Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Missile Defense Agency											Date: February 2015	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603176C / *Advanced Concepts and Performance Assessment*							
COST ($ in Millions)	**Prior Years**	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
Total Program Element	-	6.919	8.470	12.139	-	12.139	13.227	12.932	13.249	13.219	Continuing	Continuing
MD71: *Advanced Concepts and Performance Assessments*	-	6.919	7.986	11.569	-	11.569	12.568	12.244	12.515	12.467	Continuing	Continuing
MD40: *Program-Wide Support*	-	-	0.484	0.570	-	0.570	0.659	0.688	0.734	0.752	Continuing	Continuing
Program MDAP/MAIS Code: 362												

Note

The FY 2016 increase funds the digital simulation and hardware in the loop infrastructure required for testing of the Multi-Spectral Targeting System (MTS-C) and Airborne Processor software prior to Standard Missile -3 Flight Test Standard Missile-01 (SFTM-01), Controlled Test Vehicle (CTV)-02 flight test, and Aegis Launch-on-Remote live fire (FTM DST-1) test missions in FY 2016 and 1Q FY 2017.

A. Mission Description and Budget Item Justification

The Advanced Concepts & Performance Assessments (ACPA) program delivers an integrated government concept definition, simulation, and analysis capability and centralizes assessment of advanced Ballistic Missile Defense (BMD) technology. Delivering insight into the performance of proposed concepts extends Missile Defense Agency's (MDA) ability to address evolving threats for the warfighter.

Independent assessments of government, university, and industry technology concepts, which are used in concert with systems engineering requirements to support acquisition strategy decisions and define technology focus areas. Innovative structured concept definition and assessment methodology enables analysts to quickly validate focus areas, verify contractor technology solutions, and evaluate promising concepts in future Ballistic Missile Defense System (BMDS) architectures.

This innovation significantly enhances our ability to assess technology concepts while decreasing the cost of the BMDS:

- Independent model based simulations of industry technology concepts to inform 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 (C2BMC)

Better Buying Power philosophy has been incorporated and applied to the earliest stages of technology development to maximize technology investments in a limited budget environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Missile Defense Agency	Date: February 2015
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603176C *I Advanced Concepts and Performance Assessment*

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

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	6.919	8.470	10.683	-	10.683
Current President's Budget	6.919	8.470	12.139	-	12.139
Total Adjustments	-	-	1.456	-	1.456
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustment	-	-	1.456	-	1.456

Change Summary Explanation

The FY 2016 increase funds the digital simulation and hardware in the loop infrastructure required for testing of the Multi-Spectral Targeting System (MTS-C) and Airborne Processor software prior to Standard Missile -3 Flight Test Standard Missile-01 (SFTM-01), Controlled Test Vehicle (CTV)-02 flight test, and Aegis Launch-on-Remote live fire (FTM DST-1) test missions in FY 2016 and 1Q FY 2017.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency			Date: February 2015
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
MD71: *Advanced Concepts and Performance Assessments*	-	6.919	7.986	11.569	-	11.569	12.568	12.244	12.515	12.467	Continuing	Continuing

Note

The FY 2016 increase funds the digital simulation and hardware in the loop infrastructure required for testing of the Multi-Spectral Targeting System (MTS-C) and Airborne Processor software prior to Standard Missile -3 Flight Test Standard Missile-01 (SFTM-01), Controlled Test Vehicle (CTV)-02 flight test, and Aegis Launch-on-Remote live fire (FTM DST-1) test missions in FY 2016 and 1Q FY 2017. The FY 2016 increase reflects a realignment of Department of Defense priorities.

A. Mission Description and Budget Item Justification

Advanced Concepts & Performance Assessment (ACPA) centralizes all Advanced Technology concept modeling, simulation, software, and analysis. Combining models of promising technical solutions into Ballistic Missile Defense System (BMDS) system-level simulations, ACPA enables leadership to make data driven acquisition and technology investment decisions.

