Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Office of the Secretary Of Defense	Date: March 2023
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	57.251	62.904	66.866	-	66.866	66.948	68.423	69.854	71.375	Continuing	Continuing
227: *Applied Research for the Advancement of S&T Priorities*	-	57.251	62.904	66.866	-	66.866	66.948	68.423	69.854	71.375	Continuing	Continuing

Note

New Start (Y/N): No

A. Mission Description and Budget Item Justification

This program supports the Department's initiatives to Build a Sustainable Technical Advantage, build a Resilient Joint Force and Defense Ecosystem, and Taking Care of People.

The Applied Research for the Advancement of Science and Technology (S&T) Priorities (ARAP) program builds a strong Department of Defense (DoD) future technical workforce and laboratory capabilities in critical emerging technology areas within the Under Secretary of Defense for Research and Engineering (USD(R&E)) Technology Vision for an Era of Competition to enable future leap-ahead capabilities that outpace our competitors. This program funds tri-Service applied researchers to work with university and industry partners, accelerating DoD learning and technology development for new capabilities. Programs continually have follow-on activities funded by the individual Services and Agencies, which reflects the foundational research capabilities and overall value of the investment.

Specific projects support the design, development, and improvement of immature, DoD needed, technologies and new concepts to achieve general mission requirements and to translate promising research into solutions for military needs. In addition, the program enables concept exploration efforts and enables studies of alternative concepts.

The research projects are aligned with the DoD S&T priorities and designated focus areas that include non-system specific technology efforts and feasibility assessments and are formulated and managed by teams of subject matter experts drawn from the Office of the Secretary of Defense, the Military Services, and the Defense Agencies.

The program also provides support to the S&T Communities of Interest (CoIs) to ensure multi-agency collaboration and coordination. The S&T CoIs produce Joint S&T Roadmaps to contribute to the USD(R&E) Modernization Priority Roadmaps.

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Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602251D8Z *I Applied Research for the Advancement of S&T Priorities*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	58.982	67.666	68.042	-	68.042
Current President's Budget	57.251	62.904	66.866	-	66.866
Total Adjustments	-1.731	-4.762	-1.176	-	-1.176
• Congressional General Reductions	-	-0.278			
• Congressional Directed Reductions	-	-4.484			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.722	-			
• Program Adjustments	-0.009	-	-1.176	-	-1.176

Change Summary Explanation

The FY 2024 reduction of $1.176 million is comprised of a realignment of $1.481 million to support Historically Black Colleges and Universities/Minority Serving Institutions program, which is a priority of the Under Secretary of Defense for Research and Engineering (USD(R&E)), $0.071 million to support departmental priorities and an economic assumption increase of $0.376 million.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense			Date: March 2023
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*	Project (Number/Name) 227 / *Applied Research for the Advancement of S&T Priorities*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
227: *Applied Research for the Advancement of S&T Priorities*	-	57.251	62.904	66.866	-	66.866	66.948	68.423	69.854	71.375	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Applied Research for the Advancement of Science and Technology (S&T) Priorities program was established to implement Department-wide technology development portfolios and foster tri-Service research areas of common interest within cross-cutting S&T efforts. The program has three investment areas: (1) large, three-year applied research programs selected by the S&T Executives; (2) smaller, two-year technology 'seedling' programs nominated by the S&T Communities of Interest (CoIs) to address technology gaps or opportunities; and (3) technology assessment and study support to the CoIs. The execution of the program by the Office of the Secretary of Defense and the support it provides to the CoIs inspires and ensures joint strategic S&T oversight and multi-Service, multi-agency collaboration and coordination.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Applied Research for the Advancement of S&T Priorities (ARAP)	51.451	52.904	56.866

Description: The program focuses on cross-cutting S&T efforts that foster tri-service research areas of common interest that give the joint warfighter a technological advantage.
It focuses on emerging areas of science, building expertise within the DoD laboratories, including investment in laboratory infrastructure and people, and on research areas that are a foundation for further investments by the Services following the completion of the projects.

Cross-cutting efforts are aligned with S&T Priorities, such as Electronic Warfare, Human Systems, Autonomy, Space, Kinetic Weapons, Directed Energy and Non-Lethal Weapons, Cyber, Sensors and Processing, Command, Control, Communications, Computers and Intelligence, Air Platforms, and Ground and Sea Platforms, as well other focus areas, such as Materials and Manufacturing Processes, Advanced Electronics, Energy and Power Technologies, Biotechnology, and Armed Services Biomedical Research Evaluation and Management.

