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 0602782N *I Mine and Expeditionary Warfare Applied Research*

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	46.719	30.435	31.460	-	31.460	31.946	34.170	34.743	34.650	Continuing	Continuing
0000: *Mine and Expeditionary Warfare Applied Research*	0.000	30.308	30.435	31.460	-	31.460	31.946	34.170	34.743	34.650	Continuing	Continuing
9999: *Congressional Adds*	0.000	16.411	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.411

A. Mission Description and Budget Item Justification

Sea mines remain a significant threat to ships. In fact, fifteen U.S. Navy ships have been sunk or damaged by mines since World War II, almost four times more than any other weapon. The Mine and Expeditionary Warfare Applied Research Program Element (PE) provides technologies for Naval Mine Countermeasures (MCM), Expeditionary Warfare, U.S. Naval sea mining, Naval Special Warfare (NSW), and Joint Tri-Service Explosive Ordnance Disposal (EOD) as well as continuing support to research vessels of the U.S. Academic Research Fleet for operations and maintenance that enable applied research at sea. This program strongly aligns with the Joint Chiefs of Staff Joint Warfighting Capability Objectives through the development of technologies to achieve military objectives with minimal casualties and collateral damage. This investment will enable Ship-to-Objective Maneuver (STOM) and focus on technologies that will provide the Naval Force with the capability to dominate the battlespace, project power from the sea, and support forces ashore with particular emphasis on rapid MCM operations. These efforts concentrate on the development and transition of technologies for the MCM-related and Urban Asymmetric/Expeditionary Warfare Operations (UAEO)-related Future Naval Capabilities (FNC) Enabling Capabilities (ECs).

The Mine and Obstacle Detection and Neutralization efforts include technologies for clandestine and overt minefield reconnaissance, organic ship self-protection, organic mine hunting and neutralization/breaching. The Urban Asymmetric Operation effort includes critical warfighting functions such as Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), fires, maneuver, sustainment, etc. The Naval Special Warfare and Explosive Ordnance Disposal technology efforts concentrate on the development of technologies for safe near-shore mine detection, diver mobility and survivability, and ordnance disposal operations. The activities described in this PE address future Navy and Marine Corps capabilities needed to maintain maritime superiority and ensure national security. They are based on input from Naval Research Enterprise stakeholders including the Naval enterprises, the 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 warfighting benefit to our sailors and Marines. These efforts align with shared priorities throughout the whole of RDT&E in order to quickly advance new capabilities from discovery to deployment across the warfighting domains.

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.

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 0602782N *I Mine and Expeditionary Warfare Applied Research*

This Program Element (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.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	48.649	30.435	32.932	-	32.932
Current President's Budget	46.719	30.435	31.460	-	31.460
Total Adjustments	-1.930	0.000	-1.472	-	-1.472
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.500	0.000			
• SBIR/STTR Transfer	-1.430	0.000			
• Program Adjustments	0.000	0.000	-1.472	-	-1.472
• 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: *Expendable energetic unmanned aerial system (UAS)*	6.757	0.000
Congressional Add: *Solid state magnetic gradiometers for UUVs*	9.654	0.000
Congressional Add Subtotals for Project: 9999	16.411	0.000
Congressional Add Totals for all Projects	16.411	0.000

Change Summary Explanation

Funding: FY25 decrease is due to reduced effort in Mine and Expeditionary Warfare Applied Research

Technical: No significant change.

