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**Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy** **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b>			<b>R-1 ITEM NOMENCLATURE</b>								
1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 3: <i>Advanced Technology Development (ATD)</i>			PE 0603758N: <i>Navy Warfighting Exp &amp; Demo</i>								
<b>COST (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012 Base</b>	<b>FY 2012 OCO</b>	<b>FY 2012 Total</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	50.537	53.177	50.157	-	50.157	53.447	54.006	60.635	77.068	Continuing	Continuing
2918: <i>Navy Warfighting Experiments and Demo</i>	50.537	53.177	50.157	-	50.157	53.447	54.006	60.635	77.068	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) Naval Warfare Experimentation develops prototypes of recent technology breakthroughs and provides them to the warfighter for experimentation during FBEs, LOEs or Sea Trials; (3) Tech Solutions develops rapid response science and technology prototypes addressing Fleet/Force needs identified by Sailors and Marines at the deckplate level; and (4) Operations Analysis provides the Navy and Marine Corps the means to identify capability needs that can be addressed with science and technology solutions.

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

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012 Base</b>	<b>FY 2012 OCO</b>	<b>FY 2012 Total</b>
Previous President's Budget	52.373	53.177	63.292	-	63.292
Current President's Budget	50.537	53.177	50.157	-	50.157
Total Adjustments	-1.836	-	-13.135	-	-13.135
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.112	-			
• SBIR/STTR Transfer	-1.064	-			
• Program Adjustments	-	-	-12.957	-	-12.957
• Section 219 Reprogramming	-0.638	-	-	-	-
• Rate/Misc Adjustments	-	-	-0.178	-	-0.178
• Congressional General Reductions Adjustments	-0.022	-	-	-	-

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**APPROPRIATION/BUDGET ACTIVITY**

1319: *Research, Development, Test & Evaluation, Navy*  
BA 3: *Advanced Technology Development (ATD)*

**R-1 ITEM NOMENCLATURE**

PE 0603758N: *Navy Warfighting Exp & Demo*

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2012 Navy **DATE:** February 2011

<b>APPROPRIATION/BUDGET ACTIVITY</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy</i> BA 3: <i>Advanced Technology Development (ATD)</i>				<b>R-1 ITEM NOMENCLATURE</b> PE 0603758N: <i>Navy Warfighting Exp &amp; Demo</i>				<b>PROJECT</b> 2918: <i>Navy Warfighting Experiments and Demo</i>			
<b>COST (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012 Base</b>	<b>FY 2012 OCO</b>	<b>FY 2012 Total</b>	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>2918: Navy Warfighting Experiments and Demo</i>	50.537	53.177	50.157	-	50.157	53.447	54.006	60.635	77.068	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, FBE, LOEs and Sea Trial Exercises.

The funding level decreases from FY 2011 to FY 2012 are the result of POM-12 refresh of ONR Leap Ahead portfolio as approved by DON S&T Corporate Board.

