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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603729N / <i>Warfighter Protection Adv Tech</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	32.989	33.120	4.935	-	4.935	-	-	-	-	-	-
2914: <i>Warfighter Protection Adv Tech</i>	0.000	4.704	4.820	4.935	-	4.935	-	-	-	-	-	-
9999: <i>Congressional Adds</i>	0.000	28.285	28.300	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This PE supports the advanced development and demonstration of technologies to improve warfighter performance, safety and survivability. Naval investment in these areas is essential in order to improve the ability to enhance, maintain, and sustain Warfighter effectiveness.

Today's Sailors and Marines are enabled by 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 Advanced Technology Development (ATD) that includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment. Efforts in this PE generally have Technology Readiness Levels (TRL) of 4 (component and/or breadboard validation in laboratory environment.), 5 (component and/or breadboard validation in relevant environment.), or 6 (system/subsystem model or prototype demonstration in a relevant environment).

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	34.149	4.851	4.949	-	4.949
Current President's Budget	32.989	33.120	4.935	-	4.935
Total Adjustments	-1.160	28.269	-0.014	-	-0.014
• Congressional General Reductions	-	-0.031			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	28.300			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.160	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.014	-	-0.014

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 1319: *Research, Development, Test & Evaluation, Navy / BA 3: Advanced Technology Development (ATD)*

R-1 Program Element (Number/Name)
 PE 0603729N / *Warfighter Protection Adv Tech*

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

Project: 9999: *Congressional Adds*

Congressional Add: *Novel Therapeutic Interventions Research*

Congressional Add: *Bone Marrow Registry Program*

Congressional Add Subtotals for Project: 9999

Congressional Add Totals for all Projects

	FY 2020	FY 2021
	4.827	4.000
	23.458	24.300
	28.285	28.300
	28.285	28.300

Change Summary Explanation

Funding: No significant change.

Technical: Not applicable.

Schedule: Not applicable.

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Appropriation/Budget Activity 1319 / 3					R-1 Program Element (Number/Name) PE 0603729N / <i>Warfighter Protection Adv Tech</i>				Project (Number/Name) 2914 / <i>Warfighter Protection Adv Tech</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2914: <i>Warfighter Protection Adv Tech</i>	0.000	4.704	4.820	4.935	-	4.935	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element supports the advanced development and demonstration of technologies to improve warfighter performance, safety and survivability. Naval investment in these areas is essential in order to improve the ability to enhance, maintain, and sustain Warfighter effectiveness.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Naval Noise-Induced Hearing Loss (NIHL) and Warfighter Performance	4.704	4.820	4.935	0.000	4.935
Articles:	-	-	-	-	-
<p>Description: Improve technologies in Warfighter performance and protection in austere (e.g., high noise, hyperbaric, hypobaric) training and operational environments. Efforts include improvements to warfighter capabilities during exposure to environmental stressors and physiological monitoring of Naval forces during multi-domain training and operational environments.</p> <p>FY 2021 Plans: Auditory Neuroscience and Performance</p> <p>Develop mitigation technologies to protect Warfighters in high-noise environments. Further advance therapeutic approaches for treatment of auditory injuries. Enhance auditory processing augmentation strategies for communication in high-noise environments, including the development and assessment of personal protective equipment, advanced communication systems, and equipment / platform quieting.</p> <p>Warfighter Performance</p> <p>- Conduct advanced development research to enhance Warfighter performance and protection in extreme pressure (hypobaric to hyperbaric), thermal (hot/cold), sensory and electromagnetic environments.</p> <p>FY 2022 Base Plans: Auditory Neuroscience and Performance:</p>					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Continue advanced development and assessment of mitigation strategies to protect Warfighters in high noise environments, including personal protective equipment, advanced communication systems, and equipment/platform quieting measures.</p> <p>Warfighter Performance:</p> <ul style="list-style-type: none"> - Continue advanced technology development and assessment of materials and protective gear to reduce exposures of humans to hazardous levels of electromagnetic energy. - Initiate research on advance physiological and cognitive monitoring technologies that incorporate real-time sensing and observation of individual and team responses to environmental and operational stressors. Enable artificial intelligence-driven sensors and analytics on operator health and performance prediction to command and leadership for real-time feedback in training and operational scenarios. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: There is no significant funding change from FY 2021 to FY 2022.</p>					
Accomplishments/Planned Programs Subtotals	4.704	4.820	4.935	0.000	4.935

<p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> <p>D. Acquisition Strategy N/A</p>

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Appropriation/Budget Activity 1319 / 3	R-1 Program Element (Number/Name) PE 0603729N / <i>Warfighter Protection Adv Tech</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
9999: <i>Congressional Adds</i>	0.000	28.285	28.300	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

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

	FY 2020	FY 2021
<i>Congressional Add:</i> Novel Therapeutic Interventions Research <i>FY 2020 Accomplishments:</i> N/A <i>FY 2021 Plans:</i> Develop warfighter centric performance-oriented data-system architecture that permits the use of measures from unobtrusive commercial off the shelf (COTS) and government off the shelf (GOTS) sensors, training data, and other measures of health, wellbeing and psychological status to understand, manage, and optimize the performance and wellbeing, and mitigate musculoskeletal injury risk potential of warfighters. Conduct research efforts to improve survivability and quality of life for service members suffering from poly-traumatic and /or musculoskeletal injuries.	4.827	4.000
<i>Congressional Add:</i> Bone Marrow Registry Program <i>FY 2020 Accomplishments:</i> N/A <i>FY 2021 Plans:</i> Develop the scientific, medical and technological advances required to support military contingencies caused by injury to the blood-forming system from toxic substances. Continue to develop, test and mature the ability to address contingency events wherein civilian or military personnel are exposed to marrow toxic agents, primarily ionizing radiation or chemical weapons containing nitrogen mustard in four focus areas: Contingency Preparedness, Development of Science and Technology for Rapid Identification of Matched Donors, Immunogenetic Studies in Transplantation and Clinical Research in Transplantation. Develop an ecosystem around concurrent physiologic and environmental monitoring wearable devices to include new environmental sensors.	23.458	24.300
Congressional Adds Subtotals	28.285	28.300

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