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CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION , NAVY/ BA-5					R-1 ITEM NOMENCLATURE 0604503N/Submarine Systems Equipment Development			
COST (\$ in Millions)	FY2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	104.086	109.204	114.789	103.482	101.731	115.823	113.140	111.679
0775/Submarine Support Equipment	1.385	1.693	1.388	1.425	1.461	1.494	1.521	1.549
0219/Submarine Sonar Improvements	51.810	57.859	62.071	54.102	60.376	75.723	77.119	78.558
0742/Submarine Integrated Antenna Systems	25.039	18.514	34.782	33.668	30.418	29.552	25.292	22.207
1411/Submarine Tactical Communications Systems	14.235	16.394	16.548	14.287	9.476	9.054	9.208	9.365
9999/Congressional Adds	11.617	14.744						

Defense Emergency Responses Funds (DERF) Funds: NOT APPLICABLE

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Submarine Support Equipment Program develops and improves submarine Electronic Warfare Support (EWS) techniques, components, equipment, and systems that will increase submarine operational effectiveness, safety of ship, and survivability in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine EWS to be operationally effective in the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare and Intelligence Collection, Maritime Protection, and Joint Strike.

The Submarine Sonar Improvement Program delivers block updates to Sonar Systems installed on SSN 688, 688I, 21, TRIDENT and SSGN Class Submarines to maintain clear acoustic, tactical and operational superiority over submarine and surface combatants in all scenarios through detection, classification, localization and contact following. Current developments are focused on supporting Littoral Warfare, Regional Sea Denial, Battle Group Support, Diesel Submarine Detection, Surveillance, and Peacetime Engagement.

The Submarine Support Equipment Program develops and improves submarine Electronic Warfare Support (ES) techniques and components, equipment, and systems that will increase submarine operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine ES to be effective in conducting the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare and Intelligence Collection, Maritime Protection, and Joint Strike.

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APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY /	BA-5	0604503N/ Submarine Systems Equipment Development	
B. (U) Program Change Summary:			
Funding: For BLIs 0775/0219/0742/1411		FY2006	FY2007
FY07 President's Budget		106.048	94.839
FY08/09 President's Budget		104.086	109.204
Total Adjustments		<u>-1.962</u>	<u>14.365</u>
		1.548	-20.134
Summary of Adjustments			
Congressional program reductions		0.029	-0.16
Congressional increases		0.042	14.744
Program reductions		-2.406	-0.219
Program increases		0.363	11.251
Reprogrammings		0.01	2.715
		<u>-1.962</u>	<u>14.365</u>
		1.548	-20.134
Schedule:			
Cancels Large Vertical Array development due to budget constraints			
SubHDR FOT/SHF Initial Operating Capability (IOC) rephased from 2nd qtr FY06 to 4th qtr FY07.			
CSRR SEAWOLF Technical Evaluation (TECHEVAL) 3Q FY06. SEAWOLF Operational Evaluation (OPEVAL) 4Q FY06, CSRR SSBN TECHEVAL 2Q FY07, CSRR OPEVAL 2Q FY07, CSRR SSGN TECHEVAL 2Q FY07, CSRR SSGN OPEVAL 3Q FY07.			
Comms at Speed and Depth (CSD) Milestone C decision changed from 1Q FY08 to 3Q FY07.			
Technical: None			

EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/ BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N/Submarine System Equipment Development				PROJECT NUMBER AND NAME 0775/Submarine Support Equipment			
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0775 Submarine Support Equipment Program	1.385	1.693	1.388	1.425	1.461	1.494	1.521	1.549
RDT&E Articles Qty								
<p>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</p> <p>This program develops and improves techniques, components, equipment, and systems that will increase submarine operational effectiveness, safety of ship, and survivability in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for Submarine Electronic Warfare Support (ES) systems to be operationally effective in the following mission areas: Joint Littoral Warfare; Joint Surveillance, Space and Electronic Warfare and Intelligence Collection; Maritime Protection; Information Operations, Special Operations Force (SOF) Support; and Joint Strike. Efforts include: (1) Integration of the technology developed and transitioned from the Advanced Submarine Support Equipment Program (ASSEP), project F0770 into the tactical ES system; (2) Resolution of software trouble reports during technology updates, from fleet feedback reports, and Submarine Warfare Federated Tactical System (SWFTS)/Non Propulsion Electronic System (NPES) Tactical Local Area Network (TACLAN) migrations; (3) Integration, test, and installation of COTS technology for system enhancements.</p> <p>The program supports three submarine mission support categories; Threat Warning/Self Protection; Situational Awareness; and Intelligence, Surveillance and Reconnaissance (ISR). Threat Warning/Self Protection projects evaluate the vulnerability of submarine masts, periscopes and sensors to visual, radar, and infrared detection. It also evaluates state of the art technology to implement periscope/mast and engineering improvements into the tactical ES system, ie AN/BLQ-10 to reduce counter detection threats. Both Situational Awareness and ISR projects develop submarine unique improvements based on emerging technologies that are available from DOD exploratory development programs and other sources.</p> <p>Threat Warning/Self Protection sub-projects include: Low Probability of Intercept (LPI) Receiver and AN/BLQ-10 software enhancements, Information Warfare Payloads, Environmental Vulnerability Server.</p> <p>Situational Awareness sub-projects include: Embedded National Tactical Receiver (ENTR), Integration of GALE, and Multifunction Modular Mast (MMM) Antenna, Special Emitter ID enhancements, algorithm development, passive ranging.</p> <p>ISR sub-projects include: Advanced EW Tuners, MMM Antenna, processor miniaturization, obsolescence issues, remote maintenance & operation, automatic calibration.</p> <p>RDTE Funding line supports the entire AN/BLQ-10 ES procurement program. Average FY OPN and SCN hardware procurement yearly funds are \$80M.</p>								

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2007
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/ BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N/Submarine System Equipment Development	PROJECT NUMBER AND NAME 0775/Submarine Support Equipment

B. Accomplishments/Planned Program

0775 Submarine Support Equipment Program

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	1.385			
RDT&E Articles Quantity				

FY 06
NPES and SWFTS software baseline changes. Research and resolve AN/BLQ-10 SPRs. ESM software enhancements. At-Sea Test and Deployment of ENTR/GALE with AN/BLQ-10. Support development of MMM Antenna. Plan and support AN/BLQ-10(V)1 ES Virginia Class DT/OT.

