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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Missile Defense Agency										Date: May 2017		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603884C / Ballistic Missile Defense Sensors							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	932.886	233.020	230.077	247.345	-	247.345	247.643	362.850	401.267	497.503	Continuing	Continuing
MD11: BMDS Radars	864.338	221.705	219.503	213.532	-	213.532	211.357	241.261	299.852	260.420	Continuing	Continuing
MD41: Pacific Radar	-	0.000	0.000	21.000	-	21.000	25.800	99.000	83.300	216.060	0	445.160
MC11: Cyber Operations	2.675	1.196	1.045	3.636	-	3.636	1.089	8.950	4.410	1.156	Continuing	Continuing
MD40: Program-Wide Support	65.873	10.119	9.529	9.177	-	9.177	9.397	13.639	13.705	19.867	Continuing	Continuing
Program MDAP/MAIS Code: 362												
Note												
N/A												
A. Mission Description and Budget Item Justification												
<p>The Ballistic Missile Defense System (BMDS) network of layered Sensors provides essential situational awareness and fire control data for the command and control of BMDS weapon systems, such as Ground-based Midcourse Defense (GMD), Aegis Ballistic Missile Defense, and Terminal High Altitude Area Defense (THAAD). The suite of remote ground-based sensors provides early warning, midcourse and terminal ballistic missile defense threat data enabling layered detection and tracking of ballistic missile targets, providing fire-control quality position, velocity, and discrimination data through Ground-Based Midcourse Defense Fire Control (GFC), or Command and Control, Battle Management, Communications (C2BMC).</p> <p>Overlapping coverage of geographically diverse sensors provides improved threat track data, reduces the impact of the loss of any one sensor, and reduces the potential impact of countermeasures. The extended coverage and accuracy provided by a network of layered sensors increases the defensive footprint and reduces the number of target engagements required, thereby conserving interceptor inventory and maintaining a high probability of successful engagement. Networked forward-based sensors enable C2BMC to pair the best sensor coverage with the best available weapon system to provide the most effective defense against ballistic missile threats.</p> <p>This Program Element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. BMDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) PEs.</p> <p>The BMD Sensors Program contributes to regional missile defense through the development, delivery and deployment/redeployment of Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) radars for operations or tests. AN/TPY-2 radars can be configured to operate either as a THAAD Fire Unit Radar (terminal mode) or Forward-Based Radar. These radars are transportable, adding flexibility to respond to geographical changes in threats. Radars provide early warning tracking and discrimination data through all phases of ballistic missile flight. Through the BMDS C2BMC and coalition data links, the AN/TPY-2 provides fire control data to enable</p>												

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remote Standard Missile (SM)-3 engagements by Aegis BMD, to allow earlier engagement by the Arrow Weapon System, and to cue deployed THAAD and U.S. and partner PATRIOT batteries.						
The BMDS sensor network also includes the COBRA DANE Radar at Eareckson Air Station, Alaska, and the Upgraded Early Warning Radars (UEWRs) at Beale Air Force Base, CA; Fylingdales Royal Air Force, United Kingdom, and Thule Air Base in Greenland. The Clear Ultra High Frequency Early Warning Radar (EWR), at Clear Air Force Station, AK, and the Cape Cod EWR, at Cape Cod Air Force Station, MA, are also being upgraded to include missile defense functionality against long-range threats in addition to their existing Missile Warning and Space Surveillance missions. Upgrade activities began in CY 2012 and are expected to be completed in CY 2017 and 2018 respectively. The addition of the Clear UEWR and Cape Cod UEWRs to the BMDS sensor architecture will improve BMDS sensor coverage and provide new engagement options against long-range missile threats.						
The Pacific Radar is a new sensor within the Ballistic Missile Defense System that addresses NORTHCOM and PACOM radar requirements for the defense of Hawaii. The Pacific Radar is an long range ballistic missile defense sensor that provides a persistent operational capability for the defense of the Pacific region and improves the discrimination capability to address multiple threats including the no warning strategic challenges of the road mobile ICBM. The radar will leverage development efforts from other sensors projects to reuse discrimination, low elevation acquisition, and tracking algorithms. The Pacific Radar final testing/integration and delivery is planned for CY 2023.						
Cyber Operations sustains the Risk Management Framework (RMF)and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of Plans of Action and Milestones (POA&Ms) for the Sensors mission system.						
This Program Element also investigates concepts and performs systems engineering to address hypersonic threats.						
B. Program Change Summary (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget		228.392	230.077	144.893	-	144.893
Current President's Budget		233.020	230.077	247.345	-	247.345
Total Adjustments		4.628	0.000	102.452	-	102.452
• Congressional General Reductions		0.000	0.000			
• Congressional Directed Reductions		0.000	0.000			
• Congressional Rescissions		0.000	0.000			
• Congressional Adds		0.000	0.000			
• Congressional Directed Transfers		0.000	0.000			
• Reprogrammings		9.606	0.000			
• SBIR/STTR Transfer		-4.978	0.000			
• Other Adjustment		0.000	0.000	102.452	-	102.452

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Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors	
<p>Change Summary Explanation</p> <p>The increase from PB17 to PB18 in FY2018 reflects funding for the new Pacific Radar, a long range BMD sensor that addresses NORTHCOM and PACOM radar requirements for the defensive of Hawaii, and studies for a potential Atlantic Radar. The increase also reflects AN/TPY-2 transition to Gallium Nitride (GaN) Transmit/Receive module technology, software improvements to implement C2BMC interface updates, and Objective Debris Mitigation (ODM). Increased funding for Cyber Operations reflects compliance with new Cyber Supply Chain requirements. Also includes reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition.</p>		

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Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD11 / BMDs Radars			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
MD11: BMDs Radars	864.338	221.705	219.503	213.532	-	213.532	211.357	241.261	299.852	260.420	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The BMDs Radars project includes development of future Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2), COBRA DANE and Upgraded Early Warning Radar (UEWR) capabilities through system engineering, software development and testing support. Modeling and Simulation (M&S) efforts include enhanced sensor models, development of Radio Frequency scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDs) M&S architecture, and Verification, Validation, and Accreditation of radar models. This project funds participation and support for Ballistic Missile Defense System (BMDs) element ground and flight test campaigns and Warfighter games and exercises.