Schedule: 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 0602782N / *Mine and Expeditionary Warfare Applied Research*				Project (Number/Name) 0000 / *Mine and Expeditionary Warfare Applied Research*			
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: *Mine and Expeditionary Warfare Applied Research*	0.000	30.308	30.435	31.460	-	31.460	31.946	34.170	34.743	34.650	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Project focuses on reducing the time involved in conducting Mine Countermeasure (MCM) operations and increasing safe standoff from minefields. It develops and transitions technologies for MCM-related and UAEO-related Future Naval Capabilities (FNC). The MIW effort includes technologies for clandestine and overt minefield reconnaissance, organic ship self-protection, organic mine-hunting, neutralization/breaching and clearance. The Littoral Warfare effort includes critical warfighting functions such as C4ISR, fires, maneuver, sustainment. The sea mining effort emphasizes technologies for future sea mines. The Naval Special Warfare and Explosive Ordnance technology efforts concentrate on the development of technologies to enhance diver capabilities including: safe near-shore mine sensing, mobility and survivability, and ordnance disposal operations.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: Mine Technology	2.095	2.137	2.084	0.000	2.084
Description: This activity primarily focuses on developing and demonstrating technologies to support on-demand battlespace shaping through advanced undersea weapons and next generation mining concepts. Efforts include Command & Control to support remote control, advanced sensing technologies, compatibility with options for unmanned delivery, detection & classification, and targeting solutions. Mine technology research supports Fleet demand for capability and prototype development for next generation naval mining concepts. ***FY 2024 Plans:*** - Continue Target Detection Devices (Mine & Expeditionary Warfare): Continue efforts in developments in advanced sensors and algorithmic capabilities that are applicable toward existing target detection devices (TDDs), development of concepts for remote controlled mines, and -Continue Target Detection Devices (Mine & Expeditionary Warfare): Continue efforts in developments in advanced sensors and algorithmic capabilities that are applicable toward existing target detection devices (TDDs), development of concepts for remote controlled mines, and assessment of sea mine technologies in order to maintain a level of expertise in naval mines. Specific effort will include advanced sensing modalities for improved detection, classification, and discrimination. The objective is to achieve a miniaturized, highly capable TDD to advance legacy mine capacity. -Continue Naval Mine Subcomponents (Mine & Expeditionary Warfare): Continue efforts in alternative packaging and miniaturization of naval mine subcomponents. Specific efforts include advanced sensing, remote control and					

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
communications, and advanced energetics. The objective is to achieve alternative capability to incrementally advance legacy mine capacity, and find new capability within legacy delivery mechanisms. in order to maintain a level of expertise in naval mines. Specific effort will include advanced sensing modalities for improved detection, classification, and discrimination. The objective is to achieve a miniaturized, highly capable TDD to advance legacy mine capacity. - Continue Naval Mine Subcomponents (Mine & Expeditionary Warfare): Continue efforts in alternative packaging and miniaturization of naval mine subcomponents. Specific efforts include advanced sensing, remote control and communications, and advanced energetics. The objective is to achieve alternative capability to incrementally advance legacy mine capacity, and find new capability within legacy delivery mechanisms ***FY 2025 Base Plans:*** -Continue Target Detection Devices (Mine & Expeditionary Warfare): Continue efforts in developments in advanced sensors and algorithmic capabilities that are applicable toward existing target detection devices (TDDs), development of concepts for remote controlled mines, and assessment of sea mine technologies in order to maintain a level of expertise in naval mines. Specific effort will include advanced sensing modalities for improved detection, classification, and discrimination. The objective is to achieve a miniaturized, highly capable TDD to advance legacy mine capacity. -Continue Naval Mine Subcomponents (Mine & Expeditionary Warfare): Continue efforts in alternative packaging and miniaturization of naval mine subcomponents. Specific efforts include advanced sensing, remote control and communications, and advanced energetics. The objective is to achieve alternative capability to incrementally advance legacy mine capacity, and find new capability within legacy delivery mechanisms. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** No significant change in funding from FY 2024 to FY 2025.					
Title: Mine/Obstacle Detection	17.233	17.099	18.465	0.000	18.465
Description: This activity focuses on applied research to enable longer detection ranges and precise detection and mine location with fewer false alarms in a variety of challenging environments. It supports Mine Warfare (MIW) related Future Naval Capabilities (FNCs). Efforts include novel sonar technologies for longer range					