FY 2023 Plans:
Complete A Combined Development Pipeline for Novel Neuromorphic Hardware (NeuroPipe) (Year 3 of 3): Demonstrate on-chip dynamic learning software (i.e. learning after training) with a low-power radiation-hard neuromorphic processor. Transition viable materials to commercial on-shore fabrication prototypes.

Continue Surface Morphing and Adaptive Structures for Hypersonics (SMASH) (Year 2 of 3): Conduct wind tunnel testing that demonstrates initial concepts to significantly extend the speed, range, and maneuverability of hypersonics.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*	**Project (Number/Name)** 227 / *Applied Research for the Advancement of S&T Priorities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Initiate new ARAP project, Advanced Power Electronics and eXtreme-RF (APEX), to be selected in third quarter FY 2022. APEX will address the erosion of U.S. Gallium Nitride (GaN) RF capability offset with respect to China by building upon recent break throughs in emerging ultrawide bandgap semiconductors (UWBGS), integrated thermal solutions, and heterogeneous integration techniques and culminate in the demonstration of increased capabilities in S-Band and X-Band RF transmitters Initiate new ARAP project to be selected in third quarter FY 2022. ***FY 2024 Plans:*** Complete Surface Morphing and Adaptive Structures for Hypersonics (SMASH) (Year 3 of 3) Conduct wind tunnel testing that demonstrates initial concepts to significantly extend the speed, range, and maneuverability of hypersonics. Continue Advanced Power Electronics and Extreme-RF (APEX) (Year 2 of 3) Development of robust, solid-state, high-power RF device technology required to meet the future needs of the warfighter and counter emerging threats from our adversaries. Investigation of higher power RF transmitter chip sets improved thermal management and establish US capabilities in ultra-wide bandgap materials. Initiate new ARAP project to be selected in third quarter FY 2023. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increase from FY 2023 to FY 2024 represents costs of research equipment and infrastructure improvements in anticipation of the next ARAP project to be selected in 3rd quarter of FY 2023 and awarded in FY 2024.			
Title: S&T Communities of Interest (CoIs)	4.800	5.000	5.000
Description: The S&T CoIs facilitate coordination and collaboration across Components to reduce duplication and optimize the development of critical S&T efforts across the DoD enterprise. Their efforts include the development of joint S&T roadmaps and the planning of technology integration. The CoIs assess and address capability gaps and their multi-domain operational impact. The COIs include Advanced Electronics; Air Platforms; Autonomy; Armed Services Biomedical Research Evaluation and Management. Biotechnology; Command, Control, Communications, Computers, and Intelligence (C4I); Cyber; Directed Energy - Non-Lethal Weapons; Electronic Warfare; Energy and Power; Ground and Sea Platforms; Human Systems; Kinetic Weapons; Materials and Manufacturing Processes; Sensors and Processing; and Space. ***FY 2023 Plans:*** FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*	**Project (Number/Name)** *227 / Applied Research for the Advancement of S&T Priorities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue to provide support to the CoIs , i.e., Advanced Electronics; Air Platforms; Autonomy; Armed Services Biomedical Research Evaluation and Management. Biotechnology; Command, Control, Communications, Computers, and Intelligence (C4I); Cyber; Directed Energy - Non-Lethal Weapons; Electronic Warfare; Energy and Power; Ground and Sea Platforms; Human Systems; Kinetic Weapons; Materials and Manufacturing Processes; Sensors and Processing; and Space. Support includes assistance in developing integrated technology roadmaps, technology trade studies, technology gap analysis, and coordinating and building relationships with OSD Critical Technology Area leads. ***FY 2024 Plans:*** Continue to provide support to the CoIs , in developing integrated technology roadmaps, conducting technology trade studies and technology gap analysis, and coordinating and building relationships with OSD Critical Technology Area leads. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** There are no significant budget changes from previous year.			
Title: ARAP Seedlings ***Description:*** The program focuses on identifying a single technology gap or problem and establishing multi-service laboratory teams to solve the problem in 12–24-months. Solutions have the potential to laying the foundation for future Applied Research for Advancement of S&T Priority (ARAP) proposals. ***FY 2023 Plans:*** Identify and select Seedling research proposals in second quarter of FY 2023. ***FY 2024 Plans:*** Support Seedlings initiated in FY 2023. Identify and select new Seedling projects in FY 2024.	1.000	5.000	5.000
Accomplishments/Planned Programs Subtotals	57.251	62.904	66.866

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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