ACPA capitalizes on the innovation of small business, universities, Federally Funded Research and Development Centers (FFRDC), University Affiliated Research Centers (UARC) 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 support 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 2014	FY 2015	FY 2016
Title: Advanced Concepts and Performance Assessment	6.919	7.986	11.569
Description: Advanced Concepts and Performance Assessment's diverse staff of subject matter experts develops advanced concepts across the broad spectrum of Ballistic Missile Defense (BMD) Technology initiatives. - Prioritize technology investments and inform requirements - Develop and extend modeling techniques - Demonstrate concept performance against evolving threats			
FY 2014 Accomplishments: - Integrated Discriminating Sensor Technology prototypes with Command, Control, Battle Management, and Communications (C2BMC) and weapon systems for end-to-end capability demonstrations. Demonstrated readiness for FTX-20 and FTM-25			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency		Date: February 2015
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
- Independently assessed industry concepts for the Common Kill Vehicle and Re-designed Exo-atmospheric Kill Vehicle (RKV) acquisition strategy. Developed Top Level Requirements (TLR) for RKV - Defined discriminating sensor component technology performance goals to meet Ballistic Missile Defense System (BMDS) mission needs - Delivered technology performance parameters for key MDA studies: the Homeland Defense Analysis of Alternatives and the BMDS Sensor Evaluation of Opportunities - Demonstrated test as you fly open architecture hardware/software-in-the-loop testbed to verify kill vehicle and sensor performance for FTX-20 and FTM-25 - Verified MQ-9 Airborne Processor (ABP) flight code used in FTX-20 and FTM-25 - Advanced sensor algorithm development and distributed C2BMC hardware-in-the-loop testing - Led a team of university, international, and small business partners in developing a framework for integrating and testing kill vehicle and sensor technologies from multiple suppliers			
FY 2015 Plans: - Work with the Ballistic Missile Defense System (BMDS) Architect and Systems Engineer to provide realistic assumptions, design concepts, models and assessments for technology items included within the future BMDS, elements, and component concepts - Provide technology concepts, models and assessments for kill vehicles, discrimination sensors, space alternatives and directed energy systems - Mature tracking, discrimination, and sensor fusion algorithms - Demonstrate precision track through simulation exercises - Accelerate assessment of hardware and algorithms for space alternative sensors - 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 engineering test bed - Reduce time to translate innovative technology into Ballistic Missile Defense System BMDS capability by providing integrated models of emerging concepts that characterize key parameters and expected performance			
FY 2016 Plans: - Increase from FY 2015 to FY 2016, funds upgrades to the digital simulation and hardware in the loop infrastructure required to move from Multi-Spectral Targeting System B (MTS-B) to MTS-C hardware and Airborne Processor software prior to Standard Missile -3 Flight Test Standard Missile-01 (SFTM-01), Controlled Test Vehicle (CTV)-02 flight test, and Aegis Launch-on-Remote live fire test (FTM DST-1) test missions in FY 2016 and 1Q FY 2017 - Build the digital simulation and hardware in the loop infrastructure required for testing of the Multi-Spectral Targeting System (MTS-C) and Airborne Processor software prior to Standard Missile -3 Flight Test Standard Missile-01 (SFTM-01), Controlled Test Vehicle (CTV)-02 flight test, and Aegis Launch-on-Remote live fire test (FTM DST-1) test missions in FY 2016 and 1Q FY 2017			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016
- Work with the Ballistic Missile Defense System (BMDS) Architect and Systems Engineer to design concepts, build models and assess technology concepts for the future BMDS - Analyze discrimination sensor flight tests - Conduct hardware-in-the-loop (HWIL) tests - Develop modular open kill vehicle architecture testbed - Mature tracking, discrimination, and sensor fusion algorithms - Demonstrate precision track through digital and HWIL simulation exercises - 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 engineering test bed - Reduce time to translate innovative technology into BMDS capability by providing integrated models of emerging concepts that characterize key parameters and expected performance			
Accomplishments/Planned Programs Subtotals	6.919	7.986	11.569

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0603175C: *Ballistic Missile Defense Technology*	10.372	-	-	-	-	-	-	-	-	-	10.372
• 0603177C: *Discrimination Sensor Technology*	29.642	36.610	28.200	-	28.200	-	-	-	-	Continuing	Continuing
• 0603178C: *Weapons Technology*	45.268	54.068	45.389	-	45.389	48.912	70.115	54.595	66.797	Continuing	Continuing
• 0603180C: *Advanced Research*	23.025	16.584	17.364	-	17.364	18.919	20.380	21.069	21.457	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	67.796	25.639	46.753	-	46.753	75.262	71.476	86.814	99.701	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	50.271	58.503	49.211	-	49.211	58.074	53.655	55.194	57.162	Continuing	Continuing

Remarks

D. Acquisition Strategy

Advanced Concepts and Performance Assessment utilizes an acquisition strategy that continues its successful partnerships with Small Business, the Aviation & Missile Research Development & Engineering Center (AMRDEC), Federally Funded Research and Development Centers (FFRDCs) and University Affiliated Research Centers

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(UARCs) 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

Exhibit R-2A, RDT&E Project Justification: PB 2016 Missile Defense Agency			Date: February 2015
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	-	0.484	0.570	-	0.570	0.659	0.688	0.734	0.752	Continuing	Continuing

A. Mission Description and Budget Item Justification

Program-Wide Support (PWS) contains non-headquarters management costs in support of Missile Defense Agency (MDA) functions and activities across the entire Ballistic Missile Defense System (BMDS). It Includes Government Civilians, Contract Support Services, and Federally Funded Research and Development Center (FFRDC) support. 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 and equipment leases; utilities; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. Program Wide Support is allocated on a pro-rata basis and therefore, fluctuates by year based on the total adjusted RDT&E profile (which excludes:0305103C Cyber Security Initiative, 0603274C Special Program, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).