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost		1.693		
RDT&E Articles Quantity				

FY 07
NPES software and SWFTS baseline changes. Research and resolve AN/BLQ-10 SPRs. ESM software enhancements. Support IO Payload development. Support AN/BLQ-10(V)1 ES Virginia Class DT/OT. LPI Receiver DF development, remote maintenance & operations development, EVS development. SEI enhancements.

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost			1.388	
RDT&E Articles Quantity				

FY 08
Conduct Test of Specific Emitter Identification enhancements, Automatic Contact Correlation, LPI Receiver DF, EVS Test, Auto Calibration & testing, IO payload development, algorithm development. NPES and SWFTS software baseline changes.

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost				1.425
RDT&E Articles Quantity				

FY 09
Conduct Test of Specific Emitter Identification, Automatic Contact Correlation, and LPI Receiver. Passive Ranging Development. Processor improvements. Research and resolve AN/BLQ-10 SPRs.

EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2007
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N/ BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N/Submarine System Equipment Development	PROJECT NUMBER AND NAME 0775/Submarine Support Equipment
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C. OTHER PROGRAM FUNDING SUMMARY:

<u>Line Item No. & Name</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>To Complete</u>	<u>Total Cost</u>
OPN LI 2560 Submarine Support Equipment Program										
ML003 SSEP Special Purpose Equipment	0.270	0.275	0.280	0.285	0.291	0.297	0.303	0.309	Continuing	Continuing
ML007 ICADF	18.626	6.448	9.876	6.720	12.142	0.000	15.825	0.000	Complete	62.891
ML008 ICADF Antenna	16.120	9.580	17.047	19.833	22.714	23.123	10.492	8.034	Continuing	Continuing
ML009 APB-EW	0.150	0.282	0.898	0.918	3.083	3.152	3.221	3.291	Continuing	Continuing
ML010 Tech Refresh Upgrades	0.160	0.306	1.202	1.226	3.221	3.293	3.365	3.438	Continuing	Continuing
ML013 ESM IMA Support	0.369	0.186	0.190	0.193	0.197	0.201	0.205	0.210	Continuing	Continuing
ML015 AN/BLQ-10(V) SSN ES Backfit Syster	42.588	44.878	50.908	55.139	6.709	0.000	0.000	0.000	Complete	235.872
ML016 AN/BLQ-10(V) SSBN ES Systems	0.000	0.000	0.000	0.000	21.868	22.309	12.748	0.000	Complete	56.925
ML017 AN/BLQ-10 Field Change Kits	2.467	8.480	4.116	2.477	15.525	43.502	54.112	57.185	Continuing	Continuing
MLCA1 AN/BLQ-10(V) Tech Refresh	3.150	3.500	0.000	0.000	0.000	0.000	0.000	0.000		
SCN LI 201300 VIRGINIA Class Submarine										
PE 0204287N	19.752	24.532	24.922	25.320	25.726	52.282	53.432	27.304	Continuing	272.597
Partial (AN/BLQ-10 ES Only)										

Related RDT&E:

(U) PE 0603562N/Submarine Tactial Warfare System/F0770 Advanced Submarine Support Equipment Program (ASSEP)

D. ACQUISITION STRATEGY:

AN/BLQ-10 (V) ES System - Procurements are executed/managed in accordance with the Acquisition Strategy Report (Rev 4) for AN/BLQ-10(V) ES System dtd 3/7/06 and the Acquisition Plan (Rev 6) for AN/BLQ-10(V) ES System dtd 3/7/06.

E. MAJOR PERFORMERS:

Lockheed-Martin, Syracuse, NY - AN/BLQ-10 system developer and End-to-End Integrator
 NUWC, Newport, RI - EW Library developer, AN/BLQ-10 systems engineering, TEMPALT development, integration support, DT/OT support, ISEA, and TDA.

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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/ BA-5				PROGRAM ELEMENT 0604503N/Submarine System Equipment Development						PROJECT NUMBER AND NAME 0775/Submarine Support Equipment				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
0775 Submarine Support Equipment Program														
AN/BLQ-10 ES Product Improvement	CPFF	Lockheed Syracuse, NY		0.467	02/07	0.671	02/07	0.632	03/08	0.625	03/09	CONT	CONT	NA
Systems Engineering & Test Support	WR	NUWC Newport, RI		0.475	11/05	0.546	11/06	0.291	03/08	0.380	03/09	CONT	CONT	N/A
Miscellaneous	VARIOUS	VARIOUS		0.067	11/05	0.127	11/06	0.050	03/08	0.042	03/09	CONT	CONT	N/A
Subtotal Product Development			0.000	1.009		1.344		0.973		1.047		CONT	CONT	N/A
Remarks:														
Software Development													0.000	NA
Training Development													0.000	
Integrated Logistics Support													0.000	
Configuration Management													0.000	
Technical Data													0.000	
Engineering Technical Services	CPAF	AT&T GSI, Vienna VA		0.250	11/06	0.213	03/07	0.217	03/08	0.222	03/09	CONT	CONT	NA
GFE													0.000	
Subtotal Support			0.000	0.250		0.213		0.217		0.222		CONT	CONT	
Remarks:														

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT							PROJECT NUMBER AND NAME				
RDT&E, N/ BA-5			0604503N/Submarine System Equipment Development							0775/Submarine Support Equipment				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
0775 Submarine Support Equipment Program														
Operational Test & Evaluation														
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														
Contractor Engineering Support														
Government Engineering Support														
Management Support Services														
Travel														
Labor (Research Personnel)														
SBIR Assessment														
Subtotal Management				0.126		0.136		0.198		0.156		CONT	CONT	
Remarks:														
Total Cost			0.000	1.385		1.693		1.388		1.425		CONT	CONT	
Remarks:														

