.451	766.237	834.533	776.671	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	290.289	385.375	283.487	-	283.487	296.098	263.681	276.092	351.607	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	533.993	620.831	571.507	-	571.507	603.672	541.667	574.553	553.969	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	798.395	741.076	727.479	-	727.479	718.949	703.473	505.529	527.720	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency								<b>Date:</b> March 2019			
<b>Appropriation/Budget Activity</b> 0400 / 4				<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>				<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>			

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

<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u> <u>Base</u>	<u>FY 2020</u> <u>OCO</u>	<u>FY 2020</u> <u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	51.905	58.125	56.161	-	56.161	57.446	58.574	61.144	62.339	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	173.988	136.715	128.156	-	128.156	119.452	132.826	127.504	139.909	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	406.806	515.897	395.924	-	395.924	417.946	335.481	451.723	405.136	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	512.838	561.352	554.171	-	554.171	513.964	439.826	358.018	276.108	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	63.032	130.944	157.425	-	157.425	142.391	116.931	119.780	122.078	0.000	852.581
• 0604672C: <i>Homeland Defense Radar-Hawaii</i>	0.000	62.221	274.714	-	274.714	210.614	135.627	87.773	40.772	0.000	811.721
• 0604673C: <i>Pacific Discriminating Radar</i>	59.564	15.926	6.711	-	6.711	59.800	53.444	279.349	398.573	0.000	873.367
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	370.516	166.543	136.423	-	136.423	122.877	99.920	88.203	64.569	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The 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. In 2015 the contract was extended through 1st quarter FY 2022, adding an additional five years to the ordering period required to complete Spiral 8.2-5. Spiral 8.2 is planned to be fielded incrementally. Enhanced Homeland Defense (Spiral 8.2-1) fielded in FY 2018, European Phased Adaptive Approach (EPAA) Phase 3/EOR (Spiral 8.2-3) begins fielding in FY 2019, completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021, and Enhanced Regional and Homeland Defense in FY 2024. This incremental fielding required a modification to the base contract increasing the ceiling 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, operations and sustainment, and cyber operations support of the C2BMC system. They perform development and testing of C2BMC products in 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),

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>
<p>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. Finally, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Radar Architecture (BOA), and Simultaneous Correlation of Unambiguous Tracks (SCOUT).</p> <p><b><u>E. Performance Metrics</u></b> N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 Engineering - Operations Engineering - Contract Support Services (CSS)	MIPR	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	0.000	0.771	Oct 2017	0.795	Oct 2018	0.813	Oct 2019	-		0.813	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Indirect Support	MIPR	DISA DECC/DISA TECC : Various	43.063	3.865	Oct 2017	2.306	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Sustaining Support	C/CPAF	Jacobs Technology : Huntsville, AL; Colorado Springs, CO	0.000	1.003	Mar 2018	1.759	Mar 2019	1.794	Mar 2020	-		1.794	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Training Support	C/FPIF	Boeing : Huntsville, AL	0.000	0.280	Oct 2017	0.750	Oct 2018	1.149	Oct 2019	-		1.149	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Unit Personnel, Control System Improvement Sustaining Support	MIPR	Army, Navy, Air Force : Various	0.912	6.554	Oct 2017	10.780	Oct 2018	9.162	Oct 2019	-		9.162	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering Training Support	SS/CPAF	Northrop Grumman : Huntsville, AL	1.747	0.593	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Operations Engineering - Prior year Operations Engineering no longer funded in the FYDP	Various	Various : Various	7.505	0.000		0.000		0.000		-		0.000	0.000	7.505	7.505
Operations Engineering - Unit Personnel, Control System Improvement, Sustaining Support	SS/CPFF	Lockheed Martin Team : Huntsville, AL	349.219	77.957	Dec 2017	79.065	Dec 2018	79.294	Dec 2019	-		79.294	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - CTTO/Training Enhancements	MIPR	Aviation and Missile Research Development and	8.238	3.979	Dec 2017	4.295	Dec 2018	6.904	Dec 2019	-		6.904	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Missile Defense Agency												Date: March 2019			
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) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
		Engineering Center : Huntsville, AL													
Concurrent Test, Training, and Operations (CTTO) - Prior year CTTO no longer funded in the FYDP	Various	Various : Various	8.443	0.000		0.000		0.000		-		0.000	0.000	8.443	4.610
Concurrent Test, Training, and Operations (CTTO) - Training Enhancements	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	89.300	11.447	Dec 2017	13.160	Dec 2018	15.760	Dec 2019	-		15.760	Continuing	Continuing	Continuing
Subtotal			508.427	106.449		112.910		114.876		-		114.876	Continuing	Continuing	N/A
Remarks N/A															
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Subtotal			-	-		-		-		-		-	-	-	N/A
Remarks N/A															
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Subtotal			-	-		-		-		-		-	-	-	N/A
Remarks N/A															

