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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 3: Advanced Technology Development (ATD)					R-1 Program Element (Number/Name) PE 0603758N / Navy Warfighting Exp & Demo							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	0.000	65.553	60.550	64.889	-	64.889	68.128	108.737	142.340	123.516	Continuing	Continuing
2918: Navy Warfighting Experiments and Demo	0.000	65.553	60.550	64.889	-	64.889	68.128	108.737	142.340	123.516	Continuing	Continuing

## A. Mission Description and Budget Item Justification

This Program Element (PE) addresses the development of recent technology breakthroughs to meet current operational needs from a subscale proof-of-principle into a full-scale prototype for warfighter experimentation during laboratory and operational demonstrations, Fleet Battle Experiments (FBE), Limited Objective Experiments (LOEs) and sea trial exercises. The key aspects of this PE are divided into four areas: (1) SwampWorks develops and demonstrates newly invented or recently discovered technologies that address emergent and enduring operational problems in an accelerated timeframe; (2) ONR Experimentation (OE) develops rapid prototypes and provides them to the warfighter for experimentation during laboratory and operational demonstrations; (3) TechSolutions develops rapid response science and technology prototypes addressing Fleet/Force needs identified by Sailors and Marines at the deckplate level; (4) Operations Analysis provides the Navy and Marine Corps the means to identify capability needs that can be addressed with science and technology solutions; and (5) support for the Naval Precision Strike Operations, providing the Navy capability to quickly locate, target, and strike critical targets.

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

FY 2016 included a single year investment for the research in Directed Energy (Solid State Laser - Technology Maturation or SSL-TM) which explains the funding decrease from FY 2016 to FY 2017. A new activity was moved into this PE in 2018 - Precision Strike Technology, formerly funded in PE 0603114N Power Projection Advanced Technology.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018 Base</b>	<b>FY 2018 OCO</b>	<b>FY 2018 Total</b>
Previous President's Budget	65.946	60.550	84.122	-	84.122
Current President's Budget	65.553	60.550	64.889	-	64.889
Total Adjustments	-0.393	0.000	-19.233	-	-19.233
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.689	0.000			
• SBIR/STTR Transfer	-1.082	0.000			
• Program Adjustments	0.000	0.000	-19.233	-	-19.233
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

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<p><b><u>Change Summary Explanation</u></b></p> <p>The FY 2018 funding decrease reflects the realignment of funding to PE 0603801N Innovative Naval Prototypes.</p> <p>Technical: Not applicable.</p> <p>Schedule: Not applicable.</p>		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 3					R-1 Program Element (Number/Name) PE 0603758N / Navy Warfighting Exp & Demo				Project (Number/Name) 2918 / Navy Warfighting Experiments and Demo			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
2918: Navy Warfighting Experiments and Demo	0.000	65.553	60.550	64.889	-	64.889	68.128	108.737	142.340	123.516	Continuing	Continuing
A. Mission Description and Budget Item Justification												
This project focuses on the development of recent technology breakthroughs to meet current operational needs from a subscale proof-of-principle into a full-scale prototype for warfighter experimentation during laboratory and operational demonstrations, Fleet Battle Experiments (FBEs), Limited Objective Experiments (LOEs) and sea trial exercises.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: NAVAL WARFARE EXPERIMENTATION								21.548	22.352	18.731	0.000	18.731
Description: The objective of this project is to capitalize on recent technology breakthroughs to develop and integrate components including subsystems into prototypes quickly. These technologies are provided to the warfighter for experimentation, field experiments, and/or tests in simulated or actual environments. The use of Navy Warfare Development Command (NWDC) Fleet Experimentation (FLEX) events is encouraged and the net results are to gain the knowledge that only an experiment can provide.												
Increase in FY 2017 will support emergent opportunities to meet fleet needs with advanced technologies including demonstrations and experimentation with Electronic Warfare, Undersea Maneuver Warfare and Advanced Autonomy technologies.												
Decrease from FY 2017 to FY 2018 is due to completion of increased products in the areas of Autonomy, Electromagnetic Warfare and the exploitation of unmanned systems. Funding is back to expected level.												
FY 2016 Accomplishments:												
- Demonstrated unmanned air vehicle swarming technologies in collaboration with the warfighter, laboratories and operational forces.												
- Demonstrated USV SWARM technologies.												
FY 2017 Plans:												
- Continue all efforts of FY 2016. Examples include:												
- Electromagnetic Warfare: 360 Degree View CVN Protection												
- Undersea Maneuver Warfare: Bow planes, Undersea Contactless Power & Communications Connector												

