Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Missile Defense Agency											Date: March 2014	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603180C / *Advanced Research*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	-	19.188	16.584	-	16.584	16.715	16.924	18.336	18.723	Continuing	Continuing
MD25: *Advanced Technology Development*	-	-	19.188	15.787	-	15.787	15.791	15.886	17.098	17.386	Continuing	Continuing
MD40: *Program-Wide Support*	-	-	-	0.797	-	0.797	0.924	1.038	1.238	1.337	Continuing	Continuing
MDAP/MAIS Code: 362												

The FY 2015 OCO Request will be submitted at a later date.

Note

Beginning in FY 2014, the Advanced Research effort transferred from the Ballistic Missile Defense Technology Program Element 0603175C to the Advanced Research Program Element, per the FY 2014 Consolidated Appropriations Act (P.L. 113-76).

A. Mission Description and Budget Item Justification

Advanced Research conducts leading edge research and development to create and enable future missile defense capability. The Missile Defense Agency (MDA) executes this mission by capitalizing on the creativity and innovation of the brightest minds in our Nation's universities and small businesses, collaborative research partnerships between allied country academic institutions, innovative ideas from industry, and facilitates technology transition to the Ballistic Missile Defense System through a Commercialization and Transition Office. Advanced Research identifies priorities and balances the research portfolio in collaboration with the Agency's Chief Architect, Chief Engineer, and an Agency-wide executive level Research Council.

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	-	-	-	-	-
Current President's Budget	-	19.188	16.584	-	16.584
Total Adjustments	-	19.188	16.584	-	16.584
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	19.188			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustment	-	-	16.584	-	16.584

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Missile Defense Agency	Date: March 2014
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603180C *I Advanced Research*

Change Summary Explanation

Beginning in FY 2014, the Advanced Research effort transferred from the Ballistic Missile Defense Technology Program Element 0603175C to the Advanced Research Program Element, per the FY 2014 Consolidated Appropriations Act (P.L. 113-76).

Exhibit R-2A, RDT&E Project Justification: PB 2015 Missile Defense Agency			Date: March 2014
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / *Advanced Research*	Project (Number/Name) MD25 / *Advanced Technology Development*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
MD25: *Advanced Technology Development*	-	-	19.188	15.787	-	15.787	15.791	15.886	17.098	17.386	Continuing	Continuing

The FY 2015 OCO Request will be submitted at a later date.

Note

Beginning in FY 2014, the Advanced Research effort was transferred from the Ballistic Missile Defense Technology Program Element 0603175C to the Advanced Research Program Element 0603180C, per the FY 2014 Consolidated Appropriations Act (P.L. 113-76).

A. Mission Description and Budget Item Justification

Advanced Technology Development explores new Ballistic Missile Defense System (BMDS) capability by leveraging the creativity and innovation of the Nation's small businesses and universities, and through cooperative international research efforts between U.S. and foreign universities of allied nations. The program manages the selection process and administers the Missile Defense Small Business Innovation Research (SBIR) Program Element, 0605502C. SBIR topics and projects are selected annually based on identified needs across the BMDS and executed in partnership with the sponsoring elements. In FY 2015, the program will conduct Advanced Technology Innovation Broad Agency Announcement (ATI BAA) solicitation for identifying potentially breakthrough research on missile defense related technology with private industry, qualified accredited educational institutions, and non-profit organizations. Projects may include directed energy, sensors, command and control, or interceptor technology. The program will execute and administer the Missile Defense Agency Science, Technology and Research Broad Agency Announcement (MSTAR BAA) which invests in university research ranging from sensor data fusion to solid rocket propulsion to advanced materials for missile defense application.