This project will continue development of discrimination advanced algorithms for the AN/TPY-2, COBRA DANE, Sea Based X-Band, and the UEWR radars to counter evolving threats. The discrimination improvement effort will develop and field integrated Element capabilities to improve BMDs's ability to identify lethal and non-lethal objects. Sensors will continue development of discrimination improvement Mid-term design and test support for SBX and Far-term trade analysis and planning.

Program Operations provides strategic planning, program integration, cost estimating, contracting, financial management, internal reviews and audits, earned-value management and program assessments for the program office.

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

Title: Basic Development Program		FY 2016	FY 2017	FY 2018
Articles:		38.529	35.279	25.004
		-	-	-
Description: The Basic Development Program includes development and testing of software maintenance updates to address software trouble reports identified on fielded SW versions and flight/ground test events. Software maintenance updates also includes annual cybersecurity certifications and accreditations, testing for vulnerabilities and third party assessments of all sensors systems. Software improvement efforts also include optimization of increased processing capabilities. The Basic Development Program also provides analysis of software performance during flight and ground testing of Phased Adaptive Approach (PAA) Phases II and III to conduct Materiel Release Analysis for software delivery. The Materiel Release Closure Plan for the Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) ensures the Reliability, Availability, and Maintainability (RAM) Program promotes reliability growth in the suite of AN/TPY-2 radars via product improvements. Specific and/or unique accomplishments to each FY are as follows:				

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2016	FY 2017	FY 2018
<i>FY 2016 Accomplishments:</i> -Completed UEWR development for the reinforcement of the surveillance fence resulting in increased probability of target acquisition -Completed the scheduled transition of the Ground Based Radar Prototype (GBR-P) to the U.S. Army Space and Missile Defense Command (SMDC) -Completed urgent materiel release to field software to CENTCOM/EUCOM that is compatible with both the legacy superdome signal data processor and new X86 version <i>FY 2017 Plans:</i> -Initiate delivery of new software build for AN/TPY-2 that incorporates new development capabilities and repairs for identified software maintenance issues <i>FY 2018 Plans:</i> -Decrease reflects completion of new software build delivery for AN/TPY-2 that incorporates new development capabilities and repairs for identified software maintenance issues					
<i>Title:</i> BMDS Radars Modeling & Simulation (M&S) <div align="right"><i>Articles:</i></div> <i>Description:</i> BMDS Radars M&S efforts include enhanced sensor models, development and maintenance of Radio Frequency (RF) scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDS), M&S architecture, and Verification, Validation, and Accreditation of radar models. This effort includes support for technical and performance assessments, using Open Systems Architecture Sensor Models (OSM) and other models/tools and maintenance of digital and Hardware in the Loop (HWIL) representations of the tactical versions of AN/TPY-2, Sea Based X-Band Radar (SBX), Upgraded Early Warning Radar (UEWR), and COBRA DANE Upgrade (CDU). This project also supports wargames, Warfighter exercises and training, and execution of element-level ground test campaigns to anchor M&S. Specific and/or unique accomplishments to each FY are as follows: <i>FY 2016 Accomplishments:</i> -Completed updates to the Objective Simulation Framework (OSF)-E interfaces allowing for future events utilizing the OSF-E test architecture <i>FY 2017 Plans:</i> -Complete development of replacement RF scene generator for AN/TPY-2, Sea Based X-Band Radar (SBX), Upgraded Early Warning Radars (UEWR), and Cobra Dane <i>FY 2018 Plans:</i>			31.138 -	26.456 -	24.092 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2016	FY 2017	FY 2018
-Decrease reflects completion of maintenance and support to the AN/TPY-2 digital M&S representation				
Title: Capability Development Program Articles: Description: The Capability Development Program provides engineering support to enable compliance with BMD System Specification threat capabilities and to address advanced threats prevalent in 2016 and beyond. This task includes the redesign of select components to address obsolescence and to improve reliability of the system. This task initiates electronic protection and objective debris mitigation development efforts to reduce or eliminate the effect of corporate clutter and electronic attack on sensors. It initiates studies to assess Gallium Nitride (GaN) next generation Transmit/Receive module technology and transition the AN/TPY-2 production line from Gallium arsenide (GaAs) components to GaN components. It develops, designs and tests sensor Mid-Term discrimination improvements for X-Band radars, to include Sea-based X-band radar (SBX) threat discrimination improvements. It also performs object classification performance updates to UEWR radars. This effort funds participation in far-term discrimination improvement threat model specifications and develops discrimination and countermeasure mitigation capability development. Additional software development activities include support to THAAD Launch on Remote (LoR) capability and X86 performance optimization to enhance processing speed. Specific and/or unique accomplishments to each FY are as follows: FY 2016 Accomplishments: -Completed development and testing of the AN/TPY-2 redesigned Antenna Equipment Unit (AEU) T1 transformer -Completed capability fielding of Sea Based X-Band Radar and AN/TPY-2 Forward Based Near-term discrimination improvements -Initiated development of AN/TPY-2 common software that aligns US and FMS software configuration FY 2017 Plans: -Initiate system design reviews for AN/TPY-2 electronic protection and object debris mitigation improvements for Mid-Term discrimination -Initiate the concept development and analysis of new discrimination capabilities for a long range BMD sensor that address NORTHCOM and PACOM radar requirements for the defense of Hawaii. -Continue development of AN/TPY-2 common software that aligns US and FMS software configuration FY 2018 Plans: -Increase reflects initiation of contract through the United States Corps of Engineers to procure, install, and test an Integrated Electronic Security System (IESS) at AN/TPY-2 Forward Based Mode (FBM) Site K. Also includes additional development content associated with active sensor bias monitoring and reporting to support BMDS system track capability. -Complete development and testing of AN/TPY-2 common software that aligns US and FMS software configuration -Initiate systems engineering effort to develop draft element specifications for potential Atlantic Radar		62.705 -	70.527 -	96.919 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2016	FY 2017	FY 2018
-Initiate development of Post Intercept Assessment (PIA) capability for the Sea Based X-Band Radar (SBX) and Upgraded Early Warning Radars (UEWRs)				
<div>Title: Sensors Directorate Operations</div> <div>Articles:</div> <div>Description: Program Operations provides strategic planning, program integration, cost estimating, contracting, financial management, internal reviews and audits, earned-value management and program assessments for the program office.</div> <div>FY 2016 Accomplishments: see above</div> <div>FY 2017 Plans: see above</div> <div>FY 2018 Plans: see above</div>		69.525 -	71.983 -	65.483 -
<div>Title: Upgrade Clear Early Warning Radar</div> <div>Articles:</div> <div>Description: Upgrade of Clear Early Warning Radar and Cape Cod Early Warning Radar includes adaptation of hardware and software to UEWR infrastructure, support to BMDS communications and architecture work and installation and at site. This project also includes preparation and removal of legacy equipment at each UEWR site. Specific and/or unique accomplishments to each FY are as follows:</div> <div>FY 2016 Accomplishments: -Completed manufacturing of Upgraded Early Warning Radar (UEWR) Receiver/Exciter -Completed purchase of non-original manufacturer equipment -Completed upgrade of UEWR Huntsville System Test Lab with Clear and Cape Cod capability</div> <div>FY 2017 Plans: -SEE ABOVE</div> <div>FY 2018 Plans: -Decrease reflects completion of Clear and Cape Cod Early Warning Radar upgrades</div>		19.808 -	15.258 -	2.034 -
Accomplishments/Planned Programs Subtotals		221.705	219.503	213.532