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

	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<b>Title:</b> NAVAL WARFARE EXPERIMENTATION	28.735	19.704	19.789
<p><b>Description:</b> The objective of this project is to capitalize on recent technology breakthroughs to develop prototypes quickly and provide them to the warfighter for experimentation during laboratory and operational demonstrations, Sea Trials or LOEs. Current efforts include experimentation with electronics warfare (EW) technologies, development of test simulation technology for ship affordability, technology to advance riverine warfare operations, development and demonstration of real time situational awareness technologies, power and energy for unmanned vehicles, and technology investigation studies.</p> <p>The funding level decrease in FY 2011 is due to completion of additional experimentation initiatives funded initially in FY 2010.</p> <p><b>FY 2010 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Continued concept based technology program efforts.</li> <li>- Continued experimentation efforts with technologies developed in SwampWorks/Tech Solutions.</li> <li>- Continued to identify promising technology breakthroughs that can be prototyped and delivered to the warfighter for experimentation.</li> <li>- Continued development and demonstration of real time situational awareness technologies.</li> <li>- Continued Ship Affordability program to examine ship designs and construction processes and develop technologies that can significantly reduce the costs to conceive, design and construct naval ships.</li> <li>- Continued DDG-51 fuel efficient power &amp; propulsion demonstrator effort.</li> <li>- Continued and completed Maritime Domain Awareness (MDA) augmentation.</li> <li>- Continued and completed effort to develop and demonstrate an integrated, affordable and minimally manned warfighting sensor capability to provide adaptive persistent surveillance leading to Operational Adaptation by Naval forces in defeating the Asymmetric and Irregular Warfare threat.</li> </ul>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<ul style="list-style-type: none"> <li>- Continued effort to develop and demonstrate integrated intelligence, surveillance, observation, and navigation technologies into a common operation picture accessible throughout the U.S. Government.</li> <li>- Continued development of network attack option models for near real time forensics and social network mapping.</li> <li>- Completed development of Autonomous Underwater Vehicle (AUV) large sensor network for persistent pervasive surveillance.</li> <li>- Completed at sea laser technology experimentation.</li> <li>- Completed effort to demonstrate shipboard high temperature degaussing technologies.</li> <li>- Initiated and completed advanced coupling for integrated in line high speed generator energy storage effort.</li> <li>- Initiated and completed experiments to demonstrate shipboard high efficiency solid state lighting technologies.</li> <li>- Initiated technology experimentation for Total Ownership Cost (TOC) reduction.</li> </ul> <p><b>FY 2011 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue all FY 2010 efforts, less those noted as complete above.</li> <li>- Complete development of network attack option models for near real time forensics and social network mapping.</li> <li>- Initiate efforts to develop and demonstrate technologies to meet current or emerging operational needs.</li> </ul> <p><b>FY 2012 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue all FY 2011 efforts, less those noted as complete above.</li> <li>- Initiate efforts to experiment and demonstrate technologies to meet current or emerging operational needs.</li> </ul>				
<p><b>Title:</b> OPERATIONS ANALYSIS</p> <p><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 Science and Technology (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 development and execution of an Electromagnetic Railgun Innovative Naval Prototype (INP) Simulation Experiment (SIMEX); participation in additional SIMEX design, data collection and analysis events; wargame design in support of the ONR Office of Innovation; analytical, strategic planning, and wargaming support; organizing and conducting workshops and symposia that increase innovation outreach; and participating in Red Teaming and conceptual analysis.</p> <p><b>FY 2010 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Continued to conduct Military Utility Analyses of Future Naval Capability technologies.</li> <li>- Continued to conduct capability gaps analyses to identify areas that can be addressed with products from the S&amp;T portfolio.</li> <li>- Continued to conduct SIMEX development, execution, data collection and analysis.</li> </ul>		2.799	2.864	2.855

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<p>- Continued to conduct wargame design in support of the ONR Office of Innovation.</p> <p>- Completed the design and execution of the Electromagnetic Railgun INP SIMEX to explore operational utility of the technology in different scenarios.</p> <p><b>FY 2011 Plans:</b></p> <p>- Continue all FY 2010 efforts, less those noted as complete above.</p> <p><b>FY 2012 Plans:</b></p> <p>- Continue all FY 2011 efforts.</p>				
<p><b>Title:</b> SWAMPWORKS</p> <p><b>Description:</b> SwampWorks seeks to develop and demonstrate technologies that address emergent and enduring operational problems in an accelerated timeframe. Some of these technologies may end up in the hands of the warfighter for experimentation, or may culminate in a significant exercise that demonstrates capability then transitions into the Acquisition Program of Record (POR). Examples of recent successes are the half-length torpedo which led to the development of the SwampWorks Broadband Sonar and transitioned to the Mk 48 Advanced Capability program and the Aircraft Carrier Situational Awareness System, which will be incorporated into a POR. Examples of current efforts include a high resolution sonar for the new lightweight torpedo, energy storage and reduced energy consumption technologies, coherent stand-in jammer, full ship shock test simulation, effective active acoustics simulation, power and energy for unmanned vehicles, and technology investigation studies.</p> <p>The increase in funding in FY 2011 is due to an increased emphasis in developing and demonstrating technologies that address emergent and enduring operational problems in an accelerated timeframe. Among the efforts pursued during FY 2011 are advanced development of DC power components and systems for shipboard applications; development of advanced unmanned systems; development of advanced technologies for the new generation of DDG-51; increased emphasis on electronic warfare, reduction of Total Ownership Costs (TOC), and autonomy capabilities; and rapid development of advanced technologies that directly support Navy priorities due to shifting theatres of operation.</p> <p>The funding level decreases from FY 2011 to FY 2012 are the result of POM-12 refresh of ONR Leap Ahead portfolio as approved by DON S&amp;T Corporate Board.</p> <p><b>FY 2010 Accomplishments:</b></p> <p>- Continued to identify enduring and emergent operational barriers identified by naval leadership and responded with relevant technology developments and demonstrations.</p> <p>- Continued novel heavy fuel propulsion system development.</p>		10.467	21.062	17.900