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<div>- Initiate new experimentation initiatives to support high impact fleet efforts. Examples include: - Electromagnetic Warfare: Ship Emissions Assessment (SEA) Drone, Open Tactical Router, DASH-X EW Netted Sensors - Advanced Autonomy: Cross-USV stero (CUS) Follow On experimentation in support of USV SWARM. Follow on from an "Operations Analysis" study performed in FY16. - Leverage fleet experimentation venues in order to optimize development efforts and gain greater fleet/force feedback of developing technologies.</div> <div><b>FY 2018 Base Plans:</b> - Continue all efforts of FY 2017. - Initiate efforts to address the priorities of the Chief of Naval Research and the Chief of Naval Operations</div> <div><b>FY 2018 OCO Plans:</b> N/A</div>						
<div><b>Title:</b> OPERATIONS ANALYSIS</div> <div><b>Description:</b> The objective of this project is to provide operational analysis through studies, analyses, gaming and experimentation to identify Navy and Marine Corps capability needs that can be addressed with S&amp;T solutions. The effort includes core analysis of S&amp;T programs, military utility/capability gaps analyses, war gaming, structured experimentation events, the articulation of the results of that analysis and wargaming, and the development of innovation strategies and messages resulting from these analyses. Recent work includes participation in SIMulation EXercise (SIMEX) design, data collection and analysis events; wargame design in support of the ONR Office of Technology; analytical, strategic planning, and wargaming support; organizing and conducting workshops and symposia that increase innovation outreach; and participating in Red Teaming and conceptual analysis.</div> <div><b>FY 2016 Accomplishments:</b> - Conducted a wargame to identify capability needs for the medium displacement unmanned surface vehicle, utilize operational personnel to ensure S&amp;T solutions are focused on capabilities needed for unmanned systems.</div> <div><b>FY 2017 Plans:</b> - Continue all efforts of FY 2016. - Initiate efforts in support of Fleet/Force.</div> <div><b>FY 2018 Base Plans:</b></div>		2.164	3.112	2.017	0.000	2.017

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continue all efforts of FY 2017. Conduct Wargames, Technology Innovation Games and technology analysis efforts to inform S&T initiatives.						
FY 2018 OCO Plans: N/A						
Title: SWAMPWORKS		31.890	25.086	22.563	0.000	22.563
Description: SwampWorks seeks to develop and demonstrate technologies that address emergent and enduring operational problems in an accelerated timeframe. The general nature of these efforts are high risk/high reward and constitute a leap ahead in capability or technology. Some of these technologies may become part of a follow-on technology development, may end up in the hands of the warfighter for Fleet/Force experimentation, or may culminate in a significant Fleet/Force exercise that demonstrates capability then transitions into the Acquisition Program of Record (POR).						
FY 2016 included a single year investment for the research in Directed Energy (Solid State Laser - Technology Maturation or SSL-TM) which explains the funding decrease from FY 2016 to FY 2017.						
The funding decrease from FY 2017 to FY 2018 is reflects fewer products in unmanned systems.						
FY 2016 Accomplishments: - Initiated additional projects in the area of Autonomy, Electromagnetic Warfare and exploitation of unmanned systems. - Pursued emergent technology opportunities to support high impact Pacific pivot efforts.						
FY 2017 Plans: - Continue all efforts of FY 2016. - FY 2017 technology efforts include: - Personal Assistant for Life Long Learning (PAL3) with ARO. - SPY 1 multiple-beam klystrons (MBK) with NRL. - Very Short Pulse Laser with NRL. - Universal Repeatable-Release Holdback Bar with NAWC Lakehurst. - Monitoring Osseo Integrated Prostheses (MOIP) with NRL. - Coordinated Ionospheric Reconstruction Cubesat Experiment (CIRCE) with NRL. - Large Scale AM with NSWC Carderock.						

