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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Office of the Secretary Of Defense **Date:** March 2019

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 1: <i>Basic Research</i>	R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>
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COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	39.051	56.573	48.874	-	48.874	45.935	46.713	47.585	48.596	Continuing	Continuing
010: <i>Basic Research Initiatives</i>	-	11.960	27.023	14.577	-	14.577	14.076	14.315	14.580	14.891	Continuing	Continuing
060: <i>Vannevar Bush Faculty Fellowship</i>	-	27.091	29.550	34.297	-	34.297	31.859	32.398	33.005	33.705	Continuing	Continuing

A. Mission Description and Budget Item Justification

Supporting basic research provides the Department of Defense (DoD) with a deep and broad awareness of current directions in areas of research important to U.S. military capabilities – including physics and the physical sciences, materials science, chemistry and chemical engineering, electrical engineering, mathematics, computer science, mechanical and aerodynamic engineering, ocean sciences, biological sciences, and the social sciences, among others. Basic research sustains scientific and engineering communities as it generates the critical technical knowledge underpinnings of DoD capabilities. Basic research allows exploration and discovery, yielding disruptive non-incremental advances that can improve or radically change military capabilities, strategy, and operations.

The Basic Research Initiatives program element (PE) supports the defense basic research enterprise in three critical areas: Strategic Support for Basic Research (SSBR), the Minerva Research Initiative (MRI), and the Vannevar Bush Faculty Fellowship Program (VBFF).

B. Program Change Summary (\$ in Millions)	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020 Base</u>	<u>FY 2020 OCO</u>	<u>FY 2020 Total</u>
Previous President's Budget	40.612	42.702	45.253	-	45.253
Current President's Budget	39.051	56.573	48.874	-	48.874
Total Adjustments	-1.561	13.871	3.621	-	3.621
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	14.000	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-1.483	-	-	-	-
• FFRDC Reduction	-0.078	-0.129	-	-	-
• Internal Program Adjustments	-	-	3.750	-	3.750
• Other Program Adjustments	-	-	-0.129	-	-0.129

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

Project: 010: *Basic Research Initiatives*

FY 2018	FY 2019

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

Congressional Add: *Program Increase for Minerva Research Initiative and Defense Experimental Program to Stimulate Competitive Research (DEPSCoR)*

Congressional Add Subtotals for Project: 010

Congressional Add Totals for all Projects

	FY 2018	FY 2019
	-	13.960
	-	13.960
	-	13.960

Change Summary Explanation

FY 2020 internal program adjustments will support the Laboratory University Collaboration Initiative (LUCI) executed under Project 060 and the I-Corps@DoD program executed under Project 010, Strategic Support for Basic Research. Internal program adjustments are consistent with higher priority DoD requirements.

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Appropriation/Budget Activity 0400 / 1					R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>				Project (Number/Name) 010 / <i>Basic Research Initiatives</i>			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
010: <i>Basic Research Initiatives</i>	-	11.960	27.023	14.577	-	14.577	14.076	14.315	14.580	14.891	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Basic Research Initiatives project, P010, includes Strategic Support for Basic Research (SSBR) and the Minerva Research Initiative.

SSBR supports oversight, policies, and initiatives to implement the Under Secretary of Defense for Research and Engineering's (USD(R&E)) strategic plan for defense basic research. This plan defines actions to help create conditions for defense basic research investments capable of producing high-payoff, transformative scientific breakthroughs for the Department. SSBR initiatives support the five Basic Research Office strategic goals: (1) drive the direction of DoD basic research investments; (2) coordinate and conduct oversight of DoD basic research programs; (3) improve the science and engineering workforce and public outreach; (4) enhance university-industry collaboration; and (5) engage with the academic research community and international partners.

The Minerva Research Initiative, a Department of Defense basic research program in the social sciences directed by the Office of the Secretary of Defense (OSD), funded in partnership with Air Force and Navy University Research Initiatives, and executed by the Office of Naval Research and the Air Force Office of Scientific Research, seeks to build a fundamental understanding of the sources of present and future conflict. It is one of the Nation's only social science basic research programs in support of national security. Minerva promotes a deeper understanding of the social and cultural environments, where threats such as radicalization and regional instabilities develop, and supports more effective strategic and operational policy decisions. Minerva program priorities are consistent with the goals set forth in the 2018 National Defense Strategy (NDS), informing DoD efforts to effectively build security globally, and are updated annually according to inputs from across the defense enterprise.