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
detection and classification of mine-like targets or obstacles on or near the seafloor, magnetic gradiometer sensing, electro-optic (EO) technology for buried mine identification, and sensor integration onto Unmanned Underwater Vehicles (UUVs). EO sensor research develops algorithms to enable image processing for rapid overt reconnaissance from an Unmanned Aerial Systems (UAS). Efforts include the development of processing, classification and data fusion techniques to reduce operator workload, and an expert system used to predict mine burial. Efforts also support development of MCM Mission Modules for Littoral Combat Ships. The program is strongly aligned with the Oceanographer of the Navy and the research topics addressed by this activity reflect the priorities for improved forecasts of the operational environment and the development and use of autonomous systems. These efforts support collection of environmental observations and operations and maintenance of research vessels of the U.S. Academic Research Fleet to enable science at sea. Field research within this activity that using active acoustic transmissions requires modeling of the acoustic effects of sound on marine life in order to meet Navy environmental requirements. ***FY 2024 Plans:*** - Continue Autonomous Vehicles (Mine & Expeditionary Warfare) efforts to develop approaches for coupling between autonomous vehicles and their sensor payloads. Continue efforts to characterize flow generated by biomimetic propulsion approaches. Continue development and demonstration of adaptive control systems for bio-inspired unmanned underwater vehicles advancing oscillating fin propulsor models, and embedding these models on vehicle hardware. The objective is to increase vehicle efficiency, maneuverability and sensing effectiveness in complex environments. - Continue Mine Countermeasures (MCM) Data (Mine & Expeditionary Warfare) efforts to aggregate, curate and interrogate real and simulated data sets for in-situ algorithm adaptation, optimization, and performance assessment. The objective is to enable unmanned systems to operate flexibly across a wide range of dynamic and unstructured environments. - Continue MCM Sensor (Mine & Expeditionary Warfare) development of next-generation small, highly capable MCM sensors. Specific efforts include sensors, electronics, and computing technology. The objective is to increase deployment options for unmanned systems.					

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
- Continue Mine & Expeditionary Warfare (Target Recognition and Signal Processing) machine learning algorithm development efforts that yield principled understanding of sensor information content, are robust to challenging operating conditions and produce human-interpretable or traceable predictions. The objective is to improve operator trust in autonomous system behavior and improve automated performance. - Continue Threat Detection/Robotic Techniques (Mine & Expeditionary Warfare development of robotic technologies to respond to detected threats. Specific effort will include dexterity, haptics and algorithms to achieve human-like behaviors. The objective is to sense and interact with the environment and threats. - Continue advanced underwater optical imager technology focusing on laboratory measurements in various turbidity conditions and environments. The objective is improve optical sensing performance in turbid environments. - Continue development and demonstration of adaptive control systems for bio-inspired unmanned underwater vehicles advancing oscillating fin propulsor models, and embedding these models on vehicle hardware. - Continue development of a learning and planning framework, conducting field experiments that demonstrate simultaneous exploration and navigation in an unknown environments while attempting to execute a complex mission. The objective is to improve autonomous search capabilities for unmanned systems. -Continue development of cooperative autonomous underwater vehicle behaviors that adapt to dynamic and uncertain environments. Continue efforts that lead to increased vehicle endurance, improved data exfiltration rates, and sophisticated networking capabilities to expand reach. Continue development of autonomous technologies to detect, classify underwater mobile threats. The objective is to improve the search/localization effectiveness and mission duration of autonomous systems. - Continue development of cooperative autonomous underwater vehicle behaviors that adapt to dynamic and uncertain environments. Continue efforts that lead to increased vehicle endurance, improved data exfiltration rates, and sophisticated networking capabilities to expand reach. Continue development of autonomous					

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
technologies to detect, classify underwater mobile threats. The objective is to improve the search/localization effectiveness and mission duration of autonomous systems.					
FY 2025 Base Plans: -Continue Autonomous Vehicles (Mine & Expeditionary Warfare) efforts to develop approaches for coupling between autonomous vehicles and their sensor payloads. Continue efforts to characterize flow generated by biomimetic propulsion approaches. Continue development and demonstration of adaptive control systems for bio-inspired unmanned underwater vehicles advancing oscillating fin propulsor models, and embedding these models on vehicle hardware. The objective is to increase vehicle efficiency, maneuverability and sensing effectiveness in complex environments. -Continue Mine Countermeasures (MCM) Data (Mine & Expeditionary Warfare) efforts to aggregate, curate and interrogate real and simulated data sets for in-situ algorithm adaptation, optimization, and performance assessment. The objective is to enable unmanned systems to operate flexibly across a wide range of dynamic and unstructured environments. -Continue MCM Sensor (Mine & Expeditionary Warfare) development of next-generation small, highly capable MCM sensors. Specific efforts include sensors, electronics, and computing technology. The objective is to increase deployment options for unmanned systems. -Continue Mine & Expeditionary Warfare (Target Recognition and Signal Processing) machine learning algorithm development efforts that yield principled understanding of sensor information content, are robust to challenging operating conditions and produce human-interpretable or traceable predictions. The objective is to improve operator trust in autonomous system behavior and improve automated performance. -Continue Threat Detection/Robotic Techniques (Mine & Expeditionary Warfare development of robotic technologies to respond to detected threats. Specific effort will include dexterity, haptics and algorithms to achieve human-like behaviors. The objective is to sense and interact with the environment and threats. -Continue advanced underwater optical imager technology focusing on laboratory measurements in various turbidity conditions and environments. The objective is improve optical sensing performance in turbid environments.					

