Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy											Date: March 2024	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602747N *I Undersea Warfare Applied Res*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	101.195	61.503	57.525	-	57.525	58.416	62.106	63.303	63.119	Continuing	Continuing
0000: *Undersea Warfare Applied Res*	0.000	56.789	61.503	57.525	-	57.525	58.416	62.106	63.303	63.119	Continuing	Continuing
9999: *Congressional Adds*	0.000	44.406	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	44.406

A. Mission Description and Budget Item Justification

The Undersea Warfare Applied Research Program Element (PE) funds applied research efforts in undersea target detection, classification, localization, tracking, and neutralization. Associated efforts focus on new Anti-Submarine Warfare (ASW) operational concepts that promise to improve wide-area surveillance, detection, localization, tracking, and attack capabilities against quiet adversary submarines operating in noisy and cluttered shallow water environments. Related efforts are aimed at leveraging technologies that will protect the country's current capital investment in surveillance, submarine, surface ship, and air ASW assets. Research focused on understanding the impacts on marine mammals of manmade underwater sound is also conducted in the PE.

The activities described in this PE address future Navy and Marine Corps capabilities needed to maintain maritime superiority and ensure national security. Targeted capabilities are based on input from Naval Research Enterprise stakeholders including combatant commands, Office of the Chief of Naval Operations (OPNAV) and Headquarters Marine Corps and are designed to exploit breakthroughs in science and technology in order to deliver maximum undersea warfighting benefit to our sailors and marines.

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 PE funds Applied Research, which is the systematic study to understand the means to meet a recognized and specific need. Most of the work in this PE can be classified between Technology Readiness Level (TRL) 2 (technology concept and/or application formulation) and TRL 4 (component and/or breadboard validation in laboratory environments).

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602747N *I Undersea Warfare Applied Res*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	104.111	61.503	60.213	-	60.213
Current President's Budget	101.195	61.503	57.525	-	57.525
Total Adjustments	-2.916	0.000	-2.688	-	-2.688
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.916	0.000			
• Program Adjustments	0.000	0.000	-2.688	-	-2.688
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: 9999: *Congressional Adds*		
Congressional Add: *Persistent Maritime Surveillance*	9.655	0.000
Congressional Add: *Undersea sensing and communications*	4.826	0.000
Congressional Add: *Academic partnerships for innovative research*	24.133	0.000
Congressional Add: *Energetics awareness*	2.896	0.000
Congressional Add: *Mobile test-bed for UUVs*	2.896	0.000
Congressional Add Subtotals for Project: 9999	44.406	0.000
Congressional Add Totals for all Projects	44.406	0.000

Change Summary Explanation

Funding: FY25 decrease is due to S&T Applied Research Reduction in Undersea Warfare Applied Research.

Technical: No significant change.

Funding: No significant change.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 2	R-1 Program Element (Number/Name) PE 0602747N / *Undersea Warfare Applied Res*	Project (Number/Name) 0000 / *Undersea Warfare Applied Res*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
0000: *Undersea Warfare Applied Res*	0.000	56.789	61.503	57.525	-	57.525	58.416	62.106	63.303	63.119	Continuing	Continuing