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

	FY 2018	FY 2019	FY 2020
Title: Strategic Support for Basic Research (SSBR)	2.211	2.312	3.163
Description: The SSBR program creates conditions for defense basic research investments capable of producing high-payoff, transformative scientific breakthroughs for the Department. SSBR initiatives support the five Basic Research Office strategic goals: (1) drive the direction of DoD basic research investments; (2) coordinate and conduct oversight of DoD basic research programs; (3) improve the science and engineering (S&E) workforce and public outreach; (4) enhance university-industry collaboration; and (5) engage with the academic research community and international partners.			
FY 2019 Plans: Conduct four to six workshops for scientific situational awareness that were planned in previous fiscal years. Convene national research leaders to provide expert perspectives on potential breakthroughs and barriers of advancement in rapidly evolving fields of basic research. Establish a Dean's Roundtable to provide a forum for university and DoD leaders to engage on cutting edge research topics, preventing research espionage, and promoting rapid innovation. Continue studies of how past DoD investments and high priority basic research has led to advances in new technologies and new capabilities for the Nation. As part of the USD(R&E) mission, continue to analyze university-related business practices for improvement and efficiency. Continue support			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019	FY 2020
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for scientific expertise to oversee science and engineering initiatives. Evaluate effectiveness of Defense Enterprise Science Initiative (DESI) and I-Corps pilot programs. Improve awareness of DoD basic research programs through outreach and site visits to performers in the national basic research enterprise, public events such as the Science, Technology, and Innovation Exchange (STIx) conference, and by overhauling public platforms such as the Basic Research Office website to improve information dissemination and access.

FY 2020 Plans:

Conduct workshops for scientific situational awareness. Continue convening national research leaders to provide expert perspectives on potential breakthroughs and barriers of advancement in rapidly evolving fields of basic research including a second year of the Dean’s Roundtable. Continue studies of the effectiveness of past DoD investments and high priority basic research in advancing new technologies and new capabilities for the Nation. As part of the USD(R&E) mission, continue to analyze university-related business practices for improvement and efficiency and support for scientific expertise to oversee science and engineering initiatives. Organize and execute a competition for the I-Corps@DoD program, and conduct a review of I-Corps projects. Continue to iteratively refine communication and outreach efforts, such as site visits and the STIx #conference to increase awareness of DoD basic research programs.

FY 2019 to FY 2020 Increase/Decrease Statement:

The increase from FY 2019 to FY 2020 supports SSBR workshops and studies, and 10 I-Corps teams.

Title: Minerva Research Initiative

Description: The Minerva Research Initiative includes three primary components: (1) a university-based social science basic research grant program, funded in partnership with Air Force and Navy University Research Initiatives; (2) the Research for Defense Education Faculty (R-DEF) program for the professional military education (PME) institutions; and (3) a collaboration with the Congressionally-established United States Institute of Peace to award research support to advanced graduate students and early career scholars working on security and peace. All components contribute to Minerva’s goals of revitalizing connections between DoD and academic social science communities and building cultural and foreign area knowledge on topics ranging from the mechanisms of radicalization to geopolitical power projection strategies in a multi-polar world. This deeper scientific understanding will provide a more informed basis to shape doctrine, analysis, and other strategic and operational decisions made by war planners and warfighters.

FY 2019 Plans:

Continue to support successful ongoing university-led research projects and execute 12-14 new projects based on input from DoD stakeholders. Encourage more partnerships between university-led and R-DEF projects. Continue active engagement with operational community by providing subject matter expertise on request and through the annual Minerva Conference and outreach to DoD stakeholders. Retain existing and generate new connections to policy and operational communities to facilitate

	9.749	10.751	11.414

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019	FY 2020
<p>the transition of Minerva research. Effectively connect new social science discoveries and analytical methods to current and future defense leadership and to inform future security decisions.</p> <p>FY 2020 Plans: Continue to support successful ongoing university-led research projects and execute 10-12 new projects based on input from DoD stakeholders. Encourage more partnerships between university-led and R-DEF projects. Continue active engagement with operational community by providing subject matter expertise on request and through the annual Minerva Conference and outreach to DoD stakeholders. Retain existing and generate new connections to policy and operational communities to facilitate the transition of Minerva research. Effectively connect new social science discoveries and analytical methods to current and future defense leadership and to inform future security decisions.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: The increase from FY 2019 to FY 2020 supports university-led research projects within the Minerva Research Initiative.</p>			
Accomplishments/Planned Programs Subtotals	11.960	13.063	14.577

