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Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy									DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 4: Advanced Component Development & Prototypes (ACD&P)				R-1 ITEM NOMENCLATURE PE 0303562N: Submarine Tactical Warfare Systems - MIP							
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	4.253	0.000	4.253	4.334	4.404	4.503	4.595	Continuing	Continuing
0770: Adv Sub Supp Equip Prog	0.000	0.000	4.253	0.000	4.253	4.334	4.404	4.503	4.595	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Submarine Tactical Warfare Systems program element is comprised of the Advanced Submarine Support Equipment Program (ASSEP) and the Submarine Special Operations Support Program. The objective is to improve submarine operational effectiveness through the development and implementation of advanced Research and Development (R&D). In order to provide improved operational effectiveness, research and development efforts are focused on Advanced Imaging Developments and Advanced Electronic Warfare Support (ES) Developments. A continuing need exists to improve these capabilities in view of the advancements in potential imaging counter detection, the need to support specialized missions and the increasingly dense and sophisticated electronic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Ongoing developments in 360 degree imaging systems technologies are supporting these needs.

B. Program Change Summary (\$ in Millions)

	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011 Base</u>	<u>FY 2011 OCO</u>	<u>FY 2011 Total</u>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	4.253	0.000	4.253
Total Adjustments	0.000	0.000	4.253	0.000	4.253
• Congressional General Reductions		0.000			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Program Adjustments	0.000	0.000	4.253	0.000	4.253

Change Summary Explanation

Technical: Not. applicable.

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<p>Schedule: Not applicable.</p> <p>FY11 from previous President's Budget is shown as zero because no FY11-15 data was presented in President's Budget 2010.</p>		

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Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy								DATE: February 2010			
APPROPRIATION/BUDGET ACTIVITY 1319: <i>Research, Development, Test & Evaluation, Navy</i> BA 4: <i>Advanced Component Development & Prototypes (ACD&P)</i>				R-1 ITEM NOMENCLATURE PE 0303562N: <i>Submarine Tactical Warfare Systems - MIP</i>				PROJECT 0770: <i>Adv Sub Supp Equip Prog</i>			
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
0770: <i>Adv Sub Supp Equip Prog</i>	0.000	0.000	4.253	0.000	4.253	4.334	4.404	4.503	4.595	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		
A. Mission Description and Budget Item Justification <p>A continuing need exists to improve Imaging and Electronic Warfare Support (ES) capabilities in view of the advancements in potential imaging counter detection, the need to support specialized missions and the increasingly dense electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine ES and imaging to be operationally effective in the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection and Joint Strike. The program is divided into two project categories: Advanced Imaging Project Development and Advanced Electronic Warfare Support Project Development. Both of these categories will allow for the evaluation of the vulnerability of submarine masts, periscopes and sensors to visual, radar, and infrared detection and evaluation of state of the art technology to implement periscope/mast engineering improvements to reduce counter detection threats, the pursuit of technologies (such as PATRIOT LPI radar range finding and 360 degree imaging systems) to develop submarine unique improvements to mast, periscope, and ES electromagnetic and electro-optic sensors based on emerging technologies available from DOD Exploratory Development Programs, industry Independent Research and Development, academia and other sources. Feasibility demonstration models (FDMs) are developed, evaluated, and validated in the lab and through at-sea.</p> <p>The Advanced Imaging Project Development Projects Include the development of: 360 Degree Imaging - Far Term Advanced System, 360 Degree Imaging - Near Term System, 360 Degree Submarine Panoramic Infra-Red (SPIR) Imaging System, 360 Degree Affordable Modular Panoramic Periscope (AMPP), Low Cost Expendable Sensor (LCES), Advanced Head Window Water Shedding, Electro-Optic Diplooms, and a Low Cost, Multi-Spectral, Grade A Head Window. The Advanced Electronic Warfare Support (ES) Development Projects include the development of: PATRIOT Phase B - Low Probability of Intercept (LPI) Radar, LPI Direction Finding (DF), Distant ES Support and Remote Log-In, Specific Emitter Identification (SEI) Improvements, ES Vulnerability Tool, Integrated ES and ECS Radio Frequency Distribution Unit (RFDU), Multi-function Modular Mast (MMM) Payloads, Mast Signature Reduction, PATRIOT Non-Scanning LPI Radar.</p> <p>All programs funded in this project are non-acquisition category programs. Program plans and priorities are established by N87. The test articles identified consist of critical components that will be fully developed during engineering development into Engineering Development Models (EDMs). ASSEP Programs will eventually be broken down into initial and developmental research, for both Imaging and Electronic Warfare.</p> <p>The ASSEP Program will become a Military Intelligence Program beginning Fiscal Year 2011 under a new Program Element 0303562N.</p>											

