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Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Navy										Date: March 2014		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 3: Advanced Technology Development (ATD)					R-1 Program Element (Number/Name) PE 0603123N / Force Protection Advanced Technology							
COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
Total Program Element	0.000	16.273	28.286	25.831	-	25.831	34.938	35.540	23.392	16.921	Continuing	Continuing
2912: Force Protection Advanced Technology	0.000	14.097	25.721	23.207	-	23.207	32.265	32.815	20.618	14.147	Continuing	Continuing
3049: Force Protection	0.000	2.176	2.565	2.624	-	2.624	2.673	2.725	2.774	2.774	Continuing	Continuing

# The FY 2015 OCO Request will be submitted at a later date.

## Note

FY 2013 funding associated with Future Naval Capability (FNC) efforts are transferring to a new Program Element titled Future Naval Capabilities Advanced Technology Development (PE 0603673N). This is to enhance the visibility of the FNC Program by providing an easily navigable overview of all 6.3 FNC investments in a single location.

## A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) are based on investment directions as defined in the Naval S&T Strategic Plan approved by the S&T Corporate Board (Sep 2011). This strategy is based on needs and capabilities from Navy and Marine Corps guidance and input from the Naval Research Enterprise (NRE) stakeholders (including the Naval enterprises, the combatant commands, the Chief of Naval Operations (CNO), and Headquarters Marine Corps). It provides the vision and key objectives for the essential science and technology efforts that will enable the continued supremacy of U.S. Naval forces in the 21st century. The Strategy focuses and aligns Naval S&T with Naval missions and future capability needs that address the complex challenges presented by both rising peer competitors and irregular/asymmetric warfare.

This PE addresses advanced technology development associated with providing the capability of Platform and Force Protection for the U.S. Navy. This program supports the development of technologies associated with all naval platforms (surface, subsurface, terrestrial and air) and the protection of those platforms.

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

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B. Program Change Summary (\$ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	18.616	28.328	32.354	-	32.354
Current President's Budget	16.273	28.286	25.831	-	25.831
Total Adjustments	-2.343	-0.042	-6.523	-	-6.523
• Congressional General Reductions	-	-0.042			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.262	-			
• SBIR/STTR Transfer	-0.521	-			
• Program Adjustments	-	-	-6.523	-	-6.523
• Rate/Misc Adjustments	0.001	-	-	-	-
• Congressional General Reductions Adjustments	-1.561	-	-	-	-
Change Summary Explanation					
Technical: Not applicable.					
Schedule: Not applicable.					

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Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy										Date: March 2014		
Appropriation/Budget Activity 1319 / 3					R-1 Program Element (Number/Name) PE 0603123N / Force Protection Advanced Technology				Project (Number/Name) 2912 / Force Protection Advanced Technology			
COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
2912: Force Protection Advanced Technology	-	14.097	25.721	23.207	-	23.207	32.265	32.815	20.618	14.147	Continuing	Continuing
# The FY 2015 OCO Request will be submitted at a later date.												
A. Mission Description and Budget Item Justification												
This project addresses advanced technology development associated with providing the capability of Platform and Force Protection for the U.S. Navy. This project supports the development of technologies associated with all naval platforms (surface, subsurface, terrestrial, and air) and the protection of those platforms.												
B. Accomplishments/Planned Programs (\$ in Millions)										FY 2013	FY 2014	FY 2015
Title: SURFACE SHIP & SUBMARINE HULL MECHANICAL & ELECTRICAL (HM&E)										6.004	6.821	8.656
Description: Activity includes: advanced technology demonstrations to evaluate emerging energy technologies and advanced technology development for Unmanned Sea Surface Vehicles. The funding increase from FY 2014 to FY 2015 is due the ramping up of the Energy Systems Technology Evaluation Program (E-STEP) effort.												
FY 2013 Accomplishments: - Continued development of autonomous navigation for Unmanned Sea Surface Vehicles from a host ship - Continued development of Integrated Damage Control Systems which includes Integrated Damage Control Communications and Advanced Magazine Protection System. - Continued Total Ship Survivability Damage Tolerance and Recoverability efforts which include integrated damage control situation awareness technologies. - Continued Affordable Submarine Propulsion and Control Surface Actuator technologies focused on the development and demonstration of affordable advanced material propellers and torque dense and quiet actuation of submarine control surface efforts. - Continued Underwater Total Ship Survivability/Payload Implosion and Platform Damage Avoidance efforts. - Continued scaled testing and large scale analysis for ship protection systems. - Continued fabrication of scaled control surface actuator systems. - Continued air-independent energy system sub-scale component development, analysis, and benchtop testing. - Continued efforts to conduct advanced technology demonstrations to evaluate emerging energy technologies using Navy and Marine Corps facilities as test beds.												