	FY 2018	FY 2019
<p>Congressional Add: Program Increase for Minerva Research Initiative and Defense Experimental Program to Stimulate Competitive Research (DEPSCoR)</p> <p>FY 2019 Plans: Continue to support successful ongoing university-led research projects and execute 12-15 new projects based on input from DoD stakeholders. This includes additional projects aligned with recent Congressional interest, such as those on peer and near-peer statecraft, supported by the Congressional increase to the Minerva budget.</p> <p>Defense Experimental Program to Stimulate Competitive Research (DEPSCoR) is a legislated program that helps build the national infrastructure for research and education by funding research activities in science and engineering (S&E) responsive to the needs of national defense. Participation in this program is limited to states that meet eligibility criteria as outlined in the authorizing language. The program is intended to increase the number of university researchers and improve the capabilities of institutions of higher education (IHEs) in eligible jurisdictions to perform competitive S&E research relevant to the Department. IHEs in eligible states will be invited to compete for awards in areas identified by the Department in broad agency announcements.</p>	-	13.960
Congressional Adds Subtotals	-	13.960

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

N/A

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

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
060: <i>Vannevar Bush Faculty Fellowship</i>	-	27.091	29.550	34.297	-	34.297	31.859	32.398	33.005	33.705	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Vannevar Bush Faculty Fellowship program supports world-class researchers in scientific areas of critical importance to DoD and ensures the cultivation of exceptional talent. Fellows' research spans a broad set of emerging scientific areas with transformative potential, including Quantum Information Science, Novel Engineered Materials, Cognitive Neuroscience, Engineering Biology, Applied Mathematics and Statistics, Manufacturing Science and others. The program fosters close connections between academia and the defense science and engineering enterprise, a primary goal of SSBR efforts. Fellows provide the Department the deep scientific expertise from today's leading research universities and collaborate with defense scientists and engineers. This program actively engages and coordinates basic research across the Department.

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

	FY 2018	FY 2019	FY 2020
Title: Vannevar Bush Faculty Fellowship (VBFF) Program	27.091	29.550	34.297
Description: The Vannevar Bush Program ensures the DoD has a research portfolio that supports creative, innovative, and productive university researchers. The objectives of the program are to: (1) support scientific research that may lead to extraordinary outcomes; (2) educate and train student and post-doctoral researchers for the defense and national security workforce; (3) foster long-term relationships between university researchers and the Department; (4) familiarize select university researchers and their students with DoD's current and future challenges through research and engagement with DoD-employed scientists; and (5) increase the number of exceptionally talented technical experts that are contributing to DoD's mission.			
FY 2019 Plans: Support 55 Vannevar Bush Fellows and collaborative research efforts with 36 Laboratory University Collaboration Initiative (LUCI) Fellows from DoD Service Laboratories. LUCI fellows engage in a three-year basic research collaboration between Vannevar Bush Fellows in fields of critical interest to the Department. Review and update program focus topic areas with input from DoD S&T community. Organize and execute a competition to select a new class of Vannevar Bush Fellows. Organize and conduct the Vannevar Bush annual meeting, including DoD laboratory tours. Facilitate connections between new Fellows and DoD scientists and engineers. Organize and conduct a program review and site visits to monitor the research progress by Vannevar Bush Fellows and their DoD collaborators. Conduct review of LUCI projects in DoD laboratories and report the scientific progress and impacts.			
FY 2020 Plans: Support 55 Vannevar Bush Fellows and collaborative research efforts with 25 Laboratory University Collaboration Initiative (LUCI) Fellows from DoD Service Laboratories. LUCI fellows engage in a three-year basic research collaboration between Vannevar Bush Fellows in fields of critical interest to the Department. Review and update program focus topic areas with input from DoD			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019	FY 2020
<p>S&T community. Organize and execute a competition to select a new class of Vannevar Bush Fellows. Organize and conduct the Vannevar Bush annual meeting, including DoD laboratory tours. Facilitate connections between new Fellows and DoD scientists and engineers. Organize and conduct a program review and site visits to monitor the research progress by Vannevar Bush Fellows and their DoD collaborators. Organize and execute a competition for the LUCI program. Conduct review of LUCI projects in DoD laboratories and report the scientific progress and impacts. Organize a study group to introduce and educate Vannevar Bush Faculty Fellows to national security challenges.</p> <p><i>FY 2019 to FY 2020 Increase/Decrease Statement:</i> The FY 2019 to FY 2020 increase supports a study group to introduce and educate Vannevar Bush Faculty Fellows to national security challenges, and also provides support to five (5) new LUCI fellows.</p>			
Accomplishments/Planned Programs Subtotals	27.091	29.550	34.297

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

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A