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Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 ITEM NOMENCLATURE PE 0303562N: Submarine Tactical Warfare Systems - MIP	PROJECT 0770: Adv Sub Supp Equip Prog			
B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Advanced Imaging Project Development <i>FY 2011 Base Plans:</i> 360 Degree Imaging (JPL) - Far Term Advanced System 360 Degree Imaging (ONR T18)- Near Term System 360 Degree Submarine Panoramic Mid-Wave Infra-Red (MWIR) Imaging System 360 Degree Affordable Modular Panoramic Periscope (AMPP) Advanced Head Window Water Shedding Low Cost, Multi-Spectral Grade A Head Window	0.000	0.000	2.552	0.000	2.552
Advanced Electronic Warfare Support (ES) Project Development <i>FY 2011 Base Plans:</i> PATRIOT Phase B - Low Probability of Intercept (LPI) Radar Capability Insertions (CI) LPI Direction Finding (DF) Distant ES Support and Remote Log-In Specific Emitter Identification (SEI) Improvements ES Vulnerability Tool Integrated ES and ECS Radio Frequency Distribution Unit (RFDU) Multi-function Modular Mast (MMM) Payloads Mast Signature Reduction PATRIOT Non-Scanning LPI Radar	0.000	0.000	1.701	0.000	1.701
Accomplishments/Planned Programs Subtotals	0.000	0.000	4.253	0.000	4.253

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Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: <i>Research, Development, Test & Evaluation, Navy</i> BA 4: <i>Advanced Component Development & Prototypes (ACD&P)</i>	R-1 ITEM NOMENCLATURE PE 0303562N: <i>Submarine Tactical Warfare Systems - MIP</i>	PROJECT 0770: <i>Adv Sub Supp Equip Prog</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
D. Acquisition Strategy This project optimizes technology insertion using a build-test-build approach to support ES and imaging operational needs. Operational needs have been based on the tactical requirements identified in CNO letters, Serial N77/3U629212, dated 04 Sep 03, Serial N77/3U629205, dated 01 Apr 03, and Serial N77/1U651534, dated 30 Oct 01, COMSUBLANT/COMSUBPACCommand Capability Issues (CCIs), Virginia Class SSN Operational Requirements Document objectives, a review, assessment and prioritization of Sensor and Processor efforts and SSN force level projections for SSN688/688I, SSN21, and SSN 774 classes through FY2011. Project efforts develop submarine unique improvements to mast, periscope, and ES electromagnetic and electro-optic sensors based on emerging technologies that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility Demonstration Models (FDMs) will be developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing.		
E. Performance Metrics The RDD program goal is to respond to urgent operational needs within 30 days and provide for rapid development and fielding of prototype solutions within 270 days.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Navy											DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 1319: Research, Development, Test & Evaluation, Navy BA 4: Advanced Component Development & Prototypes (ACD&P)				R-1 ITEM NOMENCLATURE PE 0303562N: Submarine Tactical Warfare Systems - MIP				PROJECT 0770: Adv Sub Supp Equip Prog					
Product Development (\$ in Millions)													
				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPIF	JPL Pasadena, CA	0.000	0.000		1.504	Oct 2010	0.000		1.504	Continuing	Continuing	Continuing
Systems Engineering	WR	NUWC, Newport, RI	0.000	0.000		2.474	Oct 2010	0.000		2.474	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		3.978		0.000		3.978			
Remarks													
Support (\$ in Millions)													
				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Technical Services	C/CPAF	AT&T GSI Vienna, VA	0.000	0.000		0.240	Feb 2011	0.000		0.240	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.240		0.000		0.240			
Remarks													