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 0208866C: O&M	422.950	467.275	504.058	-	504.058	495.950	522.599	544.281	574.889	0	3,532.002
• 0208866C: <i>PROCUREMENT</i>	1,489.203	1,139.503	1,178.364	-	1,178.364	1,576.815	1,535.529	1,522.410	1,555.094	0	9,996.918
• 0603179C: <i>Advanced C4ISR</i>	9.661	3.626	0.000	-	0.000	0.000	0.000	0.000	0.000	0	13.287
• 0603890C: <i>BMD</i>	406.326	408.594	449.442	-	449.442	466.760	540.409	629.864	501.915	Continuing	Continuing
<i>Enabling Programs</i>											
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	425.996	456.267	430.115	-	430.115	461.275	501.956	496.411	514.139	Continuing	Continuing
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.566	47.776	48.954	-	48.954	49.524	52.628	53.573	54.636	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	46.191	54.750	53.265	-	53.265	54.505	57.588	58.574	59.738	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	81.265	93.287	130.695	-	130.695	114.545	126.250	97.666	97.659	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	290.267	293.441	305.791	-	305.791	295.042	351.626	336.137	334.678	Continuing	Continuing
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	132.278	173.162	357.659	-	357.659	135.187	52.218	50.843	119.803	Continuing	Continuing
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	83.597	83.250	84.239	-	84.239	65.886	76.218	68.231	56.579	Continuing	Continuing
• 13999903: <i>Planning and Design, Defense Wide</i>	0.000	8.233	8.397	-	8.397	8.525	8.822	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Radar Sustainment Contract (RSC) was awarded on 1 Nov 2011 to support the X-Band Family of Radars including the Army Navy/Transportable Radar Surveillance (AN/TPY-2); the Sea Based X-Band (SBX) Radar; and the Ground Based Radar Prototype (GBR-P). The scope of work covered by this acquisition is limited to that effort which Raytheon has previously performed as the X-band radar product developer. The maintenance and development effort includes the following :

1) Software - (a) maintenance of existing software developed to support the Family of X-Band Radars, and (b) development of hardware and software to meet enhanced capabilities and risk reduction measures ((i.e. PAA Phase 2 and 3 development efforts including debris mitigation; enhanced operational environments; and

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<p>launch on network track, etc.); 2) Models & Simulation - (a)development, maintenance, and verification of high fidelity models, (b) support for wargames and exercises, and (c) support for performance assessment events; 3) Engineering Services - engineering support for deployed radars to facilitate maintenance efforts which may include but are not limited to hardware obsolescence studies, hardware redesign, technology insertion, and refurbishment efforts. The contract is an Indefinite Delivery/ Indefinite Quantity (IDIQ) task order contract.</p> <p>The BMDS Communications System Complex-Transportable (BCSC-T) Program Plan addresses the design, development, acquisition, testing, integration, activation, and fielding of the BCSC-T. The overall executing agent is the Program Manager - Communications and Transmission Systems (PMDCATS). Lockheed Martin Mission Systems (C2BMC prime contractor) via an Other Transaction Agreement provides on-site support.</p> <p><u>E. Performance Metrics</u> N/A</p>		