A. Mission Description and Budget Item Justification

This PE funds applied research efforts in undersea target detection, classification, localization, tracking, and neutralization. Associated efforts focus on new Anti-Submarine Warfare (ASW) operational concepts that promise to improve wide-area surveillance, detection, localization, tracking, and attack capabilities against quiet adversary submarines operating in noisy and cluttered shallow water environments. Related efforts are aimed at leveraging technologies that will protect the country's current capital investment in surveillance, submarine, surface ship, and air ASW assets.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: Anti-Submarine Warfare (ASW) Distributed Search	14.882	20.981	11.290	0.000	11.290
Description: Anti-Submarine Warfare (ASW) Distributed Search focuses on the development of technologies for the tactical search for undersea targets ranging from hours to weeks, using automated sensor systems deployed around operating areas, including along key transit routes to protect naval/maritime forces, around temporarily fixed sea base regions and naval force operating areas, or around fixed defensive regions and areas of interest, such as key US/Allied ports. "Search" is conducted in concentrated areas, typically exploiting cues received from surveillance systems. The objective is to develop rapidly deployable systems employing automated detection and classification capabilities for use in both shallow and deep water operating environments. Related efforts include the development of distributed systems; Unmanned Undersea Vehicle-based and affordable off-board deployable sensing systems employing persistent detection concepts and components; and active acoustic sensing and processing techniques, navy-unique transduction and underwater networking technologies. These efforts provide an extended reach of organic platform-based systems through the use of new sensor concepts, improved materials for advanced sensors, optimized deployment, employment, and automated operation of distributed sensor fields.					
FY 2024 Plans: - Continue Active Sonar development of advanced signal and information processing for high duty cycle active sonar. Further development of concepts for next-generation active sonar system automation, leveraging the latest advances in machine learning and artificial intelligence. Continue non-acoustic, orthogonal concepts that complement and augment active sonar concepts.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
- Continue Sensors applied research in improved sensor technology to include both passive and active acoustic and optical sensing to extend the capabilities of platform-based systems as well as innovative sensor technology for off-board and rapidly deployable systems. - Continue Signal Processing development of advanced signal and information processing for high duty cycle active sonar. Continue to leverage advances in machine learning, e.g. deep learning, to improve performance in clutter type classification and clutter/target discrimination in current active sonar systems. Continue to leverage advances in artificial intelligence, with the objective to develop next-generation intelligent active sonar systems that optimally adapt operating parameters for the operating environment. - Continue development of technologies and techniques for exploiting structural acoustic vulnerabilities of adversary undersea platforms conducting an at sea trial. - Continue efforts that will lead to optimized sensing and behaviors by adapting in dynamic and uncertain environments; cooperative vehicle autonomy with increased endurance; data exfiltration and networking to expand reach; next generation sensors (acoustic and non-acoustic); adaptive, autonomous technologies to detect, classify, and track underwater mobile threats. - Continue development of technologies and signal processing, verified through sea trials that exploit the structural acoustics of undersea vehicles and structures. ***FY 2025 Base Plans:*** -Continue Active Sonar development of advanced signal and information processing for high duty cycle active sonar. Further development of concepts for next-generation active sonar system automation, leveraging the latest advances in machine learning and artificial intelligence. Continue non-acoustic, orthogonal concepts that complement and augment active sonar concepts. -Continue Sensors applied research in improved sensor technology to include both passive and active acoustic and optical sensing to extend the capabilities of platform-based systems as well as innovative sensor technology for off-board and rapidly deployable systems. -Continue Signal Processing development of advanced signal and information processing for high duty cycle active sonar.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
-Continue to leverage advances in machine learning, e.g. deep learning, to improve performance in clutter type classification and clutter/target discrimination in current active sonar systems. Continue to leverage advances in artificial intelligence, with the objective to develop next-generation intelligent active sonar systems that optimally adapt operating parameters for the operating environment. -Continue development of technologies and techniques for exploiting structural acoustic vulnerabilities of adversary undersea platforms conducting an at sea trial. -Continue efforts that will lead to optimized sensing and behaviors by adapting in dynamic and uncertain environments; cooperative vehicle autonomy with increased endurance; data exfiltration and networking to expand reach; next generation sensors (acoustic and non-acoustic); adaptive, autonomous technologies to detect, classify, and track underwater mobile threats. -Continue development of technologies and signal processing, verified through sea trials that exploit the structural acoustics of undersea vehicles and structures. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease from FY 2024 to FY 2025 is due to reduced development of technologies and techniques for exploiting structural acoustic vulnerabilities of adversary undersea platforms pertaining to Anti-Submarine Warfare (ASW) Distributed Search and for reallocated resources to ASW Surveillance.					
Title: Anti-Submarine Warfare (ASW) Precision Localization	3.573	3.645	3.540	0.000	3.540
Description: ASW Precision Localization focuses on the development and demonstration of technologies which use information from surveillance or search systems to determine an Area Of Uncertainty (AOU) relative to target range, bearing, and depth adequate to handoff to an attack system. Precision Localization employs non-acoustic techniques such as magnetic and optical sensing to localize submerged threats. The objective is to increase magnetic sensor range and robustness, enable deployment on Unmanned Air Vehicles (UAVs), and increase optical sensing search rates. Efforts include the development of non-traditional tracking and advanced magnetic and electric field sensors and processing. These technologies will provide a decreased AOU size					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
thus enabling the effective use of smaller, more versatile torpedoes as well as increased performance gain in detection, targeting, tracking/trailing, and homing via target acquisition and covert prosecution. ***FY 2024 Plans:*** -Continue Precision Localization research on advanced sensing modalities and sampling approaches. Investigate alternative methods for Precision Localization leveraging magnetic and electric field sensing technologies and incorporating alternative technologies and approaches. -Continue sensors research into novel methods to develop smaller and power efficient, high performance magnetic, electric field, acoustic, and novel sensors. Continue research on advanced concepts for processing arrays of independent sensors to create adaptive information theoretic sensor systems. Continue applied research into information theoretic optical sampling and telemetry characteristics to better support sensor performance and data integrity; improve the effectiveness of photonic sensor operations across the air-water interface; and extend the distance optical sensors can effectively operate within the water column. -Continue Remote and Optical Sensing research into remote methods of sensing target signatures. Continue research on optical sensing for precision localization and to better exploit the information capacity available in photonic systems to increase sensor performance. ***FY 2025 Base Plans:*** -Continue Precision Localization research on advanced sensing modalities and sampling approaches. Investigate alternative emethods for Precision Localization leveraging magnetic and electric field sensing technologies and incorporating alternative technologies and approaches. -Continue sensors research into novel methods to develop smaller and power efficient, high performance magnetic, electric field, acoustic, and novel sensors. Continue research on advanced concepts for processing arrays of independent sensors to create adaptive information theoretic sensor systems. Continue applied research into information theoretic optical sampling and telemetry characteristics to better support sensor performance and data integrity; improve the effectiveness of photonic sensor operations across the air-water interface; and extend the distance optical sensors can effectively operate within the water column.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
-Continue Remote and Optical Sensing research into remote methods of sensing target signatures. Continue research on optical sensing for precision localization and to better exploit the information capacity available in photonic systems to increase sensor performance. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** No significant change from FY 2024 to FY 2025.					
Title: Anti-Submarine Warfare (ASW) Surveillance ***Description:*** ASW Surveillance focuses on improving detection, classification, and localization capabilities in large ocean areas relative to the capabilities of existing ASW surveillance systems. The related technologies support the conduct of covert, wide-area surveillance ranging from one day to six months. The objectives are to develop and demonstrate technologies that provide clandestine indications and warnings in far forward and contested operating areas, and in complex operational environments against all submarine threats, including new threats with unknown target signatures and tactics. Covertness implies use of non-observable platforms and/or deployed automated sensors employing passive sonar, or other non-detectable methods. The surveillance process includes initial detection and classification. Efforts include the development of Unmanned Undersea Vehicle-based and affordable, off-board deployable sensing systems employing a wide variety of surveillance concepts and components. These efforts focus on alternative detection phenomena, vector/tensor sensors, automated acoustic processing, more compact and longer lasting power sources, and high bandwidth, acoustic communications links. ***FY 2024 Plans:*** - Continue Sonar signal processing related research to develop artificial intelligence technology providing optimized sonar system line-ups that adjust themselves in real time to the current undersea environment. - Continue Sonar exploitation of the information content of ambient noise, creating novel tactical detection methods that exploit ambient noise information content and conducting at sea measurements to validate. - Continue Sonar development and assessment of signal approaches for low complexity sonars, focusing on passive analysis and the generation of actionable warnings. Validate single processing approaches using at sea data.	21.986	20.201	26.514	0.000	26.514

