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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 1: Basic Research</i>					R-1 Program Element (Number/Name) PE 0601103F / <i>University Research Initiatives</i>							
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	159.073	178.859	161.861	0.000	161.861	165.083	168.248	171.615	150.000	Continuing	Continuing
615094: <i>University Research Initiatives</i>	-	159.073	178.859	161.861	0.000	161.861	165.083	168.248	171.615	150.000	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 (NDSEG) 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 (DoD) Science and Technology (S&T) 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 & technology capabilities. The use of program funds in this PE would be in addition to the civilian pay expenses budgeted in program elements 0601102F, 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602602F, 0602605F, 0602788F, 0602298F and 1206601SF.

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	164.991	158.859	161.914	0.000	161.914
Current President's Budget	159.073	178.859	161.861	0.000	161.861
Total Adjustments	-5.918	20.000	-0.053	0.000	-0.053
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	20.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-5.918	0.000			
• Other Adjustments	0.000	0.000	-0.053	0.000	-0.053

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

Project: 615094: *University Research Initiatives*

Congressional Add: *Program Increase - Basic Research*

	FY 2019	FY 2020
Congressional Add Subtotals for Project: 615094	9.621	20.000
Congressional Add Totals for all Projects	9.621	20.000

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

	FY 2019	FY 2020	FY 2021
Title: Multidisciplinary University Research Initiative	78.906	86.552	88.286
Description: Promote fundamental, multi- and interdisciplinary science and engineering research projects involving multiple principle investigators.			
FY 2020 Plans: Fund competitive research grants at U.S. universities that focus on significantly expanding the basic knowledge of 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. Fund existing multi-year awards of multi-disciplinary programs.			
FY 2021 Plans: Continue funding competitive research grants at U.S. universities that focus on significantly expanding the basic knowledge of Air Force-relevant science and technology areas, not normally achievable in smaller funded, single investigator awards. Continue to			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
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 2020 to FY 2021 Increase/Decrease Statement: FY 2021 increased compared to FY 2020 by \$1.734 million. Funding increased due to added emphasis in multidisciplinary university research and the Presidential Early Career Award for Scientists and Engineers program.				
Title: Science and Engineering Education Description: Support post-graduate, graduate, and undergraduate education in science and engineering disciplines at U.S. universities. FY 2020 Plans: 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. Fund awards initiated under prior year DoD programs. FY 2021 Plans: 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. FY 2020 to FY 2021 Increase/Decrease Statement: FY 2021 increased compared to FY 2020 by \$1.000 million. Funding increased due to added emphasis in National Defense Science and Engineering Graduate and undergraduate research awards.		55.652	57.041	58.041
Title: Research Instrumentation Description: Enhance scientific and engineering research through advanced education infrastructure and instrumentation at U.S. universities. FY 2020 Plans: 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. FY 2021 Plans:		14.894	15.266	15.534

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Continue to 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.			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> FY 2021 increased compared to FY 2020 by \$0.268 million. Justification for the increase is described in the plans above.			
Accomplishments/Planned Programs Subtotals	149.452	158.859	161.861

	FY 2019	FY 2020
<i>Congressional Add:</i> Program Increase - Basic Research	9.621	20.000
<i>FY 2019 Accomplishments:</i> Conducted Congressionally directed effort		
<i>FY 2020 Plans:</i> Conduct Congressionally directed effort		
Congressional Adds Subtotals	9.621	20.000

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

N/A

Remarks

E. Acquisition Strategy

N/A