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Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD11 / BMDS Radars					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Basic Development Program - Ground Based Radar Prototype (GBR-P) Caretaker	MIPR	SMDC : AL	5.839	2.939	Nov 2015	0.000		0.000		-		0.000	0	8.778	0
Basic Development Program - Information Assurance AN/TPY-2	SS/CPFF	Raytheon : MA	10.549	4.873	Nov 2015	4.708	Nov 2016	3.722	Nov 2017	-		3.722	Continuing	Continuing	Continuing
Basic Development Program - Information Assurance SBX	SS/CPFF	Raytheon : MA	0.441	0.211	Oct 2015	0.221	Oct 2016	0.223	Oct 2017	-		0.223	Continuing	Continuing	Continuing
Basic Development Program - Material Release Get Well Plan	SS/CPFF	Raytheon : MA	9.075	3.745	Dec 2015	4.796	Dec 2016	2.045	Dec 2017	-		2.045	Continuing	Continuing	Continuing
Basic Development Program - Sys Integration & Tech Assessments	SS/CPFF	Raytheon : MA/AL	12.313	4.907	Mar 2016	4.581	Mar 2017	3.273	Mar 2018	-		3.273	Continuing	Continuing	Continuing
Basic Development Program - X-Band Software Enhancements/ Development	SS/CPFF	Raytheon : AL	53.769	21.854	Jan 2016	20.973	Jan 2017	15.741	Jan 2018	-		15.741	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - M&S Development	SS/CPFF	Raytheon, Northrup Grumman : MA, CO	93.948	22.604	Dec 2015	19.525	Nov 2016	17.058	Nov 2017	-		17.058	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - VV&A of Models	MIPR	AMRDEC : AL	34.986	6.402	Dec 2015	4.971	Dec 2016	5.037	Dec 2017	-		5.037	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - Warfighter Exercises	SS/CPFF	Raytheon : MA	6.209	2.132	Feb 2016	1.960	Feb 2017	1.997	Feb 2018	-		1.997	Continuing	Continuing	Continuing
Capability Development Program - AN/TPY-2 GaN TTP	SS/CPAF	Raytheon : MA	0.000	4.878	Apr 2016	0.000		10.200	Jan 2018	-		10.200	Continuing	Continuing	Continuing

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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Capability Development Program - Advanced Technology Discrimination	SS/CPAF	Raytheon : MA	5.860	5.919	Dec 2015	16.475	Dec 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Atlantic Radar Study	MIPR	TBD : TBD	0.000	0.000		0.000		5.000	Dec 2017	-		5.000	Continuing	Continuing	Continuing
Capability Development Program - Electronic Protection	SS/CPAF	Raytheon, GTRI : MA, GA	0.000	4.625		12.889	Oct 2016	7.659	Oct 2017	-		7.659	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Defense of Hawaii Radar (EDHR) Studies and Analysis	MIPR	JHU/APL, NSWC, MDA : MD, AL, VA	0.000	0.000		3.000	Jan 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Discrimination	C/CPAF	USAF, Raytheon : Hanscom AFB MA	62.927	10.830	Jan 2016	6.203	Jan 2017	21.900	Nov 2017	-		21.900	Continuing	Continuing	Continuing
Capability Development Program - Integrated Electronic Security System (IESS) Site K	MIPR	US Corps of Engineers : Germany	0.000	0.000		0.000		6.820	Jan 2018	-		6.820	Continuing	Continuing	Continuing
Capability Development Program - Post Intercept Assessment (PIA)	C/TBD	TBD : TBD	0.000	0.000		0.000		10.400	Jan 2018	-		10.400	Continuing	Continuing	Continuing
Capability Development Program - Prior year Capability Development no longer funded in the FYDP	Various	Various : Various	10.974	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Program AN/TPY-2 Capability Development	SS/CPAF	Raytheon : MA	48.065	36.453	Oct 2015	31.960	Oct 2016	34.940	Oct 2017	-		34.940	Continuing	Continuing	Continuing

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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Sensors Directorate Operations - Army Hybrid Program Office	MIPR	SMDC : AL	3.048	1.670	Dec 2015	1.741	Dec 2016	1.865	Dec 2017	-		1.865	Continuing	Continuing	Continuing
Sensors Directorate Operations - Govt Salaries, Travel, Training (MDA Sensors)	Various	MDA : AL, VA, MA	110.721	22.107	Oct 2015	23.198	Oct 2016	22.026	Oct 2017	-		22.026	Continuing	Continuing	Continuing
Sensors Directorate Operations - MiDAESS, FFRDC/UARC	SS/CPAF	CSS, APL, LL, OGA : AL/MA/VA/MD	214.022	38.396	Jan 2016	38.884	Jan 2017	32.431	Nov 2017	-		32.431	Continuing	Continuing	Continuing
Sensors Directorate Operations - Network and Infrastructure Services	SS/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	25.368	5.531	Feb 2016	4.872	Feb 2017	6.205	Feb 2018	-		6.205	Continuing	Continuing	Continuing
Sensors Directorate Operations - Other Govt Agencies	MIPR	SMDC/AL, Hanscom AFB : MA	27.725	1.821	Feb 2016	3.288	Feb 2017	2.956	Feb 2018	-		2.956	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - BCN Upgrades	MIPR	MDA C2BMC / DISA : MA, AK	17.374	0.929	Jun 2016	0.330	Jun 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Facilities Site Activation/Admin Comms	MIPR	MDA C2BMC : MA, AK	3.947	2.305	Nov 2015	1.197	Nov 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - GMD Fire Control Integration	SS/CPAF	Boeing/AK/AL, Raytheon : MA	5.354	0.173	Dec 2015	0.383	Dec 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Prior year Upgrade Clear Early Warning Radar no longer funded in the FYDP	Various	Various : Various	3.603	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Radar	C/CPAF	Raytheon : MA	92.815	16.192	Jan 2016	13.348	Jan 2017	2.034	Jan 2018	-		2.034	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency													Date: May 2017		
Appropriation/Budget Activity 0400 / 4							R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MD11 / <i>BMDS Radars</i>				

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Upgrade -- Prime Contractor															
Upgrade Clear Early Warning Radar - UEWR System Test Lab Upgrades	SS/CPAF	Raytheon : MA/AL	5.406	0.209	Mar 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			864.338	221.705		219.503		213.532		-		213.532	-	-	-

Remarks Note: Clear Early Warning Upgrade Program includes upgrade of the Cape Cod EWR.															
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Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			-	-		-		-		-		-	-	-	-

