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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 I BA 3: Advanced Technology Development (ATD)					PE 0603176C I Advanced Concepts and Performance Assessment							
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	16.918	11.853	17.880	12.996	-	12.996	13.741	15.048	15.319	16.361	Continuing	Continuing
MD71: Advanced Concepts and Performance Assessments	16.458	11.283	17.298	11.612	-	11.612	11.765	11.924	12.096	12.368	Continuing	Continuing
MD40: Program-Wide Support	0.460	0.570	0.582	0.829	-	0.829	0.676	0.720	0.762	0.805	Continuing	Continuing
MC71: Cyber Operations	-	0.000	0.000	0.555	-	0.555	1.300	2.404	2.461	3.188	0	9.908
Program MDAP/MAIS Code: 362												
Note N/A												
A. Mission Description and Budget Item Justification												
The Advanced Concepts & Performance Assessments PE delivers an integrated government concept definition, simulation, and analysis capability and centralizes assessment of advanced ballistic missile defense technology. Delivering insight into the performance of proposed concepts extends MDA's ability to address evolving threats for the warfighter.												
Subject matter experts provide independent assessments of government, university, and industry technology concepts, used in concert with systems engineering requirements to support acquisition strategy decisions and define technology focus areas. The innovative structured concept definition and assessment methodology enables the MDA to quickly validate focus areas, verify contractor technology solutions, and evaluate promising concepts in future Ballistic Missile Defense System (BMDS) architectures. This methodology significantly enhances MDA's ability to assess technology concepts while decreasing the cost of development through: - Independent model-based simulations of industry technology concepts to inform the systems engineering process - Digital simulation and hardware-in-the-loop performance assessments of algorithms and hardware concepts prior to expensive live fire test events - End-to-end testing of technology concepts integrated with weapon systems and Command, Control, Battle Management and Communications												
Performance assessment of advanced concepts incorporates Better Buying Power philosophy in the earliest stages of technology development to maximize technology investments with minimal investment. Performance assessment supports evaluation and analysis of capabilities for both right and left of launch.												

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0400: Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)		PE 0603176C / Advanced Concepts and Performance Assessment			
B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	12.139	17.880	12.599	-	12.599
Current President's Budget	11.853	17.880	12.996	-	12.996
Total Adjustments	-0.286	0.000	0.397	-	0.397
• 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	-0.022	0.000			
• SBIR/STTR Transfer	-0.264	0.000			
• Other Adjustment	0.000	0.000	0.397	-	0.397
Change Summary Explanation					
N/A					

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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603176C / Advanced Concepts and Performance Assessment				Project (Number/Name) MD71 / Advanced Concepts and Performance Assessments			
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
MD71: Advanced Concepts and Performance Assessments	16.458	11.283	17.298	11.612	-	11.612	11.765	11.924	12.096	12.368	Continuing	Continuing
Note N/A												
A. Mission Description and Budget Item Justification Advanced Concepts & Performance Assessment centralizes advanced technology concept modeling, simulation, software, and analysis. Integrating models of promising technical solutions into BMDS system-level simulations enables leadership to make data driven acquisition and technology investment decisions. This funding capitalizes on the innovation of small business, universities, Federally Funded Research and Development Centers, and University Affiliated Research Centers to pursue a broad range of hardware, software, models, algorithms, trade studies and analysis. These innovations bring together government developed models representing existing and future ballistic missile defense architectures, technology concepts, and advanced algorithms to provide detailed assessments of concept performance and inform investment decisions. These innovations, combined with a robust high performance computing infrastructure, provide a unique in-house government capability to demonstrate and assess technology concepts.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2016	FY 2017	FY 2018	
Title: Advanced Concepts and Performance Assessment									11.283	17.298	11.612	
Description: Advanced Concepts and Performance Assessment's diverse staff of subject matter experts developed advanced concepts across the broad spectrum of ballistic missile defense technology initiatives. Recurring Accomplishments: -Prioritize technology investments and inform requirements -Work with the BMDS Architect and MDA Systems Engineer to design concepts, build models and assess technology concepts for the future BMDS -Analyze and evaluate industry sensor and kill vehicle concepts -Develop and extend modeling techniques -Demonstrate concept performance against evolving threats -Focus research and engineering activities from university and small business partners to identify suitable technology and concepts that improve BMDS performance through a rapid innovation model based on engineering test bed FY 2016 Accomplishments: -Funded upgrades to the digital simulation and hardware-in-the-loop infrastructure required to move from Multi-Spectral Targeting System (MTS)-B to MTS-C hardware and airborne processor software prior to the Controlled Test Vehicle flight test and the												