EXHIBIT R4, Schedule Profile																							DATE: February 2007													
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/ BA-5					PROGRAM ELEMENT NUMBER AND NAME 0604503N/Submarine System Equipment Development										PROJECT NUMBER AND NAME 0775/Submarine Support Equipment																					
Fiscal Year	2006				2007				2008				2009				2010				2011				2012				2013							
	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	1	2	3	4				
SSEP F0775 SCHEDULE																																				
AN/BLQ-10 Baseline SWFTS and NPES Changes, SPR Resolution and Software Enhancements	S/W Update				S/W Update				S/W Update				S/W Update				S/W Update				S/W Update				S/W Update				S/W Update							
Specific Emitter ID/Auto Contact Correlation					Test				Spiral 1																											
Low Probability of Intercept DF (LPI)					Integrate				At-Sea Test				Spiral 1																							
Advanced EW Tuners					Research				Test				Integrate								Research				Test				Downselect & Integrate							
Multifunction Modular Mast (MMM) Payload													Integrate								Spiral 1								Spiral 2							
Processor Upgrade	Research				Test				Integrate												Research				Test				Integrate							
Remote Maintenance					Test				Integrate																											
EVS																	Research				Test				Integrate											
Multi Static Passive Ranging																									Research				At-Sea Test							
Next Generation Processor																									Research				Test							
Pulse Digitizer Upgrade																									Research				Test				At-Sea Test			
Radar Wideband Miniaturization																													Research				Test			

Exhibit R-4a, Schedule Detail					DATE: February 2007			
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT			PROJECT NUMBER AND NAME			
RDT&E, N/ BA-5		0604503N/Submarine Sys Equip Development			0775/Submarine Support Equipment			
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
AN/BLQ-10 Baseline Changes, SPR Resolution, and Software Enhancements	2Q	2Q	2Q	2Q	2Q	2Q	2Q	2Q
0775 Sub Specific Emitter ID/ACC & Virginia DT/OT								
At -Sea Test		2Q						
Spiral 1			3Q					
Spiral 2							1Q	
LPI DF								
Integrate		2Q	2Q					
At -Sea Test								
Spiral 1				3Q				
Advanced EW Tuners								
Research		3Q			4Q			
Test			3Q			4Q		
Downselect and Integrate				1Q			4Q	
Multifunction Modular Mast (MMM) Payload								
S/W Specification								
Integrate				1Q				
Spiral 1					4Q			
Spiral 2							4Q	
Spiral 3								
Processor Upgrade								
Research	3Q				3Q			
Test		1Q				1Q		
Integrate		2Q				3Q		
Remote Maintenance								
Test		2Q						
Integrate			2Q					
EVS								
Research					1Q			
Test						1Q		
Integrate						2Q		
Multi Static Passive Ranging								
Research							1Q	
At-Sea Test								3Q
Next Generation Processor								
Research							2Q	
Test								4Q
Pulse Digitizer Upgrade								
Research						4Q		
Test							2Q	
At-Sea Test								2Q
Radar Wideband Miniaturization								
Research							3Q	
Test								3Q

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EXHIBIT R-2a, RDT&E Budget Item Justification							DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/ BA-5		PROGRAM ELEMENT NUMBER AND NAME 0604503N/Submarine Systems Equipment Development			PROJECT NUMBER AND NAME 0219/Submarine Sonar Improvement			
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	51.810	57.859	62.071	54.102	60.376	75.723	77.119	78.558
RDT&E Articles Qty								

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program delivers block updates to Sonar Systems installed on SSN 688, 688I, 21, SSGN and TRIDENT Class Submarines to maintain clear acoustical, tactical and operational superiority over submarine and surface combatants in all scenarios through detection, classification, localization and contact following. Current developments, detailed below, are focused on supporting Littoral Warfare, Regional Sea Denial, Battle Group Support, Diesel Submarine Detection, Surveillance, and Peacetime Engagement. Acoustics Rapid COTS Insertion (A-RCI) is a multi-phased, evolutionary development effort geared toward addressing Acoustic Superiority issues through the rapid introduction of interim development products applicable to SSN 688, 688I Flight, SSN21, SSGN, VIRGINIA, and SSBN 726 Class Submarines. A-RCI Phases I and II introduce towed array processing improvements; A-RCI Phase III introduces spherical array processing improvements, and AN/BSY-1 High Frequency Upgrade introduce high frequency array processing improvements for SSN 688I, SSGN, VIRGINIA and Seawolf Class. As part of CNO N872's plan to maintain acoustic superiority for In-Service Submarines a joint cooperative effort with PEO IWS-5 to deliver annual Advanced Processing Builds (APBs) to prevent obsolescence and deliver capability improvements is ongoing. The capabilities in the APBs will be integrated as part of A-RCI certified systems. This effort, known as the N872 Business Plan funds the APB integration efforts with the Multi-Purpose Processor as well as the AN/BQQ-10 Sonar system beginning in FY02. This budget submit also reflects development of the Total Ship Monitoring System and Active Intercept and Ranging capabilities to be introduced into the Fleet.

Towed system's development efforts provide increased operational capabilities and reliability improvements to maintain a clear acoustical, tactical, and operational superiority over submarine and surface combatants. These efforts include development of a Fiber Optic Thinline Towed Array, (TB-33) for increased reliability, the Next Generation Fatline Towed Array (TB-34) which provide improved Littoral Operational capability and the Low Cost Conformal Array, an HF array that provides enhanced situational awareness.

AN/BSY-2 efforts are focused on ARCI-(V)5 development which implements ARCI Phases II-IV in the Seawolf Class submarines.

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B. Accomplishments/Planned Program

	FY06	FY07	FY08	FY09
Accomplishments/Effort/Subtotal Cost	14.106	14.562	14.106	14.562
RDT&E Articles Quantity				

APB Productionization
 Completed A-RCI OpEval in FY03. Received A-RCI MSIII decision authority in FY04.
 FY06 - Began the productization of APB 06
 FY07 through FY09 - Continue Advanced Processing Build (APB) Sea Testing, Integration and Certification. This effort is primarily the transition of APB software from development to A-RCI for integration and test, and formal certification.

