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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 1: Basic Research</i>	R-1 Program Element (Number/Name) PE 0601103F / <i>University Research Initiatives</i>
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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	-	174.048	206.192	182.372	0.000	182.372	158.784	137.782	149.011	157.144	Continuing	Continuing
615094: <i>University Research Initiatives</i>	-	174.048	206.192	182.372	0.000	182.372	158.784	137.782	149.011	157.144	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program supports defense-related basic research in a wide range of scientific and engineering disciplines relevant to maintaining U.S. military technology superiority. Research topics include, but are not limited to, transformational and high priority technologies such as nanotechnology, sensor networks, artificial intelligence and information fusion, smart materials and structures, quantum materials and processes for sensing, communication and computing, efficient energy and power conversion, and high-energy materials for propulsion and control. The program also enhances and promotes the education of U.S. scientists and engineers in disciplines critical to maintaining, advancing, and enabling future U.S. defense technologies. For example, the National Defense Science and Engineering Graduate program awards fellowships to train U.S. citizens in science and engineering disciplines of military importance under a joint tri-Service and Office of the Assistant Secretary of Defense for Research and Engineering competitive scholarship program. Finally, this program assists universities in establishing superior instrumentation capabilities needed to improve the quality of defense-related research and education. A fundamental component of this program is the recognition that future technologies and technology exploitations require highly coordinated and concerted multi- and inter-disciplinary efforts. Efforts in this program have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver science and technology capabilities. The use of program funds in this PE would be in addition to the civilian pay expenses budgeted in program elements 0602020F, 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602602F, 0602605F, 0602788F, 1206601SF, and 0602298F. Funds in this program element may be used to investigate specified science advancements in air, space and/or cyber domains.

This program is in Budget Activity 1, Basic Research because this budget activity includes scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs.

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B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	187.403	171.192	173.509	0.000	173.509
Current President's Budget	174.048	206.192	182.372	0.000	182.372
Total Adjustments	-13.355	35.000	8.863	0.000	8.863
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	35.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-6.859	0.000			
• Other Adjustments	-6.496	0.000	8.863	0.000	8.863

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 615094: *University Research Initiatives*

Congressional Add: *Program increase: Defense university research instrumentation program*

Congressional Add: *CPF-GHz-THz Antenna Systems*

Congressional Add Subtotals for Project: 615094

Congressional Add Totals for all Projects

	FY 2022	FY 2023
	24.085	30.000
	-	5.000
	24.085	35.000
	24.085	35.000

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

	FY 2022	FY 2023	FY 2024
Title: Multidisciplinary University Research Initiative	82.480	92.444	96.372
Description: Promote fundamental, multi- and interdisciplinary science and engineering research projects involving multiple principal investigators.			
FY 2023 Plans: Enhance the program and continue funding competitive research grants at U.S. universities that focus on significantly expanding the basic knowledge of Department of the Air Force-relevant science and technology areas, not normally achievable in smaller funded, single investigator awards. Support and recognize superior academic researchers in the early stages of their careers through the Presidential Early Career Award for Scientists and Engineers program. Continue funding of existing multi-year awards of multi-disciplinary programs.			
FY 2024 Plans:			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
<p>Continue enhancing the program and continue funding competitive research grants at U.S. universities that focus on significantly expanding the basic knowledge of Department of the Air Force-relevant science and technology areas. Focus on complex research efforts not normally achievable in smaller funded, single investigator awards. Continuing support and recognition for superior academic researchers in the early stages of their careers through the Presidential Early Career Award for Scientists and Engineers program. Continue funding the existing multi-year, multidisciplinary awards and receive proposals from universities to fund next round of multidisciplinary research grants. The FY 2024 Multidisciplinary University Research topics are: Plasmon-Controlled Single-Atom Catalysis; A New Mathematical Paradigm for Integrating Data, Models, Decisions; AlN Semiconductors for High-Power Electronics; Compositionally Complex Ceramics (CCCs) via Knowledge-Guided Pyrolysis for Hypersonics; Piezoelectric Materials Interfaced with Semiconductors for Integrated Quantum Systems; Space-Based Characterization of Arctic Permafrost Dynamics; Modeling and Measuring Multilevel Resonance; Fundamental Limits of Passive Heterodyne Photodetection of Incoherent, Broadband Sources; and Tensor Networks and Low-Rank Methods for High-Dimensional Computing.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 increased compared to FY 2023 by \$3.928 million. Funding increased to bolster investment in complex research efforts that require large, multidisciplinary, research teams, in the topic areas described in the plans above.</p>				
<p>Title: Science and Engineering Education</p> <p>Description: Support post-graduate, graduate, and undergraduate education in science and engineering disciplines at U.S. universities.</p> <p>FY 2023 Plans: Enhance the program and continue to award highly competitive National Defense Science and Engineering Graduate fellowships. Support competitive awards for graduate and undergraduate research experiences, including those established under the Awards to Stimulate and Support Undergraduate Research Experiences program. Continue funding for awards initiated under prior year DoD programs.</p> <p>FY 2024 Plans: Continue enhancing the program and continue to award highly competitive National Defense Science and Engineering Graduate fellowships. Continue to support competitive awards for graduate and undergraduate research experiences, including those established under the Awards to Stimulate and Support Undergraduate Research Experiences program. Continue funding for awards initiated under prior year DoD programs.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 increased compared to FY 2023 by \$0.371 million. Funds increased as described in above plans.</p>		52.487	61.629	62.000
<p>Title: Research Instrumentation</p>		14.996	17.119	24.000

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
<p>Description: Enhance scientific and engineering research through advanced education infrastructure and instrumentation at U.S. universities.</p> <p>FY 2023 Plans: Enhance the program and award grants on a competitive basis under the Defense University Research Instrumentation Program to U.S. universities to acquire state-of-the-art, high technology instrumentation and infrastructure to enhance research and educational capabilities.</p> <p>FY 2024 Plans: Continue enhancing the program and award grants on a competitive basis under the Defense University Research Instrumentation Program to U.S. universities to acquire state-of-the-art, high technology instrumentation and infrastructure to enhance research and educational capabilities.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 increased compared to FY 2023 by \$6.881 million. Funding increased to further enhance basic research through investments in laboratory instrumentation at U.S. universities, to support research in quantum science, biotechnology, trusted autonomy, advanced materials, directed energy, and other research enablers to future Department of the Air Force technologies.</p>			
Accomplishments/Planned Programs Subtotals	149.963	171.192	182.372

	FY 2022	FY 2023
Congressional Add: Program increase: Defense university research instrumentation program	24.085	30.000
FY 2022 Accomplishments: Conducted Congressionally directed effort		
FY 2023 Plans: Not Applicable		
Congressional Add: CPF-GHz-THz Antenna Systems	-	5.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Adds Subtotals	24.085	35.000

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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E. Acquisition Strategy
Not Applicable