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
- Continue Sensor studies to improve performance of acoustic vector sensors, vector magnetometers, electrochemical sensors and three-axis magnetometers. - Continue Sensors development of automation approaches that will modernize undersea passive acoustic detection and classification techniques conducting a major at sea trial to collect data for algorithm training and assessment. - Continue Underwater Vehicle Propulsion development of approaches for fluid-loaded elastic structures and soft-bodied unmanned underwater vehicle propulsion. - Continue Underwater Vehicle Propulsion development of technologies for a solar sea glider focused on develop a wavelength tailored photovoltaic cell with selectable layers for use at surface and sub-surface conditions and begin to look at mitigation approaches to bio-fouling. - Continue Signal Processing investigating applicable non-acoustic methods of detection and classification of ultra-quiet, low-Doppler submarines in complex operating environments. Initiate applied research to exploit recent advances in basic / theoretical computer science to efficiently implement signal processing and artificial-intelligence algorithms using mathematical approaches including randomized methods. - Continue efforts that will lead to optimized sensing and behaviors by adapting in dynamic and uncertain environments; cooperative vehicle autonomy with increased endurance; data exfiltration and networking to expand reach; next generation sensors (acoustic and non-acoustic); adaptive, autonomous technologies to detect, classify, and track underwater mobile threats; and new processing techniques which increase performance and expand the tactical utility of current systems. ***FY 2025 Base Plans:*** -Continue Sonar signal processing related research to develop artificial intelligence technology providing optimized sonar system line-ups that adjust themselves in real time to the current undersea environment. -Continue Sonar exploitation of the information content of ambient noise, creating novel tactical detection methods that exploit ambient noise information content and conducting at sea measurements to validate.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
-Continue Sonar development and assessment of signal approaches for low complexity sonars, focusing on passive analysis and the generation of actionable warnings. Validate single processing approaches using at sea data. -Continue Sensor studies to improve performance of acoustic vector sensors, vector magnetometers, electrochemical sensors and three-axis magnetometers. -Continue Sensors development of automation approaches that will modernize undersea passive acoustic detection and classification techniques conducting a major at sea trial to collect data for algorithm training and assessment. -Continue Underwater Vehicle Propulsion development of approaches for fluid-loaded elastic structures and soft-bodied unmanned underwater vehicle propulsion. -Continue Underwater Vehicle Propulsion development of technologies for a solar sea glider focused on develop a wavelength tailored photovoltaic cell with selectable layers for use at surface and sub-surface conditions and begin to look at mitigation approaches to bio-fouling. -Continue Signal Processing investigating applicable non-acoustic methods of detection and classification of ultra-quiet, low-Doppler submarines in complex operating environments. Initiate applied research to exploit recent advances in basic/theoretical computer science to efficiently implement signal processing and artificial-intelligence algorithms using mathematical approaches including randomized methods. -Continue efforts that will lead to optimized sensing and behaviors by adapting in dynamic and uncertain environments; cooperative vehicle autonomy with increased endurance; data exfiltration and networking to expand reach; next generation sensors (acoustic and non-acoustic); adaptive, autonomous technologies to detect, classify, and track underwater mobile threats; and new processing techniques which increase performance and expand the tactical utility of current systems.					
FY 2025 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The increase from FY 2024 to FY 2025 is due to reallocated resources from Anti-Submarine Warfare (ASW) Distributed Search and an increase to the NRL Base.					
Title: Marine Mammals ***Description:*** The goal of the Marine Mammals and Biology activity focus is to better understand and characterize the effects of underwater sounds produced by Navy acoustic sources on marine mammals. Studies address characterizing marine mammal and their ecosystems, quantifying effects of sound exposure on marine mammals, and improving the ability to monitoring and detect marine mammals in the open ocean. Research results supports Navy environmental compliance information needs and facilitates acquiring Letter of Authorizations from NOAA regulators that enable all Navy training and testing operations, and the development of appropriate state-of-the-art mitigation measures. The marine mammals research conducted in this Program Element (PE) represents part of a total effort executed in coordination with complementary research performed in PE 0602435N Ocean Warfighting Environment Applied Research. ***FY 2024 Plans:*** - Continue efforts include applied research in areas including monitoring and detection, integrated ecosystem, and effects of Anti- Submarine Warfare (ASW) sonar on marine mammals. - Continue Passive Acoustic Monitoring research efforts on passive acoustics and other technology supporting wide area surveillance, including the development and testing of new autonomous hardware platforms and signal processing algorithms for detection, classification, and localization of marine mammals. Continue research using animal tagging and passive acoustic monitoring to quantify behaviors, movement and distribution of marine mammals relative to key environmental properties and sonar exposure, both incidental and experimental. - Continue Sonar Exposure research to quantify the behavioral and physiological effects to potentially population-level consequences of sonar exposure on marine life to develop risk criteria for Navy's sound effects modeling, and develop quantitative inputs for modeling biologically significant effects on marine mammal populations. Navy sound effects modeling is used in Environmental Impact Statements, and subsequent Letters	2.539	2.591	2.514	0.000	2.514