	FY06	FY07	FY08	FY09
Accomplishments/Effort/Subtotal Cost	26.051	35.571	28.765	32.274
RDT&E Articles Quantity				

Integration and Testing.
 Awarded new contracts to Lockheed Martin and General Dynamics in FY04 for continued A-RCI and MPP development, integration and test.
 FY06 - Began transition and integration of APB 06.
 FY07 through FY09 - Continued Integration and testing to support the introduction of Advanced Processing Builds to be installed on SSN 688I, SSN 688, SSBN 730, SSN 21, and SSGN 726 and VA Class.

	FY06	FY07	FY08	FY09
Accomplishments/Effort/Subtotal Cost	0.900			
RDT&E Articles Quantity				

BQS-15A EC20
 Merges the BQS-15 EC-18 array with A-RCI processing displays.
 FY06 - Completed development, integration and testing of the BQS-15A EC-20.

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B. Accomplishments/Planned Program (Cont.)

	FY06	FY07	FY08	FY09
Accomplishments/Effort/Subtotal Cost		2.000	3.300	2.200
RDT&E Articles Quantity				

HF Precision Imaging Active Sonar
Begin development efforts for HF Precision Imaging Active Sonar in FY07.

	FY06	FY07	FY08	FY09
Accomplishments/Effort/Subtotal Cost			10.500	3.000
RDT&E Articles Quantity				

Low Cost Confromal ArrayLCCA is a low cost HF array that provides enhanced situational awareness, providing the capability to extend passive detection range in littoral environments against quiet threats and multi-path ranging beyond first bottom bounce capability. The program is being developed by PEO-IWS-5 and is currently scheduled to transition in FY08. EDM procurements, fabrication and assembly will begin in FY08. EDM Deliveries will be accepted in FY09. ARCI Integration, TECHEVAL and OPEVAL testing is planned for FY09.

Accomplishments/Effort/Subtotal Cost	0.300			
RDT&E Articles Quantity				

The development of the Next Generation Fatline Towed Array provides improvement in littoral water operations and increased frequency coverage. Began development efforts for the Next Generation Fatline Towed Array in FY04, completed Design Readiness Review in FY05 and completed development in FY06.

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<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">FY 06</th> <th style="width: 15%;">FY 07</th> <th style="width: 15%;">FY 08</th> <th style="width: 15%;">FY 09</th> </tr> </thead> <tbody> <tr> <td>Accomplishments/Effort/Subtotal Cost</td> <td style="text-align: center;">4.453</td> <td style="text-align: center;">5.726</td> <td style="text-align: center;">5.400</td> <td style="text-align: center;">2.066</td> </tr> <tr> <td>RDT&E Articles Quantity</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Affordable Towed Array Technology (ATAT) development provides more affordable and reliable thinline arrays using fiber optic technology and eliminating "wet end" electronics. Program began development in FY04, completed Critical Design Review in FY06 and has transitioned to Production Representative Unit (PRU) Fabrication. FY06 - Continue development of Affordable Towed Array Technology (ATAT, Fiber Optic Array, TB-33), completed CDR, began transition to PRU fabrication. FY07 - Begin reliability design testing, in support of LRIP decision. FY08 - Continue development of ATAT and begin operational testing in support of MS C decision. FY09 - Complete development and transition to MS C full rate production.</p> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">FY 06</th> <th style="width: 15%;">FY 07</th> <th style="width: 15%;">FY 08</th> <th style="width: 15%;">FY 09</th> </tr> </thead> <tbody> <tr> <td>Accomplishments/Effort/Subtotal Cost</td> <td style="text-align: center;">6.000</td> <td></td> <td></td> <td></td> </tr> <tr> <td>RDT&E Articles Quantity</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px;"> <p>Mission Tailorable Towed Array (MTTA) development provides mission dependent variant of thinline arrays to improve sensor performance in littoral environment while maintaining open ocean capability. FY06- Complete evaluation of mission dependent variant of thinline arrays.</p> </div>						FY 06	FY 07	FY 08	FY 09	Accomplishments/Effort/Subtotal Cost	4.453	5.726	5.400	2.066	RDT&E Articles Quantity						FY 06	FY 07	FY 08	FY 09	Accomplishments/Effort/Subtotal Cost	6.000				RDT&E Articles Quantity				
	FY 06	FY 07	FY 08	FY 09																														
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RDT&E Articles Quantity																																		
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RDT&E Articles Quantity																																		

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EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2007
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N/Submarine Systems Equipment Development	PROJECT NUMBER AND NAME 0219/Submarine Sonar Improvements	

C. OTHER PROGRAM FUNDING SUMMARY:

<u>Line Item No. & Name</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>To Complete</u>	<u>Total Cost</u>
OPN BLI 214700 SSN Acoustics	193.695	219.278	244.747	220.727	230.608	237.557	229.049	235.131	Continuing	Continuing
OPN BLI 214705 SSN Acoustics Installation	41.510	53.621	75.234	81.757	76.267	53.683	57.645	55.321	Continuing	Continuing
Total	235.205	272.899	319.981	302.484	306.875	291.240	286.694	290.452		

D. ACQUISITION STRATEGY:

Acoustic Systems:

A-RCI utilizes an open architecture and Commercial Off-the-Shelf products in support of new and upgraded sonar systems. A follow-on development and production sole source cost plus award fee contract was awarded to Lockheed Martin Federal Systems and General Dynamics, Advanced Information Systems in December 2003. Program Review with Milestone Decision Authority was conducted in October 2003 granting approval for the FY04 production option. MS III authority for A-RCI was received in February 2004.

Thinline Arrays:

Towed Systems is the development of a highly reliable and more affordable Fiber Optic Thinline variant towed array which uses fiber optic sensor technology for data collection and moves all outboard electronics from the array to inboard the submarine where they can be easily maintained. Cost savings in array production will be gained by using automated production techniques and significantly reducing or eliminating the "hand touch" labor common to today 's towed array production methods because of the number of different electronics that must be wired together to achieve the acoustics capabilities necessary to meet today's and tomorrow threats. This development is being accomplished under a Phase III SBIR. CDR was completed in FY06 and the program has transitioned to fabrication of Production Representative Units. Contract award for follow-on development awarded in 1st quarter FY07.