Remarks Operations and sustainment of Upgraded Early Warning Radar (UEWR), COBRA DANE (CD), and Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) Radars Contract Logistics Support (CLS) are Operations and Maintenance (O&M) Defense-Wide appropriations and are described in the Missile Defense Agency (MDA) O-Documents.															
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			-	-		-		-		-		-	-	-	-

Remarks N/A															
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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency												Date: May 2017		
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MD11 / <i>BMDS Radars</i>				

Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			-	-		-		-		-		-	-	-	-

Remarks N/A															
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	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	864.338	221.705		219.503		213.532		-		213.532	-	-	-

Remarks N/A															
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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency										Date: May 2017									
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors					Project (Number/Name) MD11 / BMDS Radars									
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 2016		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		
(EX) Vigilant Shield/Global Thunder 16					▲														
SNG-C-H-1					◆														
(EX) Host Nation 16					◆	◆													
SNG-S-D-1					◆	◆	◆												
(EX) Steadfast Alliance 16						◆	◆												
SNG-A-H-1						◆	◆	◆	◆										
(WG) Demonstration, Table-top Exercises & Experiments 16							◆	◆	◆										
SNG-U-D-1								◆	◆	◆									
SNG-C-D-1								◆	◆	◆									
SNG C-H-2								◇	◇										
SNG-U-HL-2								◇	◇										
SNG-S-H-1								◇	◇	◇	◇								
SNG-S-D-2									◇	◇									
SNG-A-HL-1									◇	◇									
SNG-A-D-1									◇	◇	◇	◇							
SNG-U-H-1										◇	◇	◇	◇						
(WG) Nimble Titan Year 2 18											◇	◇	◇	◇					
(EX) Air and Missile Defense Exercise Series 18												△							
SNG-C-D-2												◇	◇						
(EX) Host Nation 18												◇	◇						
(EX) Global Lightning 18												◇	◇						
SND-A-H-2												◇	◇						
SNG-U-D-2												◇	◇						
SNG-S-H-2												◇	◇						

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency

Date: May 2017

Appropriation/Budget Activity

0400 / 4

R-1 Program Element (Number/Name)

PE 0603884C / Ballistic Missile Defense
Sensors

Project (Number/Name)

MD11 / BMDS Radars

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 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
(EX) European Air & Missile Defense Exercise Alliance 17									△																			
(EX) Key Resolve 18									△																			
(EX) European Test Bed 18									△																			
(EX) Global Response Exercise (GREx) 18									◇	◇																		
(EX) Steadfast Alliance 18									◇	◇																		
SNG-C-H-3									◇	◇	◇																	
SNG-S-D-3										◇	◇																	
(WG) Demonstration, Table-top Exercises & Experiments 18										◇	◇	◇																
(WG) BMDS Wargames 19										◇	◇	◇	◇	◇														
SNG-A-H-3													◇	◇														
(EX) Fleet Synthetic Training-Joint 19													△															
(EX) European Test Bed 19													△															
SNG-A-D-2													◇	◇														
(EX) Joint Project Optic Windwill 2019													◇	◇														
(EX) Steadfast Armour 19													◇	◇														
(EX) Austere Challenge 19													◇	◇	◇	◇	◇	◇										
(WG) Huntsville Wargames 19													△															
SNG-C-H-4													◇	◇														
(EX) KEEN Sword 19													◇	◇	◇													
(EX) KEEN Edge 20													◇	◇	◇	◇												
(EX) Vigilant Shield 20														◇	◇													
SNG-S-H-3														◇	◇													
(EX) Global Thunder 20														◇	◇													
(WG) Nimble Titan Year 2 20														◇	◇	◇	◇											

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency										Date: May 2017														
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors										Project (Number/Name) MD11 / BMDS Radars									
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 2016		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022							
(EX) Air and Missile Defense Exercise Series 20														△										
SNG-U-H-2														◇	◇									
(EX) Global Lightning 20														◇	◇									
SNG-U-D-3														◇	◇									
(EX) European Air & Missile Defense Exercise Alliance 19														△										
(EX) Fleet Synthetic Training-Joint 20														△										
(EX) Global Response Exercise (GREx) 19														△										
(EX) Key Resolve 20														△										
(EX) European Test Bed 20														△										
(EX) Steadfast Alliance 20														◇	◇									
(EX) Host Nation 20														△										
SNG-S-D-4														◇	◇									
(EX) KEEN Sword 21														◇	◇	◇	◇							
(EX) KEEN Sword 23														◇	◇	◇	◇							
(WG) BMDS Wargames 21														◇	◇	◇	◇	◇						
(EX) Global Lightning 21																◇	◇							
SNG-A-H-4																◇	◇							
(EX) Global Lightning 22																◇	◇							
(EX) European Air & Missile Defense Exercise Alliance 20																△								
(EX) Eagle Resolve 21																△								
(EX) Fleet Synthetic Training-Joint 21																△								
(EX) Key Resolve 21																△								
(EX) European Test Bed 21																△								
SNG-A-D-3																◇	◇							

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency										Date: May 2017														
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors										Project (Number/Name) MD11 / BMDS Radars									
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 2016		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022							
(EX) Joint Project Optic Windwill 2021																				◇	◇			
(EX) Steadfast Armour 21																				◇	◇			
(EX) Austere Challenge 21																				◇	◇	◇		
(WG) Huntsville Wargames 21																					△			
SNG-C-H-5																				◇	◇			
SNG-S-H-4																					◇	◇		
(EX) Global Thunder 22																					◇	◇		
(EX) Vigilant Shield 22																					◇	◇		
(EX) Air and Missile Defense Exercise Series 22																						△		
SNG-U-D-4																					◇	◇		
SNG-U-H-3																					◇	◇		
(EX) European Air & Missile Defense Exercise Alliance 21																						△		
(EX) European Test Bed 22																						△		
(EX) Fleet Synthetic Training-Joint 22																						△		
(EX) Steadfast Alliance 22																						◇		
(EX) Host Nation 22																						◇		
SNG-S-D-5																						◇		
(WG) BMDS Wargames 23																						◇		

