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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 3: Advanced Technology Development (ATD)					R-1 Program Element (Number/Name) PE 0603729N / Warfighter Protection Adv Tech							
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	0.000	42.895	41.377	4.849	-	4.849	4.851	4.949	5.049	5.151	Continuing	Continuing
2914: Warfighter Protection Adv Tech	0.000	4.751	4.877	4.849	-	4.849	4.851	4.949	5.049	5.151	Continuing	Continuing
9999: Congressional Adds	0.000	38.144	36.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	74.644

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. 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.

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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	4.878	0.000	0.000	-	0.000
Current President's Budget	42.895	41.377	4.849	-	4.849
Total Adjustments	38.017	41.377	4.849	-	4.849
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	41.377			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.482	0.000			
• Program Adjustments	0.000	0.000	4.849	-	4.849
• Rate/Misc Adjustments	-0.001	0.000	0.000	-	0.000
• Congressional Add Adjustments	39.500	-	-	-	-

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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: Novel Therapeutic Interventions Research		
Congressional Add: Bone Marrow Registry Program		
Congressional Add Subtotals for Project: 9999		
Congressional Add Totals for all Projects		
Change Summary Explanation		
No significant change between FY 2019 and FY 2020		

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319 / 3					R-1 Program Element (Number/Name) PE 0603729N / Warfighter Protection Adv Tech				Project (Number/Name) 2914 / Warfighter Protection Adv Tech			
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
2914: Warfighter Protection Adv Tech	0.000	4.751	4.877	4.849	-	4.849	4.851	4.949	5.049	5.151	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.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: NAVAL NOISE-INDUCED HEARING LOSS (NIHL)								4.751	4.877	4.849	0.000	4.849
Description: Improve Warfighter performance in high noise operational and training environments and reduce the incidence of auditory injuries.												
FY 2019 Plans: NOISE INDUCED HEARING LOSS: Conduct advanced research in medical prevention and treatment of NIHL and tinnitus. Investigate the incidence and susceptibility of NIHL and tinnitus, and evaluate mitigation strategies. Study the reduction of noise at the source, jet engine quieting and flight deck noise reduction and improve personal protective equipment technology.												
FY 2020 Base Plans: Develop advanced communication systems and platform quieting approaches for training and operational environments; develop in-ear dosimetry technologies to support the prediction of susceptibility/incidence of auditory damage, as well as the assessment of personal protective equipment; and advance infra-red therapy for the prevention and treatment of auditory injuries.												
FY 2020 OCO Plans: N/A												
FY 2019 to FY 2020 Increase/Decrease Statement:												

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B. Accomplishments/Planned Programs (\$ in Millions)					
	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
No significant change between FY 2019 and FY 2020					
Accomplishments/Planned Programs Subtotals	4.751	4.877	4.849	0.000	4.849
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 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
9999: Congressional Adds	0.000	38.144	36.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	74.644
A. Mission Description and Budget Item Justification Congressional Interest Items not included in other Projects.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2018	FY 2019			
Congressional Add: CW Bill Young Marrow Donor Program								30.419	0.000			
FY 2018 Accomplishments: Bone Marrow program conducts research to develop hematopoietic cell transplants using "marrow" from unrelated donors, as well as to develop medical countermeasure to marrow toxic exposures. Program has five focus efforts: Triage Guidelines for Cytokine Administration Following a Radiological Disaster; Hematologic Laboratory Surge Network Exercise and Plan Development; Local Public Health Radiological Preparedness Gap Review and Tool Development Identification; Evaluation and identification of whole genome donor-recipient pair variation and donor-specific DNA methylation patterns that affect HCT outcomes; and Developing a Genomic Data Repository.												
FY 2019 Plans: N/A												
Congressional Add: Novel Therapeutic Interventions Research								7.725	5.000			
FY 2018 Accomplishments: Novel Therapeutic Interventions Program conducts research on therapies that address readiness challenges by reducing battlefield mortality and improving quality of life. Research areas include treatment of injuries through the operational use of Platelet-Rich Plasma (PRP) and Bone Marrow Concentrate (BMC) for poly-trauma victims and use of new Bio-Motion techniques for treating musculoskeletal injuries.												
FY 2019 Plans: Novel Therapeutic Interventions Program conducts research on therapies that address readiness challenges by reducing battlefield mortality and improving quality of life. FY 19 efforts include utilizing a wearable garment to estimate strains/stresses in lower limbs during extreme exercises to determine joint susceptibility to microfractures, stress fractures, and potential ligament damage; development of a model of fluid resuscitation and physiology algorithm, and development in the use of platelet rich plasma (PRP) and bone marrow concentrate (BMC) for poly-traumatic injuries sustained during field operations												
Congressional Add: Bone Marrow Registry Program								0.000	31.500			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019
<p><i>FY 2018 Accomplishments:</i> N/A</p> <p><i>FY 2019 Plans:</i> Bone Marrow program will 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.</p> <p>Conduct efforts to develop and integrate framework, sensors and hardware platform for the real-time detection of acute ionizing radiation exposure and prediction of bone marrow injury to assist in the rapid identification of high risk personnel, assessment and triage, and pre-emptive donor matching for those requiring transplantation.</p>		
Congressional Adds Subtotals	38.144	36.500

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

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
Congressional Interest Items not included in other Projects.