Fatline Arrays:

In FY04 Towed Systems awarded multiple competitive contracts for the development of a Fatline Towed Array which will provide better littoral operations and ranging. Development is complete and this program has now transitioned to initial production. Results of operational testing are expected in FY08.

Hull Mounted Arrays:

The Low Cost Conformal Array (LCCA) will transition from ASTO in FY08 with a competitive contract being awarded for the EDM development. EDM procurements, fabrication and assembly will begin in FY08. EDM Deliveries will be accepted in FY09. ARCI Integration, TECHEVAL and OPEVAL testing is planned for FY09.

E. MAJOR PERFORMERS:

Lockheed Martin Corporation, Naval Electronics and Surveillance Systems-Undersea Systems; Manassas, Virginia - Provides primary hardware development, software integration and systems engineering support for Advanced Processor Builds for SSN 688, 688 I, 21 and Virginia Class submarine sonar systems. Contract awards projected for October each fiscal year.

General Dynamics, Advanced Information Systems; Fairfax, Virginia - Provides primary software development for SSN688, 688I, 21 and Virginia Class submarine sonar systems. Contract awards projected for October each fiscal year.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N/Submarine Systems Equipment Development	PROJECT NUMBER AND NAME 0219/Submarine Sonar Improvements
<p>E. Major Performers (cont'd)</p> <p>Naval Undersea Warfare Center, Newport, Rhode Island - Provides systems engineering support for SSN688, 688I, 21 and Virginia Class submarine sonar systems. Work Requests to be issued October each fiscal year.</p> <p>Chesapeake Science Corporation, Millersville, Maryland: Provides primary hardware development, software integration and systems engineering support for the Affordable Towed Array Technology Initiatives. Contract awards projected for October each fiscal year.</p>		

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Exhibit R-3 Cost Analysis (page 1)								DATE: February 2007						
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT		PROJECT NUMBER AND NAME									
RDT&E, N / BA-5			0604503N/Submarine Systems		0219/Submarine Sonar Improvement									
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY06 Cost	FY06 Award Date	FY07 Cost	FY07 Award Date	FY08 Cost	FY08 Award Date	FY09 Cost	FY09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Various	LMC, Manassas, VA	14.187											
Primary Hardware Development	Various	Chesapeake Sciences	19.078	4.004	12/05	4.339	12/06	3.700	12/07	1.700	12/08	Cont.	32.821	
Primary Hardware Development	SS/CPAF	LMC, Manassas, VA	143.796	13.106	12/05	19.168	12/06	15.573	12/07	16.500	12/08	Cont.	208.143	
Ancillary Hardware Development	SS/CP	ARL University of Texas	5.140	2.318	3/06	3.600	12/06	3.800	12/07	4.000	12/08	Cont.	18.858	
		Newport News	0.044	0.044	12/05	0.048	12/06	0.048	12/07	0.048	12/08	Cont.	0.232	
Systems Engineering	WX	NUWC, Newport R.I.	100.146	8.876	10/05	5.253	10/06	5.300	10/07	5.474	10/08	Cont.	125.049	
Systems Engineering	SS/CPAF	Lockheed, Eagan	5.763	2.222	4/06	2.500	1/07	2.500	12/07	2.500	12/08	Cont.	15.485	
Systems Engineering	Various	Various	12.220											
Software Development	SS/CP	Progeny Systems	7.181	4.400	4/06	2.200	12/06	2.200	12/07	2.300	12/08	Cont.	18.281	
Systems Engineering	WX	NSWC, Carderock MD	4.246	1.445	12/05	1.500	10/06	1.445	10/07	1.500	10/08	Cont.	10.136	
Systems Engineering	SS/CP	John Hopkins APL	6.151	3.780	3/06	3.780	12/06	3.780	12/07	3.800	12/08	Cont.	21.291	
Hardware/Software Development	Various	SBIR's	1.378	0.100	5/06	0.100	12/06	0.100	12/07	0.080	12/08	Cont.	1.758	
Award Fees	SS/CPAF	LMC, Syracuse N.Y.	0.495											
Miscellaneous	Various	Various	9.402											
Hardware/Software Development	C/CPIF	TBD	0.146	0.000		0.000		10.500	12/07	3.000	12/08	Cont.	13.646	
Systems Engineering	WX	NSWC, Crane, IN	0.154	0.080	12/05	0.085	10/06	0.085	10/07	0.090	10/08	Cont.	0.494	
Systems Engineering	WX	Naval Research Lab (NRL)	0.623	0.199	12/05	0.256	11/06	0.280	11/07	0.300	11/08	Cont.	1.658	
Subtotal Product Development			330.150	40.574		42.829		49.311		41.292		0.000	467.852	
Remarks:														

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Exhibit R-3 Cost Analysis (page 3)													DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT		PROJECT NUMBER AND NAME										
RDT&E, N / BA-5			0604503N/Submarine System		0219/Submarine Sonar Improvement										
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY06 Cost	FY06 Award Date	FY07 Cost	FY07 Award Date	FY08 Cost	FY08 Award Date	FY09 Cost	FY09 Award Date	Cost to Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation														0.000	
Operational Test & Evaluation	WX	OPTEVFOR	1.519	1.000	11/05	1.200	11/06	1.350	11/07	1.300	11/08			6.369	
Developmental/Operational T&E	Various	Various	6.118											6.118	
Test Assets														0.000	
Tooling														0.000	
GFE														0.000	
Award Fees														0.000	
Subtotal T&E			7.637	1.000		1.200		1.350		1.300		0.000		11.187	
Remarks:															
Contractor Engineering Support														0.000	
Management Support Services	Various	Various	4.189	0.797	3/06	0.800	12/06	0.810	12/07	0.810	12/08			5.786	
Program Management Support	SS/CP	Mitre	0.523											0.523	
Travel	PD	NAVSEA	0.450	0.200	11/05	0.200	11/06	0.200	11/07	0.200	11/08			0.850	
Transportation														0.000	
SBIR Assessment														0.000	
Subtotal Management			5.162	0.997		1.000		1.010		1.010		0.000		7.159	
Remarks:															
Total Cost			458.436	51.810		57.859		62.071		54.102		0.000		510.246	
Remarks:															