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency			Date: May 2017
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
(EX) Vigilant Shield/Global Thunder 16	1	2016	1	2016
SNG-C-H-1	1	2016	1	2016
(EX) Host Nation 16	1	2016	2	2016
SNG-S-D-1	1	2016	3	2016
(EX) Steadfast Alliance 16	2	2016	3	2016
SNG-A-H-1	2	2016	1	2017
(WG) Demonstration, Table-top Exercises & Experiments 16	3	2016	1	2017
SNG-U-D-1	4	2016	2	2017
SNG-C-D-1	4	2016	2	2017
SNG C-H-2	1	2017	2	2017
SNG-U-HL-2	1	2017	2	2017
SNG-S-H-1	1	2017	4	2017
SNG-S-D-2	2	2017	3	2017
SNG-A-HL-1	2	2017	3	2017
SNG-A-D-1	2	2017	1	2018
SNG-U-H-1	3	2017	2	2018
(WG) Nimble Titan Year 2 18	4	2017	3	2018
(EX) Air and Missile Defense Exercise Series 18	1	2018	1	2018
SNG-C-D-2	1	2018	2	2018
(EX) Host Nation 18	1	2018	2	2018
(EX) Global Lightning 18	1	2018	2	2018
SND-A-H-2	1	2018	2	2018

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency				Date: May 2017	
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>		Project (Number/Name) MD11 / <i>BMDS Radars</i>	
		Start		End	
Events	Quarter	Year	Quarter	Year	
SNG-U-D-2	1	2018	2	2018	
SNG-S-H-2	1	2018	2	2018	
(EX) European Air & Missile Defense Exercise Alliance 17	2	2018	2	2018	
(EX) Key Resolve 18	2	2018	2	2018	
(EX) European Test Bed 18	2	2018	2	2018	
(EX) Global Response Exercise (GREx) 18	2	2018	3	2018	
(EX) Steadfast Alliance 18	2	2018	3	2018	
SNG-C-H-3	2	2018	4	2018	
SNG-S-D-3	3	2018	4	2018	
(WG) Demonstration, Table-top Exercises & Experiments 18	3	2018	1	2019	
(WG) BMDS Wargames 19	3	2018	3	2019	
SNG-A-H-3	1	2019	2	2019	
(EX) Fleet Synthetic Training-Joint 19	2	2019	2	2019	
(EX) European Test Bed 19	2	2019	2	2019	
SNG-A-D-2	2	2019	3	2019	
(EX) Joint Project Optic Windwill 2019	2	2019	3	2019	
(EX) Steadfast Armour 19	2	2019	3	2019	
(EX) Austere Challenge 19	2	2019	3	2020	
(WG) Huntsville Wargames 19	3	2019	3	2019	
SNG-C-H-4	3	2019	4	2019	
(EX) KEEN Sword 19	3	2019	1	2020	
(EX) KEEN Edge 20	3	2019	2	2020	
(EX) Vigilant Shield 20	4	2019	1	2020	
SNG-S-H-3	4	2019	1	2020	
(EX) Global Thunder 20	4	2019	1	2020	

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency				Date: May 2017	
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>		Project (Number/Name) MD11 / <i>BMDS Radars</i>	
		Start		End	
Events	Quarter	Year	Quarter	Year	
(WG) Nimble Titan Year 2 20	4	2019	3	2020	
(EX) Air and Missile Defense Exercise Series 20	1	2020	1	2020	
SNG-U-H-2	1	2020	2	2020	
(EX) Global Lightning 20	1	2020	2	2020	
SNG-U-D-3	1	2020	2	2020	
(EX) European Air & Missile Defense Exercise Alliance 19	2	2020	2	2020	
(EX) Fleet Synthetic Training-Joint 20	2	2020	2	2020	
(EX) Global Response Exercise (GREx) 19	2	2020	2	2020	
(EX) Key Resolve 20	2	2020	2	2020	
(EX) European Test Bed 20	2	2020	2	2020	
(EX) Steadfast Alliance 20	2	2020	3	2020	
(EX) Host Nation 20	3	2020	3	2020	
SNG-S-D-4	3	2020	4	2020	
(EX) KEEN Sword 21	3	2020	2	2021	
(EX) KEEN Sword 23	3	2020	2	2021	
(WG) BMDS Wargames 21	3	2020	3	2021	
(EX) Global Lightning 21	1	2021	2	2021	
SNG-A-H-4	1	2021	2	2021	
(EX) Global Lightning 22	1	2021	2	2021	
(EX) European Air & Missile Defense Exercise Alliance 20	2	2021	2	2021	
(EX) Eagle Resolve 21	2	2021	2	2021	
(EX) Fleet Synthetic Training-Joint 21	2	2021	2	2021	
(EX) Key Resolve 21	2	2021	2	2021	
(EX) European Test Bed 21	2	2021	2	2021	
SNG-A-D-3	2	2021	3	2021	