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
of Authorization issued by the NOAA regulator that enable all Navy Anti- Submarine Warfare (ASW) exercises and testing. - Continue Marine Mammals with further research to design equipment and capability to quantify the gas management and kinetics in marine mammals to evaluate the mechanisms that enable marine mammals to dive to deep. - Continue Sound Reception Mechanisms in Whales to pursue research to advance our understanding of sound reception mechanisms in large whales including the anatomy surrounding the ear and the whole head to improve and validate finite element models of sound propagation through various tissues. - Continue Marine Mammal Behavior research into the stress response of marine mammals to ASW sonar exposure with an emphasis on quantifying the effects of prolonged exposure effects on immune system suppression, reproductive failure, accelerated aging, and slowed growth. Conduct research on potential effects of Navy ASW sonar sources on marine mammal behavior, life functions, vital rates, and population level effects. The goal is to understand and quantify the effects of naval activities on species or stocks of marine mammals, including effects on annual rates of recruitment and survival. - Continue Environmental Compliance research to provide tools to support environmental compliance efforts and decision making related to how marine mammals can be affected by anthropogenic sounds. ***FY 2025 Base Plans:*** -Continue efforts of applied research in areas including monitoring and detection, integrated ecosystem, and effects of Anti- Submarine Warfare (ASW) sonar on marine mammals. -Continue Passive Acoustic Monitoring research efforts on passive acoustics and other technology supporting wide area surveillance, including the development and testing of new autonomous hardware platforms and signal processing algorithms for detection, classification, and localization of marine mammals. -Continue research using animal tagging and passive acoustic monitoring to quantify behaviors, movement, and distribution of marine mammals relative to key environmental properties and sonar exposure, both incidental and experimental.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
-Continue Sonar Exposure research to quantify the behavioral and physiological effects to potentially population-level consequences of sonar exposure on marine life to develop risk criteria for Navy's sound effects modeling, as well as develop quantitative inputs for modeling biologically significant effects on marine mammal populations. Navy sound effects modeling is used in Environmental Impact Statements, and subsequent Letters of Authorization issued by the NOAA regulator that enable all Navy Anti- Submarine Warfare (ASW) exercises and testing. -Continue further research efforts to design equipment and capability to quantify the physiological requirements, such as gas management and kinetics, in marine mammals to evaluate the mechanisms that enable marine mammals to dive to deep. -Continue research to advance our understanding of sound reception mechanisms in large whales including the anatomy surrounding the ear and the whole head to improve and validate finite element models of sound propagation through various tissues. -Continue Marine Mammal Behavior research into the stress response of marine mammals to ASW sonar exposure with an emphasis on quantifying the effects of prolonged exposure on immune system suppression, reproductive failure, accelerated aging, and slowed growth. -Continue to conduct research on potential effects of Navy ASW sonar sources on marine mammal behavior, life functions, vital rates, and population level effects. The goal is to understand and quantify the effects of naval activities on species or stocks of marine mammals, including effects on annual rates of recruitment and survival. -Continue Environmental Compliance research to provide tools to support environmental compliance efforts and decision making related to how marine mammals can be affected by anthropogenic sounds. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** No significant change from FY 2024 to FY 2025.					
Title: Undersea Weaponry	13.809	14.085	13.667	0.000	13.667