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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2013	FY 2014	FY 2015
- Initiated efforts to conduct advanced technology demonstrations to evaluate emerging energy technologies using Navy and Marine Corps facilities as test beds.  <b>FY 2014 Plans:</b> - Continue all efforts of FY 2013.  <b>FY 2015 Plans:</b> - Continue all efforts of FY 2014.					
<b>Title:</b> AIRCRAFT TECHNOLOGY  <b>Description:</b> DESCRIPTION: The Aircraft Technology activity develops technologies for enhanced capability of Naval aviation aircraft platforms in terms of mission effectiveness, platform range, responsiveness, survivability, observability, readiness, safety and life cycle cost. It also develops new Naval air vehicle concepts and high impact, scalable Naval air vehicle technologies, such as - autonomous air vehicle command and control, helicopter and tiltrotor rotor drive systems, aerodynamics, propulsion systems, materials, structures and flight controls for future and legacy air vehicles. This activity directly supports the Naval Aviation Enterprise Science and Technology Objectives and the Naval Science and Technology Strategic Plan, principally in the Autonomy and Unmanned Systems, Platform Design and Survivability, Power and Energy and Total Ownership Cost Focus Areas.  The funding increase in FY 2013 and ramp up in FY 2014 are due to the Autonomus Aerial Cargo/Utility System (AACUS) program and the 6.3 portion of the Variable Cycle Advance Technology (VCAT) program.  The funding decrease in FY 2015 is due to a re-scoping of the 6.3 portion of the Variable Cycle Advanced Technology (VCAT) program.  <b>FY 2013 Accomplishments:</b> - Initiated demonstration of initial core software, sensor, air vehicle, and capability applications for Autonomous Aerial Cargo/Utility System (AACUS). - Initiated the advanced technology demonstration portion of the Variable Cycle Advanced Technology (VCAT) Program. Critical technology development efforts will begin with major engine manufactures and system contractors to develop/mature the highest priority, long-lead propulsion system technologies, including variable/adaptive cycle engine components, for next generation carrier-based TACAIR/ISR systems.  <b>FY 2014 Plans:</b> - Continue all efforts of FY 2013.			8.093	18.900	14.551

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2013</b>	<b>FY 2014</b>
<ul style="list-style-type: none"> <li>- Demonstrate initial core software, sensor, air vehicle, and capability applications for Autonomous Aerial Cargo/Utility System (AACUS).</li> <li>- Complete the majority of VCAT Phase I variable cycle engine/propulsion subsystem technology development efforts.</li> </ul> <p><b>FY 2015 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue all efforts of FY 2014, less those noted as completed above.</li> <li>- Continue VCAT Phase I variable cycle engine/propulsion subsystem technology development efforts through completion.</li> </ul>			
<b>Accomplishments/Planned Programs Subtotals</b>		14.097	25.721
<b>C. Other Program Funding Summary (\$ in Millions)</b>			
N/A			
<b>Remarks</b>			
<b>D. Acquisition Strategy</b>			
N/A			
<b>E. Performance Metrics</b>			
<p>The overall goals of this advanced technology program are the development of technologies which focus on the warfighter and providing the ability to win or avoid engagements with other platforms or weapons and, in the event of engagement, to resist and control damage, while preserving operational capability. Overall metric goals are to transition the advanced technology projects into acquisition programs. Each Activity within this PE has unique goals and metrics, some of which include classified quantitative measurements.</p> <p>Specific examples of metrics under this PE include:</p> <ul style="list-style-type: none"> <li>- Advanced technology demonstrations to evaluate emerging energy technologies.</li> </ul>			

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COST (\$ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
3049: Force Protection	-	2.176	2.565	2.624	-	2.624	2.673	2.725	2.774	2.774	Continuing	Continuing

# The FY 2015 OCO Request will be submitted at a later date.

**A. Mission Description and Budget Item Justification**

Develop advanced technologies, critical to protecting naval installations, to provide seamless full spectrum protection against asymmetric terrorist attack by improving the ability to: sense developing and immediate threats; shape our responses through improved situational awareness and decision making; shield personnel, mission critical facilities, infrastructure, and operating fleet assets; maintain essential functions; and sustain and restore critical services in the aftermath of an incident. Technologies developed will also seek to reduce the required manpower and skill levels devoted to the force protection mission.