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017
<p>Pacific Dragon flight test. Efforts lead up to the currently planned Aegis Launch-on-Remote tracking exercise and live fire test missions in FY 2017 and FY 2018</p> <ul style="list-style-type: none"> -Analyzed discrimination sensor flight tests -Conducted HWIL tests -Developed modular open kill vehicle architecture testbed -Matured tracking, discrimination, and sensor fusion algorithms -Demonstrated precision track through digital and HWIL simulation exercises -Reduced time to translate innovative technology into BMDS capability by providing integrated models of emerging concepts that characterize key parameters and expected performance <p>FY 2017 Plans:</p> <p>Increase from FY 2016 to FY 2017 funds post-test and planned data replay simulation events, hardware in the loop infrastructure, high performance computing infrastructure upgrade, as well as test costs required for performance assessments for Aegis Launch-on-Remote live fire test and advanced sensor demonstration.</p> <ul style="list-style-type: none"> -Define and analyze sensor discrimination capability using flight test data -Mature tracking, discrimination, and sensor fusion algorithms for multi-phenomenology sensor platform -Demonstrate end-to-end correlation of sensor track and discrimination data through digital and hardware-in-the-loop simulation exercises -Conduct performance analysis of government and industry Multi-Object Kill Vehicle and low-power and multi-kilowatt directed energy concepts -Incrementally demonstrate contribution to BMD for launch-on-remote, engage-on-remote, discrimination, and handover improvements for next-generation sensors and kill vehicle concepts -Demonstrate ruggedized deployable virtual testbed to provide onsite assessment of flight test data in near real-time -Implement modular open kill vehicle architecture testbed to verify industry concepts -Accelerate development of hardware in the loop infrastructure required for assessment and testing of advanced sensor and directed energy concepts in preparation for concept demonstrations -Update High Performance Computing infrastructure to improve security and performance of concept assessment models and simulations <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> -Conduct performance analysis of government and industry concepts for multi object kill vehicle and directed energy to: -Assess the reduction of the number of interceptors required to destroy each credible, lethal object in the raid -Evaluate sensor concepts' ability to reduce the number of credible objects assessment of directed energy concepts and identification of promising discrimination techniques 			

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B. Accomplishments/Planned Programs (\$ in Millions)										FY 2016	FY 2017	FY 2018
-Incrementally demonstrate contribution to BMD for launch-on-remote, engage-on-remote, discrimination, and handover improvements for next-generation sensors and kill vehicle concepts -Execute realistic test scenarios to complete performance evaluations quantifying emerging sensor capability -Incorporate real-time sensor processing in hardware-in-the-loop events to serve as the proving ground for mission architecture -Combine actual flight test data with simulated data to mature tracking, discrimination, and sensor fusion algorithms for multi-phenomenology sensor platform -Expand the modular open kill vehicle architecture testbed to verify industry concepts -Update high performance computing infrastructure to improve cybersecurity posture and performance of concept assessment models and simulations -Assess technology and concepts to predict performance against advanced threats												
Accomplishments/Planned Programs Subtotals										11.283	17.298	11.612
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	
• 0603177C: <i>Discrimination Sensor Technology</i>	27.981	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing	
• 0603178C: <i>Weapons Technology</i>	50.263	71.843	5.495	-	5.495	0.000	0.000	0.000	0.000	Continuing	Continuing	
• 0603180C: <i>Advanced Research</i>	16.987	27.733	20.184	-	20.184	20.695	21.555	21.936	22.361	Continuing	Continuing	
• 0603294C: <i>Common Kill Vehicle Technology</i>	60.851	0.000	252.879	-	252.879	321.175	110.934	0.000	0.000	Continuing	Continuing	
Remarks												
D. Acquisition Strategy												
Continues a successful partnership with small business, the Aviation & Missile Research Development & Engineering Center, Federally Funded Research and Development Centers, and University Affiliated Research Centers to provide concept modeling and assessment capability. This innovative strategy leverages agency and partner subject matter experts and government model-based assessments to inform Better Buying Power acquisition decisions.												
E. Performance Metrics												
N/A												

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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603176C / Advanced Concepts and Performance Assessment				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	0.460	0.570	0.582	0.829	-	0.829	0.676	0.720	0.762	0.805	Continuing	Continuing

A. Mission Description and Budget Item Justification

Program Wide Support (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).

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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
MC71: <i>Cyber Operations</i>	-	0.000	0.000	0.555	-	0.555	1.300	2.404	2.461	3.188	0	9.908

Note

N/A

A. Mission Description and Budget Item Justification

This project supports the monitoring and tracking of Cybersecurity mitigations as required in the Department of Defense Instruction Number 8510.01 which establishes risk Management Framework (RMF) requirements for DoD Information Technology (IT). Funds in this project implement and sustain DoD-required RMF and associated Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance System Security Manager (PM/ISSAM) Plans of Action and Milestones (POAMs) for enabling M&S mission systems. This project captures the RMF documentation (artifacts, validation results, Information Assurance Risk Assessment results, and MDA Authorizing Official (AO) and Chief Information Officer (CIO) accreditation decisions) into the Defense Information Systems Agency's (DISA) Enterprise Mission Assurance Support Service (eMASS) system. Hardware and software upgrades required to meet DoD standards are supported by funding in this project. Independent Verification and Validation 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.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2016	FY 2017	FY 2018
<i>Title:</i> Information Assurance / Cyber Network Defense	0.000	0.000	0.555
<i>Description:</i> Funds network defense and Information System Security Manager (ISSM) activities including: -Conduct Cybersecurity/information assurance engineering and architecture planning. -Plan and test information assurance controls. -Develop DoD Risk Management Framework (RMF) certification and accreditation packages. -Conduct Controls Validation Testing of systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies. -Conduct annual information assurance reviews to assess compliance in implementing and maintaining information assurance controls.			
<i>FY 2016 Accomplishments:</i> N/A			
<i>FY 2017 Plans:</i> N/A			
<i>FY 2018 Plans:</i>			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017
N/A			
Accomplishments/Planned Programs Subtotals		0.000	0.000
			0.555
C. Other Program Funding Summary (\$ in Millions)			
N/A			
Remarks			
D. Acquisition Strategy			
N/A			
E. Performance Metrics			
N/A			