Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy											Date: April 2022	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 1: *Basic Research*					R-1 Program Element (Number/Name) PE 0601103N / *University Research Initiatives*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	139.627	174.898	90.076	-	90.076	122.489	124.939	127.444	129.993	Continuing	Continuing
0000: *University Research Initiatives*	0.000	112.597	117.448	90.076	-	90.076	122.489	124.939	127.444	129.993	Continuing	Continuing
9999: *Congressional Adds*	0.000	27.030	57.450	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	84.480

A. Mission Description and Budget Item Justification

The Office of Naval Research's (ONR) mission is to ensure the technological advantage of U.S. Naval forces. ONR fosters scientific research necessary for the discovery, development and delivery of new technologies. Often this research is done in partnership with academia. This program includes support for multidisciplinary basic research in a wide range of naval relevant scientific and engineering disciplines that enables the U.S. Navy to maintain technological superiority and for the university research infrastructure to acquire the research instrumentation needed to maintain and improve the quality of university research important to the Navy. Multidisciplinary University Research Initiative (MURI) efforts involve teams of researchers investigating high priority topics and opportunities that intersect more than one traditional technical discipline. For many military problems, this multidisciplinary approach serves to stimulate innovation, accelerate research progress and lay the foundations for transition of results into Naval applications. The Defense University Research Instrumentation Program (DURIP) supports university research infrastructure essential to high quality, Navy-relevant research. The instrumentation program complements other Navy research programs by supporting the purchase of high cost research instrumentation that is necessary to carry out cutting-edge research. This program supports Presidential Early Career Awards for Scientists and Engineers (PECASE) which are single investigator research efforts performed by outstanding academic scientists and engineers early in their research careers. This program provides the knowledge base, scientific concepts, and technological advances for the maintenance of Naval power and national security. The Minerva Research Initiative is funded in partnership with the Office of the Secretary of Defense to support basic social science and multi-disciplinary research aimed at improving national security and international stability. The goals of this program are to enhance connections between DoD and academia and build cultural and foreign area knowledge on topics ranging from the mechanisms of radicalization to geopolitical power projection strategies in a multi-polar world.

The missions of today's Sailors and Marines are enabled by the results of naval Science and Technology (S&T). Since 1946, the Office of Naval Research (ONR) has fostered scientific research related to the maintenance of maritime superiority and national defense. ONR manages the Department of the Navy's (DON) portfolio of naval Basic and Applied research, and Advanced Technology Development investments to ensure naval forces can effectively deter conflict, but when called upon, fight, win and come home safe. Current investments hedge against uncertainty, providing solutions to commanders today, and options for the future. The Naval S&T budget supports higher guidance defined by the National Defense Strategy, and responds to requirements identified by the Secretary of the Navy through research priorities set by the Chief of Naval Research, coordinated across the Naval Research Enterprise (NRE), and outlined in the Naval R&D Framework.

This Program Element (PE) funds Basic Research, typically defined as systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind. The work in this PE can be classified between Technology Readiness Level (TRL) 1 (basic principles observed and reported) and TRL 2 (technology concept and/or application formulation).

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601103N *I University Research Initiatives*

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	144.102	117.448	0.000	-	0.000
Current President's Budget	139.627	174.898	90.076	-	90.076
Total Adjustments	-4.475	57.450	90.076	-	90.076
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	57.450			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-4.475	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	90.076	-	90.076

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: 9999: *Congressional Adds*		
Congressional Add: *Defense University Research Instrumentation Program*	9.653	35.000
Congressional Add: *Aircraft Fleet Readiness and Sustainment*	7.723	0.000
Congressional Add: *University research initiatives*	9.654	10.000
Congressional Add: *Coastal adapt. Res. for imp. coastal comm. and NWS earle military install. Resil*	0.000	0.450
Congressional Add: *Navy aircraft fleet readiness and sustainment*	0.000	8.000
Congressional Add: *Biocoherent energy transfer research*	0.000	4.000
Congressional Add Subtotals for Project: 9999	27.030	57.450
Congressional Add Totals for all Projects	27.030	57.450