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
-Continue development and demonstration of adaptive control systems for bio-inspired unmanned underwater vehicles advancing oscillating fin propulsor models, and embedding these models on vehicle hardware. (NRL) -Continue development of a learning and planning framework, conducting field experiments that demonstrate simultaneous exploration and navigation in an unknown environments while attempting to execute a complex mission. The objective is to improve autonomous search capabilities for unmanned systems. (NRL) -Continue development of cooperative autonomous underwater vehicle behaviors that adapt to dynamic and uncertain environments. Continue efforts that lead to increased vehicle endurance, improved data exfiltration rates, and sophisticated networking capabilities to expand reach. Continue development of autonomous technologies to detect, classify underwater mobile threats. The objective is to improve the search/localization effectiveness and mission duration of autonomous systems. (NRL) -Initiate development of low size, weight and power (SWaP) neuromorphic computing payloads for mine countermeasure UUVs. The objective is to improve machine learning and autonomy performance for high-data rate sensor inputs on small vehicle form-factors. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The increase from FY 2024 to FY 2025 is in order to Initiate development of low size, weight and power (SWaP) neuromorphic computing payloads for mine countermeasure UUVs					
Title: Mine/Obstacle Neutralization ***Description:*** This activity includes applied research to support selected Mine Countermeasures-related Future Naval Capabilities (FNC) for the rapid neutralization of mines and obstacles, and sea mine jamming techniques to increase surface ship safe standoff from threat mines. It includes computational tools and models to assess mine and obstacle vulnerability and lethality of novel approaches for neutralization to support various far-term Surf Zone and Beach Zone mine and obstacle breaching system concepts. ***FY 2024 Plans:***	0.449	0.458	0.446	0.000	0.446

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
- Continue Rapid Neutralization of Mines and Obstacles effort in rapid neutralization of mines and obstacles including development of lethality and vulnerability models, technology concept assessments, and approaches for neutralization of mines and obstacles in all water depths, the surf zone, beach and inland. The objective is to enable maneuver of joint forces from ship to inland objective. - Continue Advanced Minesweeping effort in advanced minesweeping including development of compact, efficient approaches for sweeping advanced influence mines. The objective is to increase the safe standoff of various tactical platforms and surface ships. - Continue Robotics development of robotic technologies to respond to detected targets including work on dexterity, haptics and algorithms to achieve human-like behaviors. The objective is to interact with the mine and/or obstacle to achieve neutralization, clearance, render-safe or removal for exploitation. ***FY 2025 Base Plans:*** -Continue Rapid Neutralization of Mines and Obstacles effort in rapid neutralization of mines and obstacles including development of lethality and vulnerability models, technology concept assessments, and approaches for neutralization of mines and obstacles in all water depths, the surf zone, beach and inland. The objective is to enable maneuver of joint forces from ship to inland objective. -Continue Advanced Minesweeping effort in advanced minesweeping including development of compact, efficient approaches for sweeping advanced influence mines. The objective is to increase the safe standoff of various tactical platforms and surface ships. -Continue Robotics development of robotic technologies to respond to detected targets including work on dexterity, haptics, and algorithms to achieve human-like behaviors. The objective is to interact with the mine and/or obstacle to achieve neutralization, clearance, render-safe or removal for exploitation. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** No significant change in funding from FY 2024 to FY 2025.					
Title: Special Warfare/EOD	10.531	10.741	10.465	0.000	10.465