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Description: Undersea Weaponry focuses on the development of technologies for current and next-generation, offensive and defensive weapons capable of engaging submarines, surface ships and threat torpedoes. Specific efforts focus on increasing probability of kill and probability of counter-kill by improving sensor performance, engagement tactics, vehicle propulsion and warhead lethality. New weapon and delivery concepts are being assessed. Detailed information regarding Undersea Weaponry Applied Research program plans and objectives is at a higher classification. ***FY 2024 Plans:*** - Continue applied research related to critical Science and Technology (S&T) for Rapid-Reaction Undersea Weapons and Counter-Measures, High-Speed Vehicle Technology, Undersea Warheads Technology, RPG-of-the-Sea and Air-Independent Power and Energy. Support related field activities under the Torpedo Field/Lab Experimentation Program. - Continue applied research to assess transition potential of technologies developed under the High-Speed Vehicle Technology and determine program continuation. - Initiate expanding efforts associated with sensing and warhead testing. ***FY 2025 Base Plans:*** - Continue applied research related to critical Science and Technology (S&T) for Rapid-Reaction Undersea Weapons and Counter-Measures, High-Speed Vehicle Technology, Undersea Warheads Technology, RPG-of-the-Sea and Air-Independent Power and Energy. Support related field activities under the Torpedo Field/Lab Experimentation Program. - Continue applied research to assess transition potential of technologies developed under the High-Speed Vehicle Technology and determine program continuation. - Continue expanding efforts associated with sensing and warhead testing. ***FY 2025 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 0000 / *Undersea Warfare Applied Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** There is no significant funding change from FY 2024 to FY 2025.					
Accomplishments/Planned Programs Subtotals	56.789	61.503	57.525	0.000	57.525

