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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Navy **Date:** February 2016

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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	0.000	39.374	36.299	4.789	-	4.789	4.878	4.877	4.878	4.879	Continuing	Continuing
2914: <i>Warfighter Protection Adv Tech</i>	0.000	4.727	4.799	4.789	-	4.789	4.878	4.877	4.878	4.879	Continuing	Continuing
9999: <i>Congressional Adds</i>	0.000	34.647	31.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	66.147

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) are based on investment directions as defined in the Naval S&T Strategic Plan approved by the S&T Corporate Board (20 Jan 2015). This strategy is based on needs and capabilities from Navy and Marine Corps guidance and input from the Naval Research Enterprise (NRE) stakeholders (including the Naval enterprises, the combatant commands, the Chief of Naval Operations (CNO), and Headquarters Marine Corps). It provides the vision and key objectives for the essential science and technology efforts that will enable the continued supremacy of U.S. Naval forces in the 21st century. The Strategy focuses and aligns Naval S&T with Naval missions and future capability needs that address the complex challenges presented by both rising peer competitors and irregular/asymmetric warfare.

This program supports the development and demonstration of field medical equipment and technologies to improve warfighter safety and to enhance personnel performance under adverse conditions. Navy investment in these areas is essential because Navy/USMC mission needs are not adequately addressed by the civilian sector or other Federal agencies. These projects support future capabilities within the Force Health Protection Program, a Future Naval Capability (FNC) that will provide technology options for the future Navy and Marine Corps by reducing morbidity and mortality when casualties occur.

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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	40.538	4.807	4.894	-	4.894
Current President's Budget	39.374	36.299	4.789	-	4.789
Total Adjustments	-1.164	31.492	-0.105	-	-0.105
• Congressional General Reductions	-	-0.008			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	31.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.165	0.000			
• Rate/Misc Adjustments	0.001	0.000	-0.105	-	-0.105

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

Project: 9999: *Congressional Adds*

Congressional Add: *CW Bill Young Marrow Donor Program*

Congressional Add: *Naval Special Warfare Performance and Injury Prevention Program*

Congressional Add Subtotals for Project: 9999

Congressional Add Totals for all Projects

	FY 2015	FY 2016
	30.461	31.500
	4.186	0.000
	34.647	31.500
	34.647	31.500

Change Summary Explanation

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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
2914: <i>Warfighter Protection Adv Tech</i>	0.000	4.727	4.799	4.789	-	4.789	4.878	4.877	4.878	4.879	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program supports the development and demonstration of field medical equipment, diagnostic capabilities and treatments; technologies to improve warfighter safety and to enhance personnel performance under adverse conditions; and systems to prevent occupational injury and disease in hazardous, deployment environments. Navy investment in these areas is essential because Navy/USMC mission needs are not adequately addressed by the civilian sector or other Federal agencies. For example, civilian emergency medicine does not address casualty stabilization during long transit times to definitive care. The National Institutes for Health (NIH) focuses on the basic science of disease processes and not product development. Programs are coordinated with other Services through the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee to prevent duplication of effort. This project funds the Force Health Protection program a Future Naval Capability (FNC) that will provide technology options for future Navy and Marine Corps capabilities and supports the "Sea Warrior" component of the Naval Transformation Roadmap, medical logistics aspects of "Sea Basing" and expeditionary force medical support associated with "Sea Strike".

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: NAVAL NOISE-INDUCED HEARING LOSS (NIHL)	4.727	4.799	4.789	0.000	4.789
<p>Description: The goal of this program is to reduce the incidence of NIHL by nearly 100%. This program employs a total systems engineering approach that includes advancements in medical technology, jet engine physics, personal protective equipment, and mitigation analyses.</p> <p>FY 2015 Accomplishments: Noise Induced Hearing Loss: - Continued advanced research in medical prevention and treatment of NIHL and tinnitus (ringing in the ears). - Continued advanced research to reduce noise at the source, jet engine quieting and flight deck noise reduction. - Continued advanced research to improve personal protective equipment technology. - Continued advanced research to study the incidence and susceptibility of NIHL and tinnitus, and to evaluate mitigation strategies.</p> <p>Regenerative Medicine: - Continued program with Army, in regenerative medicine (Armed Forces Institute of Regenerative Medicine (AFIRM II)).</p>					

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Initiated program, with Army, in regenerative medicine (Armed Forces Institute of Regenerative Medicine (AFIRM II)). FY 2016 Plans: Noise Induced Hearing Loss: - Continue all efforts of FY 2015, less those noted as completed above Regenerative Medicine: - Continue all efforts of FY 2015, less those noted as completed above FY 2017 Base Plans: Noise Induced Hearing Loss: Continue all efforts of FY 2016, less those noted as completed above Regenerative Medicine: - Continue all efforts of FY 2016, less those noted as completed above FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	4.727	4.799	4.789	0.000	4.789

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

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
Efforts within this PE are measured at two levels. At the lower level, each is measured against technical and financial milestones on a monthly basis. Annually, each project is reviewed in depth for technical and transition performance by the Chief of Naval Research (CNR).