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Description: The goal of this effort is to develop technologies to extend stand-off of special operations and Explosive Ordnance Disposal (EOD) forces in clandestine hydrography, mine clearance and port security missions while increasing the range and effectiveness of divers. Advanced technologies are needed to gain access to areas contaminated by area-denial sensors and/or booby traps. Developed technologies will transition to the Joint Service EOD Program, the Naval EOD Program, or the DOD Technical Response Group. This activity includes applied research in sensor technology for Naval Special Warfare (NSW) and EOD autonomous and handheld sonar systems to increase detection range and accuracy in harsh environments. Other efforts include such mission support technology improvements as communications, navigation and life support for UUVs and human divers. ***FY 2024 Plans:*** - Continue Advanced Robotic Techniques efforts in advanced robotic technologies including development of human- like manipulators and haptics. The objective is to provide access to underwater, buried and surface munitions and enable standoff operations with high precision. - Continue Platforms development of air, surface and subsurface platforms to conduct operations in the littorals to improve diver situational awareness, mobility and safety, address drag reduction, diver propulsion, communications, navigation, thermal envelope, life support and contamination protection. - Continue Ordnance Detection efforts for sensors to detect munitions and improvised explosive devices. Specific efforts include compact electromagnetic, optical and next generation magnetometer sensors which are held-hand or robot deployable. The objective is to improve performance by achieving a lower false alarm rates and higher probability of detection. - Continue Sensor Techniques effort to develop compact sensor technologies to diagnose explosive threats and unexploded ordnance including the development of hand-held or robot deployable sensor technologies. The objective is to determine the status of explosive threats and unexploded ordnance. - Continue Neutralization Explosive Threats effort to develop technologies to enable render-safe or neutralization of explosive threats and unexploded ordnance. The objective is to enable precision render-safe or neutralization operations at standoff distances.					

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
- Continue Unmanned Systems Situational Awareness development of onboard processing in unmanned systems to enable environmental situational awareness (SA) in the littorals. - Continue Rapid Operational Clearance efforts to develop technologies to rapidly clear operational areas of munitions. The objective is to decrease the amount of time needed for services to clear munitions and conduct clearance operations at standoff. ***FY 2025 Base Plans:*** -Continue Advanced Robotic Techniques efforts in advanced robotic technologies including development of human- like manipulators and haptics. The objective is to provide access to underwater, buried and surface munitions and enable standoff operations with high precision. -Continue Platforms development of air, surface and subsurface platforms to conduct operations in the littorals to improve diver situational awareness, mobility and safety, address drag reduction, diver propulsion, communications, navigation, thermal envelope, life support and contamination protection. -Continue Ordnance Detection efforts for sensors to detect munitions and improvised explosive devices. Specific efforts include compact electromagnetic, optical and next generation magnetometer sensors which are held-hand or robot deployable. The objective is to improve performance by achieving a lower false alarm rates and higher probability of detection. -Continue Sensor Techniques effort to develop compact sensor technologies to diagnose explosive threats and unexploded ordnance including the development of hand-held or robot deployable sensor technologies. The objective is to determine the status of explosive threats and unexploded ordnance. -Continue Neutralization Explosive Threats effort to develop technologies to enable render-safe or neutralization of explosive threats and unexploded ordnance. The objective is to enable precision render-safe or neutralization operations at standoff distances. -Continue Unmanned Systems Situational Awareness development of onboard processing in unmanned systems to enable environmental situational awareness (SA) in the littorals.					

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	**Project (Number/Name)** 0000 / *Mine and Expeditionary Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
-Continue Rapid Operational Clearance efforts to develop technologies to rapidly clear operational areas of munitions. The objective is to decrease the amount of time needed for services to clear munitions and conduct clearance operations at standoff. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** No significant change from FY 2024 to FY 2025.					
Accomplishments/Planned Programs Subtotals	30.308	30.435	31.460	0.000	31.460

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 0602782N / *Mine and Expeditionary Warfare Applied Research*	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	16.411	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.411

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Expendable energetic unmanned aerial system (UAS) ***FY 2023 Accomplishments:*** Conduct research in expendable energetic unmanned aerial system. ***FY 2024 Plans:*** N/A	6.757	0.000
Congressional Add: Solid state magnetic gradiometers for UUVs ***FY 2023 Accomplishments:*** Conduct research in solid state magnetic gradiometers for UUVs. ***FY 2024 Plans:*** N/A	9.654	0.000
Congressional Adds Subtotals	16.411	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A