Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Missile Defense Agency											Date: May 2021	
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 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	151.042	27.166	35.024	21.466	-	21.466	-	-	-	-	-	-
MD25: *Advanced Technology Development*	147.523	26.285	34.282	20.635	-	20.635	-	-	-	-	-	-
MD40: *Program-Wide Support*	3.519	0.881	0.742	0.831	-	0.831	-	-	-	-	-	-
Program MDAP/MAIS Code: 362												

Note

Decrease from FY 2021 to FY 2022 reflects the FY 2021 Congressional adds for adaptive optics, high-speed flight experiment testing, domestic supply of strategic metals, and a portion of the undistributed Congressional add to restore the Defense Wide Review Missile Defense Agency manpower reduction. FY 2022 is a return to baseline funding levels.

A. Mission Description and Budget Item Justification

The Advanced Research program conducts leading edge advanced research and development to create and enable future missile defense capabilities. The Missile Defense Agency (MDA) executes this mission by capitalizing on the creativity and innovation of the brightest minds in our Nation's universities; small and large businesses; national laboratories; and collaborative research partnerships between allied countries, academic institutions, and industry. In accordance with identified Agency requirements and Warfighter needs, the program assesses and demonstrates the utility of emerging component technologies. After successful maturation and demonstration activities, the program facilitates transition of the technologies to the Missile Defense System through a Commercialization and Transition Office and other MDA programs.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	27.674	18.687	18.883	-	18.883
Current President's Budget	27.166	35.024	21.466	-	21.466
Total Adjustments	-0.508	16.337	2.583	-	2.583
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	16.337			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.508	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	2.583	-	2.583

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Change Summary Explanation

Increase in FY 2021 provides Congressional adds for adaptive optics, high-speed flight experiment testing, domestic supply of strategic metals, and a portion of the undistributed Congressional add to restore the Defense Wide Review Missile Defense Agency manpower reduction.

Increase in FY 2022 provides continued sustainment of program manpower level that Congress restored in FY 2021 enactment.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Missile Defense Agency			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MD25: *Advanced Technology Development*	147.523	26.285	34.282	20.635	-	20.635	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2021 to FY 2022 reflects the FY 2021 Congressional adds for adaptive optics, high-speed flight experiment testing, and a portion of the undistributed Congressional add to Defense Wide Review Missile Defense Agency manpower reduction. FY 2022 is a return to baseline funding level.

A. Mission Description and Budget Item Justification

The Missile Defense Agency's (MDA) Advanced Technology Development Project pursues a broad range of emerging technologies targeted for application and insertion into the Missile Defense System (MDS). MDA explores potential new MDS capabilities by leveraging the creativity and innovation of the Nation's industry, universities, and national laboratories to conduct advanced technology development. MDA also pursues advanced technology development through cooperative international research agreements 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 (PE), 0605502C. SBIR topics and projects are selected annually based on needs across the MDS and executed in partnership with sponsoring intra-agency organizations. These mechanisms foster a cooperative environment between small businesses, prime contractors, and MDA elements to yield reduced cost and increased returns on investment for successful technology integration efforts.

MDA's Advanced Technology Development Project assesses the feasibility and technical performance of the advanced research and development efforts through in-house means and partnerships with Department of Defense and other government agency laboratories. MDA provides independent assessments, demonstration and experimentation environments, and other concept assessment capabilities. The output of the experimentation, demonstration, and laboratory efforts provide risk, transition feasibility, and performance assessments, concept assessment data and analysis, and an overall improvement in the state-of-the-art of advanced technology evaluation. The culmination of research, development, and assessment is the commercialization and transition of promising technologies into the MDS.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022
Title: Advanced Research	26.285	34.282	20.635
Articles:	-	-	-
Description: This activity funds technology and research initiatives executed through continuous cycles of development, maturation, and assessment of component technologies identified by emerging weapon and sensor system concepts. Recurring tasks include: - Conduct systems engineering, integration, research, and materiel solution analysis to identify initiatives and technology to include missiles, sensors, and command and control components in the defense against current and future threats - Pursue advanced technology investments for defense against ballistic and non-ballistic hypersonic threats			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Missile Defense Agency		Date: May 2021
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, Article Quantities in Each)	FY 2020	FY 2021	FY 2022
- Develop breakthrough technology and innovative solutions from private industry, qualified accredited educational institutions, and non-profit organizations to include: -- Additive manufacturing technology initiatives for interceptor propulsion and structural components -- Materials development, assessment, and processing techniques -- Advanced threat component technologies -- Electro-optical and infrared sensor and communication systems -- Radar and radio frequency communication systems -- Interceptor and space systems component technologies -- Left through right of launch integration - Assess and evaluate advanced technology investments to extract risk-reduction information and determine transition feasibility - Execute the Broad Agency Announcement addressing breakthrough technologies and innovative solutions from private industry, qualified accredited educational institutions, and non-profit organizations to include: -- Artificial intelligence related to machine learning, big data, and Decision Theory -- Computer Science, Signal and Data Processing -- Directed energy technology -- Future MDS concept development -- Kill Web Algorithms, Probability and Decision Theory -- Modeling and simulation (M&S) -- Radar and radio frequency sensor systems -- Phenomenology - Utilize NanoSat technology demonstrations to conduct testing and reduce risk for new and advanced technologies for the MDS - Leverage university research opportunities including allied nations to enhance MDS advanced technology initiatives and build stronger relationships with allies and partners - Manage the selection process of SBIR and technology application programs to assist MDA funded technology developers in finding and entering technology transfer opportunities to missile defense applications Specific and/or unique accomplishment to each FY are as follows: ***FY 2021 Plans:*** - NanoSat Testbed Initiative: provide risk reduction in the development of new and advanced technologies, in support of the MDS, by testing and demonstrating capabilities under realistic environmental conditions - Mature component technology and reduce technology risk using sounding rockets to demonstrate interceptor technology in a relevant environment			

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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, Article Quantities in Each)	FY 2020	FY 2021	FY 2022
- High Temperature Seeker Window Development: Mature and evaluate seeker windows that support existing and future missions. ***FY 2022 Plans:*** - Assess incoming innovative technology whitepapers and pursue awards for those that align with Agency priorities and budget - NanoSat Testbed Initiative: collect and analyze on-orbit mission data from communication architectures experiments, initiate next series of experimentation focused on improved engagement management techniques - High Temperature Seeker Window Assessment: Mature and evaluate seeker windows that support existing and future missions. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease from FY 2021 to FY 2022 reflects the FY 2021 Congressional adds for adaptive optics, high-speed flight experiment testing, domestic supply of strategic metals, and a portion of the undistributed Congressional add to restore the Defense Wide Review Missile Defense Agency manpower reduction. FY 2022 is a return to baseline funding levels.			
Accomplishments/Planned Programs Subtotals	26.285	34.282	20.635

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	45.852	49.410	15.800	-	15.800	-	-	-	-	-	-
• 0603294C: *Common Kill Vehicle Technology*	13.319	11.058	0.000	-	0.000	-	-	-	-	-	-
• 0604181C: *Hypersonic Defense*	386.528	272.632	247.931	-	247.931	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The acquisition strategy to conduct these technology development agreements consists of partnering with accredited universities, small businesses, and nonprofit organizations. MDA awards competitive procurements via the MDA Science and Technology Advanced Research Broad Agency Announcement (BAA); the Advanced Technology Innovation BAA; the Small Business Innovative Research and the Small Business Technology Transfer program.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Missile Defense Agency			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	3.519	0.881	0.742	0.831	-	0.831	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.