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 2	R-1 Program Element (Number/Name) PE 0602747N / *Undersea Warfare Applied Res*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	44.406	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	44.406

A. Mission Description and Budget Item Justification

Efforts for Undersea Warfare Applied Research

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Persistent Maritime Surveillance ***FY 2023 Accomplishments:*** Conduct basic research supporting persistent maritime surveillance ***FY 2024 Plans:*** N/A	9.655	0.000
Congressional Add: Undersea sensing and communications ***FY 2023 Accomplishments:*** Regional research teams from several universities will jointly pursue applied research related to oceanographic processes, models and innovative technologies. Peer-reviewed scientific publications and final technical reports are the anticipated deliverables. ***FY 2024 Plans:*** N/A	4.826	0.000
Congressional Add: Academic partnerships for innovative research ***FY 2023 Accomplishments:*** Conduct academic partnerships for innovative research applied research ***FY 2024 Plans:*** N/A	24.133	0.000
Congressional Add: Energetics awareness ***FY 2023 Accomplishments:*** Conduct research in energetics awareness. ***FY 2024 Plans:*** N/A	2.896	0.000
Congressional Add: Mobile test-bed for UUVs ***FY 2023 Accomplishments:*** Conduct research in mobile test-bed for UUVs. ***FY 2024 Plans:*** N/A	2.896	0.000
Congressional Adds Subtotals	44.406	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 2	**R-1 Program Element (Number/Name)** PE 0602747N / *Undersea Warfare Applied Res*	**Project (Number/Name)** 9999 / *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A