Advanced Technology Development pursues a broad range of revolutionary technology targeted for application and insertion into the BMDS. This effort facilitates the commercialization and transition of promising technology into the BMDS by promoting a cooperative environment to reduce cost and increase return on investment between small business, prime contractors and MDA elements. The program also manages the Science, Technology, Engineering and Mathematics (STEM) program for MDA, with a goal of increasing the awareness of K-12 and college students in STEM careers in order to enhance the number of U.S. scientists and engineers capable of solving future BMDS challenges.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Advanced Research	-	19.188	15.787
Description: N/A			
FY 2013 Accomplishments: FY 2013 accomplishments are captured in the BMD Technology Program Element, 0603175C.			
FY 2014 Plans: Award Advanced Research contracts to domestic universities for innovative investigations to enlarge the battle space and enhance discrimination and raid handling			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Missile Defense Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
-Pursue on-going scientific and engineering university research initiatives and projects: --Clemson University: Power scaling capability of High Power Fiber Laser Research --Texas A&M University: Solid Propellant Additives for Divert Attitude Control System (DACS) Applications --Tuskegee University: Mechanical properties, fracture behavior and failure mechanisms of selective composites for re-entry vehicles --University of Illinois: Decision Theory for Optimal Engagement Planning --University of Tennessee: Target Handoff and Resource Management for Multi-Sensor Multi-Target Tracking System --North Carolina State University/Czech Republic Institute of Physics: Multi-sensor algorithm development to track space objects and debris --U.S. Air Force Academy: Scaling Diode Pumped Alkali Lasers for higher power output --Alabama A&M University: Computational algorithms using reconfigurable logic devices --University of Alabama Huntsville: Computational studies of aero-optic effects of higher Reynolds numbers gas flows over sensor structures. --University of Southern California: Algorithms for detection, track, and classification of objects in a high debris environment --Texas A&M University: Hybrid Waveguide/Micro Electro Mechanical System Optical Signal Processor -Sponsor breakthrough technology and innovative solutions from private industry, qualified accredited domestic educational institutions, and nonprofit organizations, using the Advanced Technology Innovation Broad Agency Announcement (BAA), to include research in: -- Lightweight optics -- Passive jitter control using mechanical isolation -- Lightweight rigid optics mounts -- Beam control optimization -- Interceptor Technology -- Sensor Technology -Partner with industry, the High Energy Laser Joint Technology Office, Universities and National Laboratories through advanced technology initiatives to improve sensor technology, high energy laser acquisition, tracking, and pointing technology, and lightweight fiber laser amplifiers -Conduct research and material solution analysis to identify initiatives and technology to include missiles, sensors, and command and control components in the defense against current and future threats			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Missile Defense Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
-Leverage University-to-University (UUR) International Research opportunities with allied nations to enhance BMDS Advanced Technology initiatives and build stronger relationships with Missile Defense Agency (MDA) North Atlantic Treaty Organization (NATO) Allied nations and our partner countries. -Manage the selection process of the Small Business Innovation Research (SBIR) and Technology Applications programs to assist MDA-funded technology developers in finding and entering technology transfer opportunities to missile defense applications -Conduct system engineering and integration to identify and mature initiatives and technology to defend against current and future threats			
FY 2015 Plans: -Pursue on-going scientific and engineering university research initiatives and projects: --Texas A&M University: Solid Propellant Additives for Divert Attitude Control System (DACS) Applications --Texas A&M University: Hybrid Waveguide/Micro Electro Mechanical System Optical Signal Processor --University of Illinois: Decision Theory for Optimal Engagement Planning --University of Tennessee: Target Handoff and Resource Management for Multi-Sensor Multi-Target Tracking System --University of Alabama Huntsville: Computational studies of aero-optic effects of higher Reynolds numbers gas flows over sensor structures --University of Southern California: Algorithms for detection, track, and classification of objects in a high debris environment --University of Maryland: Development of Thrusters for Fast Response Time DAC Propulsion Systems --University of New Hampshire: Gas Circulator for Diode Pumped Alkali Laser --University of Connecticut: Innovative Radar Signal Processing & Algorithms --Purdue University: Propulsion Improvements for MDA Applications --Howard University: Infrared Analysis in Counterfeit Parts Detection and Supply Chain Validation --Auburn University / Middle East Technical University, Turkey: Integrated Framework for Engineering Replicability into High Assurance BMDS Simulations -Sponsor breakthrough technology and innovative solutions from private industry, qualified accredited domestic educational institutions, and nonprofit organizations, using the Advanced Technology Innovation Broad Agency Announcement (BAA), to include research in: -- Radar Systems -- Directed Energy Systems			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Missile Defense Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
-- Electro-Optical / (Infrared)IR Sensor Systems -- Computer Science, Signal and Data Processing -- Mechanical and Aerospace engineering -- Decision Theory -- Modeling & Simulation -- Interceptor Technology -- Sensor Technology -Partner with industry, the High Energy Laser Joint Technology Office, Universities and National Laboratories through advanced technology initiatives to improve sensor technology, high energy laser acquisition, tracking, and pointing technology, and lightweight fiber laser amplifiers -Conduct research and material solution analysis to identify initiatives and technology to include missiles, sensors, and command and control components in the defense against current and future threats -Leverage University-to-University (UUR) International Research opportunities with allied nations to enhance Ballistic Missile Defense System (BMDS) Advanced Technology initiatives and build stronger relationships with Missile Defense Agency (MDA) North Atlantic Treaty Organization (NATO) Allied nations and our partner countries. -Manage the selection process of the Small Business Innovation Research (SBIR) and Technology Applications programs to assist MDA-funded technology developers in finding and entering technology transfer opportunities to missile defense applications -Conduct system engineering and integration to identify and mature initiatives and technology to defend against current and future threats -MDA Science Technology Engineering and Mathematics (STEM) Outreach will expand volunteer activities for other MDA facilities to increase overall MDA K-12 STEM awareness and engagement nationwide			
Accomplishments/Planned Programs Subtotals	-	19.188	15.787