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EXHIBIT R4, Schedule Profile																							DATE: February 2007									
APPROPRIATION/BUDGET ACTIVITY					PROGRAM ELEMENT NUMBER AND NAME										PROJECT NUMBER AND NAME																	
RDT&E, N / BA-5					0604503N/Submarine Systems Equipment Development										0219/Submarine Sonar Improvement																	
Fiscal Year	2006				2007				2008				2009				2010				2011				2012				2013			
	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	1	2	3	4
Acquisition Milestones	Annual MDA Program Review				Annual MDA Program Review				Annual MDA APB Program Review				Annual MDA APB Program Review				Annual MDA APB Program Review				Annual MDA APB Program Review				Annual MDA APB Program Review							
A-RCI APB I&T, Certification	APB-06				APB-07				APB-08				APB-09				APB-10				APB-11				APB-12				APB-13			
Tech Insertion Development, I&T, Certification	TI-06				TI-08				TI-10				TI-12																			
Test & Evaluation Milestones																																
APB Test Readiness Reviews				▲				▲				▲				▲				▲				▲				▲				▲
APB Sea Tests	▲			▲				▲				▲				▲				▲				▲				▲				▲
Production																																
FY06																																
FY07																																
FY08																																
FY09																																
FY10																																
FY11																																
FY12																																
FY13																																

* Not required for Budget Activities 1, 2, 3, and 6

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EXHIBIT R4, Schedule Profile		Next Generation Fatline Development																												DATE: February 2007			
APPROPRIATION/BUDGET ACTIVITY										PROGRAM ELEMENT NUMBER AND NAME										PROJECT NUMBER AND NAME													
RDT&E, N / BA-5										0604503N: SSN-688 and Trident Modernization										0219: Submarine Sonar Improvement													
Fiscal Year	2006				2007				2008				2009				2010				2011				2012				2013				
	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	1	2	3	4	
Acquisition Milestones																																	
Next Generation Fatline Development																																	
Production Representative Delivery	▲																																
Test & Evaluation Milestones																																	
Lake Test		▲																															
Operational Test												△																					
Procurement																																	
Production Contract																																	
Deliveries																																	

* Not required for Budget Activities 1, 2, 3, and 6

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EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2007
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME Program Element (PE) No. and Name	PROJECT NUMBER AND NAME Project Unit (PU) No. and Name: Congressional Plus-Ups : VARIOUS

CONGRESSIONAL PLUS-UPS:

	FY07		
9384C			
Affordable Towed Array Construction	1.295		

Affordable Towed Array Construction development provides evaluation through fabrication of additional hardware, automate manufacturing processes to improve product quality, increase production rate and minimize defects resulting in improved system reliability and reduced cost, and qualify commercial sources for critical components including amplitude modulators, fiber Bragg gratings, and low noise lasers.

	FY07		
9840C			
Improved Submarine Towed Array Reliability	1.793		

Improved Submarine Towed Array Reliability development provides procurement of Towed Array Handler reliability improvements such as the Capstan Wrap Reduction Modification and Control/Indicator unit upgrades which reduce stress on the towed array, improving reliability and availability of the array.

	FY07		
9841C			
SONAR Advanced Optical Co-Processor (SOAC)	0.996		

Insertion of optical computer technology into the ARCI offers the potential of skip-generation increases in computational processing power while remaining within on-board physical size, weight, heat production, and power consumption constraints. Funding will support testing advanced algorithm effectiveness, identification of current and un-met candidate signal processing needs that can be off-loaded from the ARCI digital computers and executed on the SOAC, develop a prototype SAOC for formal system test and evaluation, and establish Low Rate Initial SAOC Pre-production Plan and LRIP Run.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME Program Element (PE) No. and Name	PROJECT NUMBER AND NAME Project Unit (PU) No. and Name: Congressional Plus-Ups : VARIOUS
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CONGRESSIONAL PLUS-UPS:

	FY07			
9A40N				
Active Intercept and Ranging System	0.996			

The Active intercept and Ranging System will test a laboratory theory at sea for an active intercept and ranging system that uses GPS and cellular phone localization algorithms on a submarine. Should the test prove successful and should additional funds become available then the algorithms will be integrated into the sonar systems aboard US Navy submarines.

	FY07			
9A41N				
Connectionless Technology for Towed Arrays	1.644			

Funds would be used to initiate a research and development effort to integrate connectionless technology into current single Thin Line and future Thin Line Twin Line Towed Array capability of submarines, including the TB-33 system by including a common twin line thin line capability for both submarines and surveillance platforms. Enhancements to the baseline TB-33 design would allow a common modular set of array components to be built to meet both single line and twin line requirement:

	FY07			
9A42N				
Twin Thin Line Towed Array Processing Imp. ARCI	1.644			

Twin Thin Line Towed Array Processing Improvements will accomplish specific research and development efforts that would significantly increase every submarine's war fighting capability with improved long range detection (i.e. twin line SURTASS like capability that can be covertly deployed), increased processing power for improved target detection, classification, hold, and tracking (i.e. Field Programmable Gate Arrays), and significantly improve reliability for continuous deployed operations.