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<ul style="list-style-type: none"> <li>- Continued and complete development of electronic warfare technologies that are responsive to fleet needs to counter emerging threats.</li> <li>- Continued and completed flight deck non-skid project.</li> <li>- Continued disruptive commercial technology studies at varied military, government, and educational institutions.</li> <li>- Completed thermal management project.</li> <li>- Completed underwater communication technology development project.</li> <li>- Initiated exploration of technologies to address emergent EW threats for surface and air platforms.</li> <li>- Initiated high risk/high payoff projects to explore significant reduction in TOC.</li> </ul> <p><b>FY 2011 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue all FY 2010 efforts, less those noted as complete above.</li> <li>- Initiate efforts to develop technologies to meet current or emerging operational needs.</li> <li>- Initiate investment in submarine control surface technologies to provide improved maneuvering capabilities and drastically reduce TOC. Programs include but are not limited to the Virginia class, and Ohio Class replacement programs.</li> <li>- Initiate investment in advanced electronic warfare technologies; projects are expected to be classified at a higher level.</li> <li>- Initiate investments in technologies to reduce TOC for the new generation of DDG-51 vessels.</li> <li>- Initiate investment in technologies to improve the new DDG-51, with specific focus on advanced propulsion, and power generation and distribution.</li> </ul> <p><b>FY 2012 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue all FY 2011 efforts.</li> <li>- Initiate efforts to develop and demonstrate technologies to meet current or emerging operational needs.</li> </ul>				
<p><b>Title:</b> TECH SOLUTIONS</p> <p><b>Description:</b> Tech Solutions develops rapid response 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 Tech Solutions website, email, phone, or chain of command. Projects are initiated as requests come in and are completed in approximately twelve to eighteen months.</p> <p><b>FY 2010 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Developed, demonstrated and delivered technical solutions to all projects identified in the previous fiscal year.</li> <li>- Initiated development of projects that provide solutions to problems identified by Science Advisors and the Fleet/Force to address emergent critical needs.</li> </ul> <p><b>FY 2011 Plans:</b></p>		8.536	9.547	9.613

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>
<ul style="list-style-type: none"> <li>- Developed, demonstrated and delivered technical solutions to all projects identified in the previous fiscal year.</li> <li>- Initiated development of projects that provide solutions to problems identified by Science Advisors and the Fleet/Force to address emergent critical needs.</li> </ul> <p><b><i>FY 2012 Plans:</i></b></p> <ul style="list-style-type: none"> <li>- Developed, demonstrated and delivered technical solutions to all projects identified in the previous fiscal year.</li> <li>- Initiated development of projects that provide solutions to problems identified by Science Advisors and the Fleet/Force to address emergent critical needs.</li> </ul>			
<b>Accomplishments/Planned Programs Subtotals</b>	50.537	53.177	50.157

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**D. Acquisition Strategy**

Not applicable.

**E. Performance Metrics**

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 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.