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

	<b>FY 2013</b>	<b>FY 2014</b>	<b>FY 2015</b>
<b>Title:</b> EMERGING THREATS	2.176	2.565	2.624
<p><b>Description:</b> This activity includes development of advanced technologies critical to protecting naval installations, and will provide seamless, full spectrum protection against asymmetric terrorist attack by improving the ability to: sense developing and immediate threats; shape our responses through improved situational awareness and decision making; shield personnel, mission critical facilities, infrastructure, and operating fleet assets; maintain essential functions; and sustain and restore critical services in the aftermath of an incident. Technologies developed will also seek to reduce the required manpower and skill levels devoted to the force protection mission.</p> <p><b>FY 2013 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Continued development of lower cost/higher performance Force Protection sensors and automated detection algorithms, and decision support tools.</li> <li>- Continued research to reduce force protection manpower and equipment costs through automation and predictive learning algorithms.</li> <li>- Continued threat characterization research and perception experiments for sensor performance optimization and model development and validation.</li> <li>- Continued development of all weather sensors optimized for installation of force protection.</li> <li>- Continued research into sensors for use in counter-surveillance around protected facilities.</li> <li>- Continued research to advance sensor fusion capabilities in high density networks with diverse sensor grids.</li> <li>- Continued development of assessment algorithms and information analysis technologies to augment skills or replace persons in operations centers.</li> <li>- Continued research into sensors and countermeasures for use against unmanned underwater vehicles.</li> </ul>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2013</b>	<b>FY 2014</b>
<ul style="list-style-type: none"> <li>- Continued multi-band electro-optical sensor and fusion algorithm development and demonstrations in adverse weather conditions.</li> <li>- Conducted interim demonstration of acoustic sensors for perimeter and area surveillance in realistic environments.</li> <li>- Initiated multi-band electro-optical sensor and fusion algorithm development and demonstrations in adverse weather conditions.</li> <li>- Initiated development of protection technology for naval installation power and energy infrastructure.</li> <li>- Expanded research into sensors and countermeasures for use against unmanned underwater to include surface swimmers, underwater divers, and underwater diver propulsion aids.</li> </ul> <p><b>FY 2014 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue all efforts of FY 2013, less those completed.</li> </ul> <p><b>FY 2015 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue all efforts of FY 2014.</li> <li>- Continue demonstration of multi-band electro-optical sensors and fusion algorithms in adverse weather conditions.</li> <li>- Initiate demonstration of sensors and countermeasures for use against underwater to include surface swimmers, underwater divers, diver propulsion aids, and underwater unmanned vehicles.</li> <li>- Initiate research in non-acoustic detection, tracking, classification, and engagement of underwater threats to naval installations.</li> <li>- Initiate development of autonomous unmanned harbor defense systems for perimeter patrol and threat interdiction.</li> </ul>			
<b>Accomplishments/Planned Programs Subtotals</b>		2.176	2.565
<b>C. Other Program Funding Summary (\$ in Millions)</b>			
N/A			
<b>Remarks</b>			
<b>D. Acquisition Strategy</b>			
N/A			
<b>E. Performance Metrics</b>			
<p>The overall goals of this advanced technology program are the development of technologies which will provide seamless full spectrum protection against asymmetric terrorist attack by improving the ability to protect naval installations. Overall metric goals are to reduce the required manpower and skill levels devoted to the force protection mission. Specific metric under the Project includes: 50% reduction of manpower associated with FP surveillance, situational awareness, and decision making, 2x improvement in electro-optical sensor performance in adverse weather conditions, 50%reduction in sensor cost per square or cubic meter of detection at a given resolution, and a 50% reduction in false alarm rates for automated detection and tracking algorithms both above and below water.</p>			