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5		PROGRAM ELEMENT NUMBER AND NAME PE 0604503N Title: SSN 688 & Trident Modernization				PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System			
COST (\$ in Millions)		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	Project Cost	25.039	18.514	34.782	33.668	30.418	29.552	25.292	22.207
RDT&E Articles Qty									
<p>(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Submarine Integrated Antenna System (SIAS) project (0742) provides for the development and testing of submarine antennas designed to meet emerging submarine communications requirements of: (a) Improved frequency coverage and data rate capabilities of submarine antennas and their interface to the External Communications System (ECS), (b) Improved submarine antenna performance and data rate while the submarine is operating at speed and depth, (c) Antenna compatibility with new waveforms and receiver equipment, (d) Improved stealth capability of existing and future antennas and (e) Improved antenna design to reduce Total Ownership Cost. This project funds research and development for submarine antennas including (1) PrePlanned Product Improvement (P3I) efforts to existing antennas including Outboard Electronics-538/BRC (OE-538/BRC) Multi-Function Antenna, OE-562 Submarine High Data Rate (SubHDR) system development of X-band and Super High Frequency SHF) K-band capabilities, (2) Development of new antenna systems including Advanced High Data Rate Antenna (AdvHDR) and (3) Communication at Speed and Depth (CSD) design efforts. These efforts will provide Ship Submersible Nuclear (SSN), Ship Submersible Ballistic Nuclear (SSBN) and Ship Submersible Guided Nuclear (SSGN) platforms with an improved communications capability while operating at speed and depth thus enhancing operational flexibility and maintaining stealth in Littoral mission applications.</p> <p>U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING AND MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.</p>									

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 5	PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & Trident Modernization	PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System		
(U) B. Accomplishments/Planned Program				
	FY 06	FY 07	FY 08	FY 09
SubHDR P-3I	15.106	3.100	2.093	8.329
RDT&E Articles Quantity				
<p>Accomplishments: FY06: Continued Follow-On-Terminal (FOT) modification development for Super High Frequency (SHF) functionality. Global Broadcast System (GBS)/Extremely High Frequency (EHF) simultaneous operation/wideband gapfiller satellite operational capability upgrades Traveling Wave Tube (TWT) life enhancement effort (\$15.106) FY07: Complete SHF FOT development/test (\$1.258). Continue development of GBS and TWT enhancements for SubHDR (\$1.842). FY08: Perform program planning and concept development for SubHDR antenna enhancement efforts required for compatibility with grade-A shock requirements and SHF Tx/Rx isolation separation kits (\$2.093). FY09: Commence System Engineering for the development of the P3I efforts for Undersea Explosion (UNDEX) antenna improvement kits, ECP/ILS documentation development, system integration and DVT test procedures (\$8.329).</p>				
	FY 06	FY 07	FY 08	FY 09
Advanced HDR	0.399	4.872	4.993	5.184
RDT&E Articles Quantity				
<p>Accomplishments: FY06: Commenced program planning and generation of acquisition documentation for AdvHDR (\$399). FY07: Commence development of systems engineering and detailed specification documentation. Contract and perform risk reduction and technology development for AdvHDR (\$4.872). FY08: Continue system definition/risk reduction and system development efforts. Begin subsystem procurement and system integration in support of EDM. Develop test documents and procedures. Milestone B documentation preparation for AdvHDR (\$4.993). FY09: Continue design and documentation development for Milestone B. Commence EDM development (\$5.184).</p>				
	FY 06	FY 07	FY 08	FY 09
Communications [Comms] at Speed and Depth	4.519	4.984	18.571	8.131
RDT&E Articles Quantity				
<p>Accomplishments: FY06: Continued to perform technology development and sea testing; a portion of this effort included cost sharing with Office of Naval Research (ONR). Obtained approval of requirements documentation and developed pre-acquisition documentation for the overall Comms at Speed and Depth program. (\$2.108) Completed technical development of documentation package for Recoverable Tethered Optical Fiber (RTOF) submarine installation. Awarded contract for RTOF installation. Awarded contract for RTOF installation aboard U.S. Navy submarine and initiate development of installation plan (\$2.411). FY07: Continue cost share technology development with Office of Naval Research (ONR) for SeaDeep and Ultra High Frequency (UHF) projects (\$500). Provide testing support to include Test and Evaluation Master Plan (TEMP) development. Continue to develop pre-acquisition documentation to support a Milestone decision. Systems engineering support to develop Capability Development Document (CDD) and acquisition documentation in support of a Milestone B decision for Increment 2 (\$2.870). Install RTOF system aboard OHIO Class submarine, provide technical oversight to sea test, remove RTOF system, and restore original capability to submarine (\$1.614). FY08: Continue cost share technology development with ONR for SeaDeep and UHF projects (\$2.500). Continue to develop acquisition documentation in support of a Milestone B decision for Increment 2. (\$500). Award initial development contract for Increment 2 for the UHF buoy and Tactical Paging Buoy (TPB) capabilities (\$15.571). FY09: Continue to develop UHF buoy and TPB Engineering Development Models (EDMs) (\$6.131). Plan and conduct developmental testing and operational testing (DT/OT) in support of Increment 2 Full-Rate Production (FRP) decision \$2.000).</p>				
R-1 SHOPPING LIST - Item No. 108				