Change Summary Explanation

Funding: No significant change.
Technical: No significant change.
Schedule: No significant change

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601103N *I University Research Initiatives*

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 1	R-1 Program Element (Number/Name) PE 0601103N / *University Research Initiatives*	Project (Number/Name) 0000 / *University Research Initiatives*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
0000: *University Research Initiatives*	0.000	112.597	117.448	90.076	-	90.076	122.489	124.939	127.444	129.993	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Office of Naval Research's (ONR) mission is to ensure the technological advantage of U.S. Naval forces. ONR fosters scientific research necessary for the discovery, development and delivery of new technologies. Often this research is done in partnership with academia. This program includes support for multidisciplinary basic research in a wide range of naval relevant scientific and engineering disciplines that enables the U.S. Navy to maintain technological superiority and for the university research infrastructure to acquire the research instrumentation needed to maintain and improve the quality of university research important to the Navy. Multidisciplinary University Research Initiative (MURI) efforts involve teams of researchers investigating high priority topics and opportunities that intersect more than one traditional technical discipline. For many military problems, this multidisciplinary approach serves to stimulate innovation, accelerate research progress, and lay the foundation for transition of results into Naval applications. The Defense University Research Instrumentation Program (DURIP) project supports university research infrastructure essential to high quality, Navy-relevant research. The instrumentation project complements other Navy research programs by supporting the purchase of high cost research instrumentation that is necessary to carry out cutting-edge research. The PECASE project supports single-investigator research efforts performed by outstanding academic scientists and engineers early in their research careers. This project provides the knowledge base, scientific concepts, and technological advances for the maintenance of Naval power and national security.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Defense University Research Instrumentation Program (DURIP)	22.430	23.672	17.989	0.000	17.989
Description: DURIP funds are awarded to universities to purchase relatively high cost research instrumentation that is normally not included in single-investigator research grants. Individual grants range from $50K to $1.5M. Funding for DURIP efforts is awarded after the Office of the Secretary of Defense (OSD) selects and announces the awardees, which typically takes place towards the second half of the fiscal year. In turn, universities need to purchase the instrumentation and take delivery before any billing occurs. It frequently takes several months for delivery and billing to be completed. DURIP is a one-year program.					
FY 2022 Plans: Funds will be awarded to support purchase or development of instrumentation to enhance Basic Research in various areas such as A Turboshaft Engine Test Stand for Particle Ingestion Research, Monitoring Decompression Illness during Undersea Missions, Sub Linear Machine learning, Acoustically equipped Gliders					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 1	**R-1 Program Element (Number/Name)** PE 0601103N / *University Research Initiatives*	**Project (Number/Name)** 0000 / *University Research Initiatives*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
for Marine Mammal, Metal Organic Chemical Vapor Deposition of Group III - Nitrides Oceanography Research Environment ***FY 2023 Base Plans:*** Funds will be awarded to support purchase or development of instrumentation to enhance Basic Research in various technical areas such as Micro-3-dimensional Printed Ion Traps, Networked Sensors for Observing the Air-Sea Interface, Atomic and Molecular Investigation of Corrosion for Prevention and Control, Atomic and Molecular Investigation of Corrosion for Prevention and Control, Versatile Legged Robots for Open-World Human-Robot Interaction in Mixed Initiative Teams, Interactions of Supersonic Projectiles with Large Droplets and Aerosol-laden Flows ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY22 to FY23 decrease in the budget request reflects reduced demand for DURIP grants resulting from delayed university execution to prior DURIP grants due to the Covid-19 pandemic. Fewer FY23 new DURIP awards are anticipated.					
Title: Multidisciplinary University Research Initiative (MURI) ***Description:*** Research efforts include high priority topics that intersect more than one traditional discipline. MURI topics are selected to address Naval Science and Technology (S&T) Framework Priorities as described in the Naval Research and Development Framework. Funding for MURI efforts is awarded after Office of the Secretary of Defense (OSD) announces the awardees, which typically takes place towards the second half of the fiscal year. Since the MURI program funds academic researchers, execution of the efforts typically ramp up during the summer months. MURI projects make significant contributions to Navy and Department of Defense (DOD) objectives by speeding up scientific programs, by cross-fertilization of ideas, by hastening the transition of basic research to practical applications, and by training students in cross-disciplinary approaches to science and engineering research of importance to DoD. MURI projects are five-year programs. ***FY 2022 Plans:***	78.860	82.156	63.257	0.000	63.257