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency				Date: May 2017	
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>		Project (Number/Name) MD11 / <i>BMDS Radars</i>	
		Start		End	
Events	Quarter	Year	Quarter	Year	
(EX) Joint Project Optic Windwill 2021	2	2021	3	2021	
(EX) Steadfast Armour 21	2	2021	3	2021	
(EX) Austere Challenge 21	2	2021	3	2022	
(WG) Huntsville Wargames 21	3	2021	3	2021	
SNG-C-H-5	3	2021	4	2021	
SNG-S-H-4	4	2021	1	2022	
(EX) Global Thunder 22	4	2021	1	2022	
(EX) Vigilant Shield 22	4	2021	1	2022	
(EX) Air and Missile Defense Exercise Series 22	1	2022	1	2022	
SNG-U-D-4	1	2022	2	2022	
SNG-U-H-3	1	2022	2	2022	
(EX) European Air & Missile Defense Exercise Alliance 21	2	2022	2	2022	
(EX) European Test Bed 22	2	2022	2	2022	
(EX) Fleet Synthetic Training-Joint 22	2	2022	2	2022	
(EX) Steadfast Alliance 22	2	2022	3	2022	
(EX) Host Nation 22	3	2022	3	2022	
SNG-S-D-5	3	2022	4	2022	
(WG) BMDS Wargames 23	3	2022	3	2023	

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency										Date: May 2017		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD41 / Pacific Radar			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
MD41: Pacific Radar	-	0.000	0.000	21.000	-	21.000	25.800	99.000	83.300	216.060	0	445.160
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2018 funding is requested to establish the Pacific Radar Program Element (MD41).

A. Mission Description and Budget Item Justification

The Pacific Radar program includes systems engineering and requirements development, software development, design reviews, testing, and Models and Simulation (M&S) efforts for radar development. This program prepares site infrastructure for construction activities and, when complete, executes site activation. Pacific Radar functionality includes integration with C2BMC systems support. Activities also include development and delivery of the initial radar software release and the establishment of the independent verification and validation (IV&V) lab to test the operational software. The Pacific Radar program includes purchasing, manufacturing, and testing long lead radar components.

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

	FY 2016	FY 2017	FY 2018
Title: Pacific Radar	0.000	0.000	21.000
Articles:	-	-	-
Description: This effort funds the initial planning, design and development of the Pacific Radar. Specific and/or unique accomplishments to each FY are as follows:			
FY 2016 Accomplishments: N/A			
FY 2017 Plans: N/A			
FY 2018 Plans: -Complete environmental, geotechnical, and other studies for environmental compliance and inform military construction (MILCON) design efforts -Initiate prime contract award and developmental engineering for radar hardware, software and equipment shelter -Initiate preparation for the Pacific Radar System Requirements Review (SRR) -Initiate preparation of the Pacific Radar Integrated Baseline Review (IBR)			
Accomplishments/Planned Programs Subtotals	0.000	0.000	21.000

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency										Date: May 2017	
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD41 / Pacific Radar			
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 0603882C: Ballistic Missile Defense Midcourse Defense Segment	1,260.480	862.080	828.097	-	828.097	630.842	651.047	567.451	551.701	Continuing	Continuing
• 0603884C: SENSORS MILCON	0.000	166.670	0.000	-	0.000	150.000	0.000	212.000	0.000	0	528.670
• 0603896C: Ballistic Missile Defense Command and Control, Battle Management & Communication	425.996	456.267	430.115	-	430.115	461.275	501.956	496.411	514.139	Continuing	Continuing
• 31299903: MILCON PLANNING and DESIGN	15.000	0.000	0.000	-	0.000	15.184	36.140	16.248	8.009	0	90.581
Remarks											
D. Acquisition Strategy											
The Pacific Radar acquisition strategy is in development by the Missile Defense Agency (MDA).											
E. Performance Metrics											
N/A											

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency												Date: May 2017		
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MD41 / <i>Pacific Radar</i>				

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Pacific Radar - Prime Contractor	TBD	TBD : TBD	0.000	0.000		0.000		18.000	Jun 2018	-		18.000	Continuing	Continuing	Continuing
Pacific Radar - Program Office	Various	TBD : TBD	0.000	0.000		0.000		3.000	Jun 2018	-		3.000	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		21.000		-		21.000	-	-	-

Remarks N/A															
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	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		21.000		-		21.000	-	-	-

Remarks N/A															
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PE 0603884C: *Ballistic Missile Defense Sensors*
Missile Defense Agency

R-1 Line #77

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency			Date: May 2017
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD41 / <i>Pacific Radar</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Pacific Radar Development	3	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency										Date: May 2017		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MC11 / Cyber Operations			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
MC11: Cyber Operations	2.675	1.196	1.045	3.636	-	3.636	1.089	8.950	4.410	1.156	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note N/A												
A. Mission Description and Budget Item Justification												
The funds in this project will be utilized to complete transitioning to and the sustainment of the new DoDI 8510.01 Risk Management Framework (RMF) for DoD Information Technology (IT) requirement for the MDA Sensors Directorate and conduct Security Control Assessments (SCA) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones for MDA Sensors mission systems. It also includes support for external cybersecurity assessments and penetration testing of the Sensors mission systems, both in laboratory-based Enterprise Cyber Range Experiments and in ground test activities, in accordance with the Director, Operational Test and Evaluation (DOT&E) directive. It maintains the Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, Cybersecurity Risk Assessment results, cybersecurity scorecard, and Authorizing Official (AO) authorization decisions) and POA&Ms for all MDA information systems.												
This project supports the monitoring, prioritization, and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/Security Control Assessor (SCA) and Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									FY 2016	FY 2017	FY 2018	
Title: Network / System Certification and Accreditation (C&A) Articles:									1.196	1.045	3.636	
									-	-	-	
Description: Cyber Operations funds Sensors Directorate Information System Security Manager (ISSM) civilian salaries and cybersecurity engineering and architecture planning for program information technology systems. This project plans and tests the cybersecurity controls for the BMDS and maintains Sensors DoD Information Assurance Certification and Accreditation Process (DIACAP) certification and accreditation packages. Effort also funds transitioning to the new Risk Management Framework (RMF) accreditation paradigm for Sensors-managed information systems, conducts Controls Validation Testing (CVT) / Security Controls Assessment (SCA) of Sensors mission and support systems and provides and maintains Plans of Action and Milestones to mitigate cybersecurity deficiencies. Cyber Operations conducts annual cybersecurity program reviews on the Sensors enclaves to assess compliance in implementing and maintaining controls. Specific and/or unique accomplishments to each FY are as follows:												
FY 2016 Accomplishments:												