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>- LC-SAS on XLUUV with NSWC Panama City.</p> <p><b>FY 2018 Base Plans:</b></p> <p>- Continue all efforts of FY 2017.</p> <p>- Initiate projects in response to the Chief of Naval Research and the Chief of Naval Operations priorities as well as technologies of interest for the Pacific Area of Responsibility (AOR).</p> <p>- Under the leadership of the Director of Research at ONR, the SwampWorks portfolio explores high-risk, disruptive, and innovative technologies and concepts, and provides a venue to develop innovative technologies. All SwampWorks activities are targeted towards advancing the capabilities of naval warfighters. Because of the portfolio's high-risk nature, brief exploratory studies can be performed to examine the maturation of the technology proposed before making substantial investments. The SwampWorks program has substantial flexibility in planning and execution which includes a streamlined approval process to allow for the shortest possible technology development timeframe. The balance of the S&amp;T projects that will start in FY18 will be identified during FY18 as the needs of the warfighters, for investments in this portfolio, evolve or change. SwampWorks is not limited to any set of technology areas. The portfolio is open to great ideas all year long and invests in innovative technology development that will ultimately provide a dramatic improvement for the warfighter.</p> <p><b>FY 2018 OCO Plans:</b></p> <p>N/A</p>						
<p><b>Title:</b> TECH SOLUTIONS</p> <p><b>Description:</b> TechSolutions develops rapid response Science and Technology (S&amp;T) solutions to immediate Fleet/Force needs identified by individual warfighters at the deckplate level. Sailors, Marines and Science Advisors submit their issues throughout the year via the TechSolutions website, email, phone, or chain of command. Projects are initiated as requests are received and are completed in approximately twelve to eighteen months, resulting in a prototype demonstration of Technology Readiness Level (TRL) 6 or higher.</p> <p><b>FY 2016 Accomplishments:</b></p> <p>- Continued development of projects that will provide solutions to address emergent critical needs.</p> <p>- Developed, demonstrated and delivered technical solution prototypes to projects initiated in the previous fiscal year.</p> <p><b>FY 2017 Plans:</b></p> <p>- Continue all efforts of FY 2016.</p>		9.951	10.000	9.186	0.000	9.186

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Initiate rapid response S&T projects in direct support of Fleet/Force needs.						
FY 2018 Base Plans: Continue all efforts of FY 2017. Initiate efforts based on Fleet/Force interactions and warfighter needs.						
FY 2018 OCO Plans: N/A						
Title: PRECISION STRIKE TECHNOLOGY		0.000	0.000	12.392	0.000	12.392
Description: The efforts described in this Activity are based on investment directions as defined in the Naval S&T Strategic Plan approved by the Science & Technology Corporate Board of 20 January 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.						
Prior to 2018, this effort was funded in PE 0603114N.						
FY 2016 Accomplishments: N/A						
FY 2017 Plans: N/A						
FY 2018 Base Plans: Efforts in this area support Naval Precision Strike Operations, providing the Navy capability to quickly locate, target, and strike critical targets.						
Prior to FY 2018, this effort was funded in PE 0603114N Power Projection Advanced Technology Development						
FY 2018 OCO Plans: N/A						
Accomplishments/Planned Programs Subtotals		65.553	60.550	64.889	0.000	64.889

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<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A <b>Remarks</b>  <b>D. Acquisition Strategy</b> Not applicable.		
<b>E. Performance Metrics</b> Overall metric goals are to transition the 6.3 advanced technology projects into acquisition programs of record, demonstrate successful technologies to enable new operational concepts, and enable the production of technology products such as proofs of concept and manufacturing packages. The performance of the work funded in this PE is reviewed at several levels to ensure that the investment is relevant and productive. At the macroscopic level, the investment is coordinated with Navy Warfare Development Command and Commander, Fleet Forces Command to address the goals and objectives identified for sea trials and Limited Objective Experiments (LOEs). At the microscopic level, the work funded in this PE is reviewed periodically by the Program Manager to ensure the investment is meeting the goals defined for each project. This review includes feedback collected from the warfighter community on all sea trials and LOEs to support the Program Manager's assessment of the value and relevance of each investment. Furthermore, the entire program is reviewed yearly by the Chief of Naval Research.		