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 1	**R-1 Program Element (Number/Name)** PE 0601103N / *University Research Initiatives*	**Project (Number/Name)** 0000 / *University Research Initiatives*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Support multidisciplinary research in areas such as molecular qubits, computer vision, ocean dynamics off rocky coasts, thermal transport, super-hard materials, social cyber-attack in social media, control theory of safe, cognitive, and learning systems. ***FY 2023 Base Plans:*** Continue to support research grants initiated in FY22 in the areas of Topologically-Protected Quantum Information, Molecular Doping of Organic Electronic Materials, Learning from Hearing, Hydrodynamics of Fish Schooling, Self-learning for Real-world Perception, Fundamental Non-equilibrium Processes in Weakly Ionized Hypersonic Flows, Understanding of Detonation Based Combustion in Multiphase Mixtures, Bioinspired Design of Energy-Self Sufficient Multi-functional Soft Material Systems, Systems-Level Foundations for Agile, Dynamic, and Ad Hoc Human Autonomy Teams, Environmental DNA-based Monitoring of the Marine Environment Continue to support multidisciplinary research in areas such as molecular qubits, computer vision, ocean dynamics off rocky coasts, thermal transport, super-hard materials, social cyber-attack in social media, control theory of safe, cognitive, and learning systems. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY22 to FY23 decrease in the budget request reflects reduced demand for FY23 incremental funds to existing multi-year MURI grants resulting from delayed university execution due to the Covid-19 pandemic. Fewer FY23 new MURI awards are also anticipated.					
Title: Presidential Early Career Awards (PECASE) ***Description:*** PECASE awards are made to academic scientists early in their research careers for extremely prestigious, single-investigator research in areas of vital importance to the Navy. Awards provide national recognition and research grants of up to $200K per year for five years. OSD, with policy and oversight responsibility for the PECASE program, awards a minimum of four new awards per year. PECASE is a five year program. ***FY 2022 Plans:*** Fund new basic research projects in Naval priority areas including statistical machine learning procedures that quantify sources of uncertainty in data analysis, nanophotonics and optical materials, deep learning for dexterous robotic manipulation, wireless communication and sensing systems.	8.457	8.916	6.775	0.000	6.775

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 1	**R-1 Program Element (Number/Name)** PE 0601103N / *University Research Initiatives*	**Project (Number/Name)** 0000 / *University Research Initiatives*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Support previous year ongoing basic research projects performed by early career investigators. ***FY 2023 Base Plans:*** - Continue to fund new basic research projects in Naval priority areas. - Continue to support previous year ongoing basic research projects performed by early career investigators. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY22 to FY23 decrease in the budget request reflects reduced demand for FY23 incremental funds to existing multi-year PECASE grants resulting from delayed university execution due to the Covid-19 pandemic. Fewer new FY23 PECASE awards are also anticipated.					
Title: Minerva Research Initiative (MRI) (Social Science Networking) ***Description:*** The Minerva Research Initiative is funded in partnership with the Office of the Secretary of Defense to support basic social science and multi-disciplinary research aimed at improving national security and international stability. The goals of this program are to enhance connections between DoD and academia and build cultural and foreign area knowledge on topics ranging from the mechanisms of radicalization to geopolitical power projection strategies in a multi-polar world. ***FY 2022 Plans:*** -Create novel techniques (e.g. social network analysis, social computational models, and, artificial Intelligence) that will enable the detection and source attribution of cyber malware incursions on large networked computer systems more quickly and accurately than is possible based on current manual approaches. -Discover large-data analytic techniques to detect and mitigate the occurrence of disinformation in social network systems more quickly and effectively than is currently possible. Techniques are sought that scale up to very large social networks and have the robustness to quickly adapt to emerging disinformation techniques. -Discover mechanisms of crowd manipulation, social hysteria, rumor and propaganda. ***FY 2023 Base Plans:***	2.850	2.704	2.055	0.000	2.055