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency										Date: May 2017		
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MC11 / <i>Cyber Operations</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2016	FY 2017	FY 2018
SEE ABOVE												
FY 2017 Plans: SEE ABOVE												
FY 2018 Plans: -In addition to above, initiate of cybersecurity supply chain compliance												
Accomplishments/Planned Programs Subtotals										1.196	1.045	3.636
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
• 0603179C: <i>Advanced C4ISR</i>	9.661	3.626	0.000	-	0.000	0.000	0.000	0.000	0.000	0	13.287	
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	425.996	456.267	430.115	-	430.115	461.275	501.956	496.411	514.139	Continuing	Continuing	
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.566	47.776	48.954	-	48.954	49.524	52.628	53.573	54.636	Continuing	Continuing	
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	46.191	54.750	53.265	-	53.265	54.505	57.588	58.574	59.738	Continuing	Continuing	
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	81.265	93.287	130.695	-	130.695	114.545	126.250	97.666	97.659	Continuing	Continuing	
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	132.278	173.162	357.659	-	357.659	135.187	52.218	50.843	119.803	Continuing	Continuing	
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	83.597	83.250	84.239	-	84.239	65.886	76.218	68.231	56.579	Continuing	Continuing	
• 0901598C: <i>Management HQ - MDA</i>	35.871	31.160	29.947	-	29.947	28.024	27.269	27.878	28.450	Continuing	Continuing	
• 13999903: <i>Planning and Design, Defense Wide</i>	0.000	8.233	8.397	-	8.397	8.525	8.822	0.000	0.000	Continuing	Continuing	
Remarks												

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency		Date: May 2017
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MC11 / <i>Cyber Operations</i>
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency												Date: May 2017			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>						Project (Number/Name) MC11 / <i>Cyber Operations</i>			
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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) - CND/IA Advisory and Assistance Services (Booz Allen)	C/CPFF	Booz Allen Hamilton : AL, CO, VA	1.297	0.721	Nov 2015	0.492	Nov 2016	0.538	Nov 2017	-		0.538	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services (Torch Technologies)	C/CPFF	Torch Technologies : AL, CO, VA	1.020	0.280	Jan 2016	0.388	Jan 2017	0.353	Jan 2018	-		0.353	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Civilian Salaries	Various	MDA : AL, CO, VA	0.358	0.195	Oct 2015	0.165	Oct 2016	0.176	Oct 2017	-		0.176	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Cybersecurity Supply Chain Compliance	SS/CPAF	Raytheon : MA	0.000	0.000		0.000		2.569	Mar 2018	-		2.569	Continuing	Continuing	Continuing
Subtotal			2.675	1.196		1.045		3.636		-		3.636	-	-	-
Remarks N/A															
			Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			2.675	1.196		1.045		3.636		-		3.636	-	-	-
Remarks N/A															

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency			Date: May 2017
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MC11 / <i>Cyber Operations</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Transition to Cyber Security Risk Management Framework (CRMF)	1	2016	4	2022
Information Assurance Certification and Accreditation (C&A) Package Preparation / Submission	1	2016	4	2022
Cyber Security Program Policy / Risk Management	1	2016	4	2022
Cyber Security Mitigation Monitoring and Tracking	1	2016	4	2022
BMDS Cyber Security Policy Development	1	2016	4	2022

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency										Date: May 2017		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors				Project (Number/Name) MD40 / Program-Wide Support			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
MD40: Program-Wide Support	65.873	10.119	9.529	9.177	-	9.177	9.397	13.639	13.705	19.867	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016 and FY 2017, Program Wide Support reflects proportional changes as a result of decreases to the Ballistic Missile Defense Sensors program element. FY 2018 reflects proportional changes as a result of increases to the Ballistic Missile Defense Sensors.
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts and Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

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

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2016	FY 2017	FY 2018
Title: Program Wide Support Description: N/A FY 2016 Accomplishments: N/A FY 2017 Plans: N/A FY 2018 Plans: N/A		10.119	9.529	9.177
	Articles:	-	-	-
	Accomplishments/Planned Programs Subtotals	10.119	9.529	9.177

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency		Date: May 2017
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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: FY 2018 Missile Defense Agency												Date: May 2017			
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>						Project (Number/Name) MD40 / <i>Program-Wide Support</i>			
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	C/CPAF	Various : Multi: AL, CA, CO, VA	5.985	2.037		0.192	Jul 2017	0.184	Jul 2018	-		0.184	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	MIPR	Various : Multi: AL, CO, NM, VA, Various	8.251	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi:AL,VA	11.077	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (Reqn)	Reqn	Department of Labor : Washington, DC	0.063	0.107		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, CA, VA	34.792	7.425	Jan 2016	9.086	Aug 2017	8.641	Aug 2018	-		8.641	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support civilian Salaries, Travel, Training	Allot	MDA : Multi:AK, AL,CA, CO, VA	3.388	0.550	Nov 2015	0.251	Nov 2016	0.352	Nov 2017	-		0.352	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	C/CPAF	JRDC : JRDC	0.587	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, CA, VA	1.730	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			65.873	10.119		9.529		9.177		-		9.177	-	-	-
Remarks N/A															

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency										Date: May 2017			
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>					Project (Number/Name) MD40 / <i>Program-Wide Support</i>			
	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	65.873	10.119		9.529		9.177		-		9.177	-	-	-
Remarks N/A													

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency														Date: May 2017									
Appropriation/Budget Activity 0400 / 4								R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>								Project (Number/Name) MD40 / <i>Program-Wide Support</i>							
Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆							
Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇							
								FY 2016		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022			
MD40 Program-Wide Support								◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇		

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency			Date: May 2017
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2016	4	2022