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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
9999: <i>Congressional Adds</i>	0.000	34.647	31.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	66.147

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

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

	FY 2015	FY 2016
<p>Congressional Add: CW Bill Young Marrow Donor Program</p> <p>FY 2015 Accomplishments: During FY15, four new transplant centers joined the Radiation Injury Treatment Network (RITN) resulting in a total composition of 61 transplant centers, 6 donor centers, and 7 cord blood banks. The new centers that joined RITN included: 1. Univ. of Colorado-Aurora (CO), 2. Northwestern University (IL), 3. Emory University (GA), and 4. North Shore University (NY). In 2015, the National Marrow Donor Program (NMDP) donor centers, including Department of Defense (DoD) and recruitment groups, recruited 191,016 minority race and 197,626 Caucasian donors, for a total of 388,642 U.S. donors added to the registry. Navy funding supported the HLA typing of 83,099 donors (excluding DoD) of this culturally diverse group (48% minority). During FY15, bone marrow donor centers (including Department of Defense (DoD)) and recruitment groups recruited 102,147 minority race and 98,976 Caucasian donors for a total of 201,123 U.S. donors added to the registry. Navy funding supported the HLA typing of 72,603 donors (excluding DoD), of this culturally diverse group (52% minority) and these numbers continue to accumulate.</p> <p>FY 2016 Plans: National Marrow Donor Program (NMDP) will continue to expand participation of transplant centers increasing the enrollment of volunteer donors to the national registry. Hospitals that participate in both the NMDP Network of treatment centers as well as the NDMS managed by the Department of Health and Human Services.</p> <p>Scientific Advances: Continue improvements in accuracy of the NMDP scientific and clinical matching system, Haplogic III and linked to the NMDP clinical data system (Phoenix).</p>	30.461	31.500
<p>Congressional Add: Naval Special Warfare Performance and Injury Prevention Program</p> <p>FY 2015 Accomplishments: This effort continued the data collection with US Naval Special Warfare at NSW Group 2 and Group 4 (Little Creek, VA), NSW Combatant-Craft Crewman (SWCC) Special Boat Team 22 (Stennis, MS) and the NSW Center/SEAL Qualification Training (Coronado, CA) to strategically maximize human capital by reducing the rate of unintentional musculoskeletal injury, sharpen battlefield performance, optimize</p>	4.186	0.000

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016
<p>military readiness, extend the tactical life cycle of the Operator, and enhance quality of life of the Operator after service. The effort with Marine Corps Special Operations Command (MARSOC) continued.</p> <p>Expansion of SPEAR database: This database will help consolidate research done by the University of Pittsburgh and enable efficient and consistent data collection across the USSOCOM Enterprise Human Performance Program. This data collection on each individual type of SOF Operator will allow the Human Performance Program to effectively provide consistent and valid research-based injury prevention and performance optimization solutions that will enable the design of training programs uniquely tailored to the needs of special operators in the most productive and cost effective manner possible. Completion of this work for each SOF Component will also fill in the gaps of previously funded scientific research.</p> <p>Close Quarters Combat Performance Metrics (CQC): Development of cognitive and physiological metrics to measure performance in a specific USSOCOM Operators task: Close Quarters Combat (CQC). Further, this work will improve the operational effectiveness of the Human Performance Program by developing measures of physiological and tactical individual and team performance in order to mitigate errors and improve cognitive performance in a CQC task using Navy Special Warfare (NSW) Operators.</p> <p>SOF Operator Availability & Performance Optimization: For research to maximize SOF Operator readiness and availability: This work will identify strategies to maximize mean time between injuries and minimize mean time to repair, so as to maximize SOF Operator availability and performance. Analyses of Operator injury history and Human Performance Program participation will attempt to identify ways to increase individual Operator availability so as to contribute to increase readiness for SOF units.</p> <p>FY 2016 Plans: N/A</p>			
Congressional Adds Subtotals		34.647	31.500
C. Other Program Funding Summary (\$ in Millions)			
N/A			
Remarks			
D. Acquisition Strategy			
N/A			

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E. Performance Metrics

Congressional Interest Items not included in other Projects.

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