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 1	**R-1 Program Element (Number/Name)** PE 0601103N / *University Research Initiatives*	**Project (Number/Name)** 0000 / *University Research Initiatives*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Complete: Create novel techniques (e.g., social network analysis, social computational models, and, artificial Intelligence) that will enable the detection and source attribution of cyber malware incursions on large networked computer systems more quickly and accurately than is possible based on current manual approaches. Continue: Research large-data analytic techniques to detect and mitigate the occurrence of disinformation in social network systems more quickly and effectively than is currently possible. Techniques are sought that scale up to very large social networks and have the robustness to quickly adapt to emerging disinformation techniques. Discover mechanisms of crowd manipulation, social hysteria, rumor and propaganda. Initiate: Efforts to address novel conflict problems such as water security, malware, ransomware, social shifts relevant to national security issues, hybrid warfare and other novel conflict problems. This will include influence operations and social media threat vectors for information operations, recruitment and training issues and identity management. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY22 to FY23 decrease in the budget request reflects reduced demand for FY23 funds for continuing MRI grants resulting from delayed university execution due to the Covid-19 pandemic.					
Accomplishments/Planned Programs Subtotals	112.597	117.448	90.076	0.000	90.076

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 1	R-1 Program Element (Number/Name) PE 0601103N / *University Research Initiatives*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	27.030	57.450	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	84.480

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
Congressional Add: Defense University Research Instrumentation Program	9.653	35.000
FY 2021 Accomplishments: Purchased instrumentation and equipment used to enhance university research in the areas of photonics; materials included high-temperature materials, soft multi-material structures, and photomechanical materials; autonomous and robotic systems; optical quantum information; oceanography; electronics; atmospheric turbulence; and distributed energy.		
FY 2022 Plans: Purchase instrumentation and equipment used to enhance university research in the areas of photonics; materials included high-temperature materials, soft multi-material structures, and photomechanical materials; autonomous and robotic systems; optical quantum information; oceanography; electronics; atmospheric turbulence; and distributed energy.		
Congressional Add: Aircraft Fleet Readiness and Sustainment	7.723	0.000
FY 2021 Accomplishments: Purchase equipment through DURIP to develop capabilities in the following areas (1) Understand Effects of Process Parameters on the Performance of Thermoplastics in Airframe Structural Applications (2) Cold Spray Additive Manufacturing for Rapid Sustainment Initiatives (3) Advanced Thermoplastic Integrated Structures produced by Automated Tool-less Manufacturing (4) Fiber Patch Placement for Aircraft Applications with Complex Contours and (5) Autonomous Repair Verifications and Inspections.		
FY 2022 Plans: N/A		
Congressional Add: University research initiatives	9.654	10.000

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 1	**R-1 Program Element (Number/Name)** PE 0601103N / *University Research Initiatives*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
FY 2021 Accomplishments: Supported collaborative university research into the understanding, detection, and prevention of Traumatic Brain Injuries. Also, supported grants to purchase instrumentation and equipment to enhance university basic research. ***FY 2022 Plans:*** Support collaborative university research into the understanding, detection, and prevention of Traumatic Brain Injuries. Also, support grants to purchase instrumentation and equipment to enhance university basic research.		
Congressional Add: Coastal adapt. Res. for imp. coastal comm. and NWS earle military install. Resil ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** Congressional Interest Items not included in other Projects.	0.000	0.450
Congressional Add: Navy aircraft fleet readiness and sustainment ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** Navy aircraft fleet readiness and sustainment basic research	0.000	8.000
Congressional Add: Biocoherent energy transfer research ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** Conduct Biocoherent energy transfer basci research	0.000	4.000
Congressional Adds Subtotals	27.030	57.450

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A