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Management Services (\$ in Millions) <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th colspan="4"></th> <th colspan="2">FY 2010</th> <th colspan="2">FY 2011 Base</th> <th colspan="2">FY 2011 OCO</th> <th>FY 2011 Total</th> <th colspan="3"></th> </tr> <tr> <th>Cost Category Item</th> <th>Contract Method & Type</th> <th>Performing Activity & Location</th> <th>Total Prior Years Cost</th> <th>Cost</th> <th>Award Date</th> <th>Cost</th> <th>Award Date</th> <th>Cost</th> <th>Award Date</th> <th>Cost</th> <th>Cost To Complete</th> <th>Total Cost</th> <th>Target Value of Contract</th> </tr> <tr> <td>Travel</td> <td>WR</td> <td>Various Not Specified</td> <td align="right">0.000</td> <td align="right">0.000</td> <td></td> <td align="right">0.035</td> <td></td> <td align="right">0.000</td> <td></td> <td align="right">0.035</td> <td>Continuing</td> <td>Continuing</td> <td>Continuing</td> </tr> <tr> <td align="right" colspan="3">Subtotal</td> <td align="right">0.000</td> <td align="right">0.000</td> <td></td> <td align="right">0.035</td> <td></td> <td align="right">0.000</td> <td></td> <td align="right">0.035</td> <td></td> <td></td> <td></td> </tr> </table>																		FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total				Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	Travel	WR	Various Not Specified	0.000	0.000		0.035		0.000		0.035	Continuing	Continuing	Continuing	Subtotal			0.000	0.000		0.035		0.000		0.035			
				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total																																																											
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract																																																								
Travel	WR	Various Not Specified	0.000	0.000		0.035		0.000		0.035	Continuing	Continuing	Continuing																																																								
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Project Cost Totals	0.000	0.000	4.253	0.000	4.253																																																																
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Exhibit R-4, RDT&E Schedule Profile: PB 2011 Navy																	DATE: February 2010											
APPROPRIATION/BUDGET ACTIVITY									R-1 ITEM NOMENCLATURE									PROJECT										
1319: Research, Development, Test & Evaluation, Navy BA 4: Advanced Component Development & Prototypes (ACD&P)									PE 0303562N: Submarine Tactical Warfare Systems - MIP									0770: Adv Sub Supp Equip Prog										
Fiscal Year	2009				2010				2011				2012				2013				2014				2015			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ASSEP																												
Imaging Advanced Development																												
360 Degree Imaging (ONR T18 AA/360) [Mid Term]																												
360 Degree Imaging (ONR 360 MWIR) [Mid Term]									Brass Board	Lab Demo	Land Testing		Perside Testing		At-Sea Test													
360 Degree Imaging (JPL Version) [Long Term]								Spiral 1 Commenced	At-Sea Test	Spiral 2 Commence	Lab Demo		At-Sea Test		Spiral 3 Commence	Lab Demo		At-Sea Test										
360 Degree Imaging (ONR AMPP) [Long Term]									Perf Spec	Brass Board		Brass Board			Lab Demo		Land Testing		Perside Testing		At-Sea Test							
Electro Optic Diploop [Long Term]										Concept Study			Perf Spec		Lab Demo				Pressure/Cycle Testing					At-Sea Test				
Low Cost, Multi-Spectral, Grade A Head Window (Spinel)																												
Head Window Water Shedding																												
Electronic Warfare Advanced Development																												
PATRIOT Phase B - LPI Radar																												
Capability Insertions (Cis) (LP DF, Distant Support/Remote Login, Specific Emitter Identification Improvements, ES Vulnerability Tool/Tactical Decision Aid, Integrated ES/ECS RFDU, MMM Payload)									EDM	Development	Lab Eval	Lab Demo	At-Sea Test	EDM	Development	Lab Eval		At-Sea Test	EDM									
Mast Signature Reduction									Concept Study		Lab Eval		Concept Study			Lab Eval									Concept Study			
Non-Scanning LPI Radar													Concept Study			Perf Spec		Lab Demo						Concept Study				

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Exhibit R-4A, RDT&E Schedule Details: PB 2011 Navy			DATE: February 2010
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Schedule Details

Event	Start		End	
	Quarter	Year	Quarter	Year
360 Degree Imaging (ONR) - MWIR - (Brass Board)	1	2011	1	2011
360 Degree Imaging (ONR) - MWIR - (Lab Demo)	4	2011	4	2011
360 Degree Imaging (ONR) - MWIR - (Land Testing)	2	2012	2	2012
360 Degree Imaging (ONR) - MWIR - (Pierside Testing)	4	2012	4	2012
360 Degree Imaging (ONR) - MWIR - (At-Sea Testing)	4	2013	4	2013
360 Degree Imaging (JPL) - (At-Sea Test)	1	2011	1	2015
360 Degree Imaging (JPL) - (Lab Demo)	1	2012	1	2014
360 Degree Imaging (ONR) - AMPP - (Perf Spec)	1	2011	1	2011
360 Degree Imaging (ONR) - AMPP - (Bread Board)	4	2011	4	2011
360 Degree Imaging (ONR) - AMPP - (Brass Board)	3	2012	3	2012
360 Degree Imaging (ONR) - AMPP - (Lab Demo)	2	2013	2	2013
360 Degree Imaging (ONR) - AMPP- (Land Testing)	1	2014	1	2014
360 Degree Imaging (ONR) - AMPP- (Pierside Testing)	4	2014	4	2014
360 Degree Imaging (ONR) - AMPP- (At-Sea Testing)	4	2015	4	2015
Capability Insertions (CI) - (EDM)	1	2011	4	2015
Capability Insertions (CI) - (Development)	2	2011	4	2013
Capability Insertions (CI) - (Lab Eval)	1	2012	3	2014
Capability Insertions (CI) - (Lab Demo)	3	2012	3	2012

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		Start		End
Event	Quarter	Year	Quarter	Year
Capability Insertions (CI) - (At-Sea Testing)	1	2013	2	2015
Mast Signature Reduction - (Concept Study)	2	2011	4	2015
Mast Signature Reduction - (Lab Eval)	3	2012	4	2014
PATRIOT Non-Scanning LPI Radar - (Concept Study)	1	2013	4	2015
PATRIOT Non-Scanning LPI Radar - (Perf Spec)	1	2014	1	2014
PATRIOT Non-Scanning LPI Radar - (Lab Demo)	1	2015	1	2015
Electro Optic Diploop - (Concept Study)	1	2012	1	2012
Electro Optic Diploop - (Perf Spec)	1	2013	1	2013
Electro Optic Diploop - (Lab Demo)	1	2014	1	2014
Electro Optic Diploop - (Pressure/Cycle Testing)	1	2015	1	2015
Electro Optic Diploop - (At-Sea Testing)	4	2015	4	2015

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