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• 0603175C: *Ballistic Missile Defense Technology*	69.438	9.321	38.800	-	38.800	76.400	52.000	112.800	178.000	-	536.759

Exhibit R-2A, RDT&E Project Justification: PB 2015 Missile Defense Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	-	6.919	8.470	-	8.470	10.683	10.867	11.687	11.994	Continuing	Continuing
• 0603177C: *Discrimination Sensor Technology*	-	29.642	45.110	-	45.110	59.278	60.054	62.897	21.051	Continuing	Continuing
• 0603178C: *Weapons Technology*	-	46.708	14.068	-	14.068	36.494	46.026	56.037	83.722	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	-	70.000	25.639	-	25.639	33.171	37.348	38.454	54.256	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy to conduct this technology development effort consists of partnering with accredited domestic universities, small businesses, and nonprofit organizations. Missile Defense Agency awards competitive procurements via the MDA Science and Technology Advanced Research Broad Agency Announcement; the Advanced Technology Innovation Broad Agency Announcement; the Small Business Innovative Research program; the Small Business Technology Transfer program; and the Science, Technology, Engineering, and Mathematics Outreach program.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Missile Defense Agency			Date: March 2014
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / *Advanced Research*	Project (Number/Name) MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	-	-	0.797	-	0.797	0.924	1.038	1.238	1.337	Continuing	Continuing

The FY 2015 OCO Request will be submitted at a later date.

Note

Beginning in FY 2014, the Advanced Research effort was transferred from the Ballistic Missile Defense Technology Program Element 0603175C to the Advanced Research Program Element 0603180C, per the FY 2014 Consolidated Appropriations Act (P.L. 113-76).

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 Service, and Federally Funded Research and Development Center (FFRDC) providing integrity and oversight of the BMDS as well as, supporting MDA in enabling the development and evaluation of technologies that will respond to the changing threat. In addition, includes Global Deployment personnel and support performing deployment site preparation and activation. Other costs included provide facility capabilities for MDA Executing Agent locations, such as physical and technical security, legal services, 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. Also includes legal settlements. In keeping with congressional intent, Program Wide Support is allocated on a pro-rata basis and therefore, fluctuates by year based on the total MDA budget.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Program Wide Support	-	-	0.797
Description: See paragraph A: Mission Description and Budget Item Justification			
FY 2013 Accomplishments: N/A			
FY 2014 Plans: N/A			
FY 2015 Plans: See paragraph A: Mission Description and Budget Item Justification			
Accomplishments/Planned Programs Subtotals	-	-	0.797

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Missile Defense Agency		Date: March 2014
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD40 / *Program-Wide Support*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A