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Missile Defense Agency												<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 0400 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>					<b>Project (Number/Name)</b> MX01 / <i>Command &amp; Control, Battle Management, Communications (C2BMC) Development Support</i>				

  

Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
<b>Subtotal</b>			-	-		-		-		-		-	-	-	N/A

  

<b>Remarks</b> N/A															
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	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	508.427	106.449		112.910		114.876		-		114.876	Continuing	Continuing	N/A

  

<b>Remarks</b> Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.													
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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Missile Defense Agency																	Date: March 2019						
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) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support							
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 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023		FY 2024			
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support								◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency			Date: March 2019
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) MX01 / Command & Control, Battle Management, Communications (C2BMC) Development Support	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	1	2018	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Missile Defense Agency										Date: March 2019		
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) MD40 / Program-Wide Support			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
MD40: Program-Wide Support	106.194	18.051	21.118	23.682	-	23.682	24.674	22.496	25.501	26.156	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

**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 personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: 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 across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

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

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
<b>Title:</b> Program Wide Support	18.051	21.118	23.682
<b>Articles:</b>	-	-	-
<b>Description:</b> 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 personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs include: 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 across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.			
<b>FY 2019 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Missile Defense Agency		<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 0400 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>	<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>	

  

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
- SEE ABOVE.  <b>FY 2020 Plans:</b> - SEE ABOVE.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Increase from FY 2019 to FY 2020 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
<b>Accomplishments/Planned Programs Subtotals</b>	18.051	21.118	23.682

  

**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 2020 Missile Defense Agency												Date: March 2019			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>				Project (Number/Name) MD40 / <i>Program-Wide Support</i>					
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	3.665	1.931	Jul 2018	0.323	Jul 2019	0.358	Jul 2020	-		0.358	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	3.111	0.000		0.000		0.000		-		0.000	0.015	3.126	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, HI, VA	3.966	0.000		3.786	Jan 2019	7.264	Oct 2019	-		7.264	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		0.661	Nov 2019	-		0.661	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	47.864	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services Civilian Salaries, Travel, Training	Allot	Various : Multi: AL, CA, CO, VA	24.139	16.120	Nov 2017	17.009	Oct 2018	15.061	Nov 2019	-		15.061	2.800	75.129	0.000
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, VA etc.	0.000	0.000		0.000		0.037	Oct 2019	-		0.037	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	JHU/APL : AL, VA	0.000	0.000		0.000		0.301	Sep 2020	-		0.301	Continuing	Continuing	Continuing
Program Wide Support - Facilities Maintenance SRM	MIPR	Various : Multi: AK, CA, CO, AL, MD, NJ, VA	1.061	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			106.194	18.051		21.118		23.682		-		23.682	Continuing	Continuing	N/A
Remarks N/A															

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Missile Defense Agency										<b>Date:</b> March 2019			
<b>Appropriation/Budget Activity</b> 0400 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management &amp; Communication</i>					<b>Project (Number/Name)</b> MD40 / <i>Program-Wide Support</i>			
	<b>Prior Years</b>	<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	106.194	18.051		21.118		23.682		-		23.682	Continuing	Continuing	N/A
<b>Remarks</b> Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.													

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PE 0603896C: *Ballistic Missile Defense Command and Co...*  
Missile Defense Agency

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Missile Defense Agency			Date: March 2019
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) MD40 / Program-Wide Support	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2018	4	2024