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 5	PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & Trident Modernization	PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System		
(U) B. Accomplishments/Planned Program				
	FY 06	FY 07	FY08	FY09
Antenna Transition Engineering	5.015	5.558	4.301	5.140
RDT&E Articles Quantity				
<p>Accomplishments: FY06: Continued to provide emerging requirements and Satellite communications Database/Link analysis for other development programs (i.e. Mobile User Objective System/Advanced Narrowband System (MUOS/ANS), Iridium Enhanced Mobile Satellite Service (EMSS), Wideband Gap Filler (WGS), Advanced Extremely High Frequency (EHF), and Wideband Commercial (\$1.446). Continued Preplanned Product Improvement (P3I) investigations and development efforts for legacy antenna systems (\$1.326). Continued concept engineering, new technology evaluations and assessments in support of current and future submarine antenna applications (\$2.243). FY07: Continue to provide emerging requirements and Satellite communications Database/Link analysis for other development programs (i.e. MUOS/ANS, Iridium EMSS, WGS, Advanced EHF, and Wideband Commercial (\$1.138). Continue P3I investigations and development efforts for legacy antenna systems (\$1.726). Continue concept engineering, new technology evaluations and assessments in support of current and future submarine antenna applications (\$2.694). FY08: Continue to provide emerging requirements and satellite communications Database/Line analysis for other development programs (i.e. MUOS/ANS, IBGWN, WGS, Advanced EHF, and Wideband Network Waveform (WNW) (\$1.153). Continue P3I investigation and development efforts for the legacy antenna systems (\$.897). Continue concept engineering, new technology evaluations and assessments in support of current and future submarine antenna applications (\$1.035). Investigate multiple usage antennas, i.e. antennas that can be used for communications other purposes such as ESM (\$1.216). FY09: Continue to provide emerging requirements and satellite communications Database/Link analysis for other development programs i.e. MUOS/ANS, IBGWN, WGS-Ka Advanced EHF, and Wideband Network Waveform (WNW) (\$1.255). Continue P3I investigation and development efforts for the legacy antenna systems (.850). Continue to investigate multiple usage antennas, i.e. antennas that can be used for communication and other purposes such as Electronic Surveillance Measures (ESM) (\$.977). Continue concept engineering, new technology evaluations and assessments in support of current and future submarine antenna applications; specifically to assess the impact to the sail and hull penetrators on different classes of submarines (\$2.058).</p>				
	FY 06	FY 07	FY 08	FY 09
OE-538			4.824	6.884
RDT&E Articles Quantity				
<p>Accomplishments: FY08: Initiate system design including hardware and software to support Mobile User Objective System (MUOS) and Wideband Network Waveform (WNW) incorporation into the OE-538 antenna. (\$3.377). Commence system engineering to support integration of MUOS and WNW into the OE-538 antenna (\$1.447). FY09: Continue system design in corporation MUOS and WNW into OE-538 (\$1.000). Commence integration and system testing of MUOS and WNW into OE-538 (\$3.818). Continue system engineering including development of documentation and Integrated Logistics System (ILS) products (\$2.066).</p>				

R-1 SHOPPING LIST - Item No. 108

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007																																				
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5			PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & Trident Modernization				PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System																																				
<p>(U) C. OTHER PROGRAM FUNDING SUMMARY:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Line Item No. & Name</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2006</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2007</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2008</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2009</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2010</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2011</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2012</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2013</th> <th style="text-align: right; border-bottom: 1px solid black;">To Complete</th> <th style="text-align: right; border-bottom: 1px solid black;">Total Cost</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">3130 Submarine Communications</td> <td style="text-align: right; padding: 5px;">126.497</td> <td style="text-align: right; padding: 5px;">88.941</td> <td style="text-align: right; padding: 5px;">86.551</td> <td style="text-align: right; padding: 5px;">104.812</td> <td style="text-align: right; padding: 5px;">121.327</td> <td style="text-align: right; padding: 5px;">135.544</td> <td style="text-align: right; padding: 5px;">155.606</td> <td style="text-align: right; padding: 5px;">144.867</td> <td style="text-align: right; padding: 5px;">Continue</td> <td style="text-align: right; padding: 5px;">Continue</td> </tr> <tr> <td colspan="11" style="padding: 5px;"> Related RDT&E: PE 0602232N Space and Electronic Warfare (SEW) Technology PE 0303109N Satellite Communications - Provides for the EHF transmitter and receiver that utilized the antenna developed under this program. </td> </tr> </tbody> </table> <p style="margin-top: 20px;">(U) D. ACQUISITION STRATEGY: *</p> <p>Program Milestones: FY08 2nd QTR CSD Milestone B (MS-B) for Increment I; FY08 2nd QTR OE-538 INC II MS B; FY2009 2Q Adv HDR MS-B. The acquisition strategy of the CSD program is an Evolutionary Acquisition effort that will produce various capabilities to be fielded in Increments. The Program of Record will enter the Joint Capability Integration and Development System (JCIDS) process, in accordance with DoD 5000.2. The CSD Program focuses on providing Internet Protocol (IP), medium data rate, two-way communication with a submerged submarine throughout the full range of tactically relevant speeds and depths. A family of solutions is required to meet the multitude of communications and operational requirements on general Information Technology (IT) capabilities used by ship and shore operators.</p> <p>T&E Milestones: Contract Milestones: OE-538: 3rd QTR FY08 Development Contract Award SubHDR: 3rd QTR FY08 AdvHDR: 2nd QTR FY09 CSD: 2nd QTR FY08 Development Contract Award</p> <p style="margin-top: 20px;">(U) E. MAJOR PERFORMERS</p> <p>Raytheon, Marlboro, MA - SHF/FOT Development, SubHDR Development Naval Undersea Warfare Center, Division Newport, RI - System Engineering, Technical Design Agent</p> <p style="margin-top: 10px;">* Not required for Budget Activities 1,2,3, and 6</p>											Line Item No. & Name	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Complete	Total Cost	3130 Submarine Communications	126.497	88.941	86.551	104.812	121.327	135.544	155.606	144.867	Continue	Continue	Related RDT&E: PE 0602232N Space and Electronic Warfare (SEW) Technology PE 0303109N Satellite Communications - Provides for the EHF transmitter and receiver that utilized the antenna developed under this program.										
Line Item No. & Name	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Complete	Total Cost																																	
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Related RDT&E: PE 0602232N Space and Electronic Warfare (SEW) Technology PE 0303109N Satellite Communications - Provides for the EHF transmitter and receiver that utilized the antenna developed under this program.																																											

R-1 SHOPPING LIST - Item No. 108

UNCLASSIFIED

CLASSIFICATION:												
Exhibit R-3 Cost Analysis (page 1)									DATE: February 2007			
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-5			0604503N SSN 688 & Trident Modernization			0742 Submarine Integrated Antenna System						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Digital Interface Dev (SubHDR)	CPAF	Raytheon, Marlboro, MA	3.545								3.545	3.545
Digital Dev (SubHDR)	CPAF	Raytheon, Marlboro, MA	7.629	0.553	03/07	0.573	02/08	1.782	02/08		10.537	3.545
Hardware Dev (SubHDR)	WX	NUWC, Newport, RI	1.456	0.477		0.682		0.477		Continuing	Continuing	0.000
Hardware Dev (HDR SHF/FOT)	CPAF	Raytheon, Marlboro, MA	14.632							0.000	14.632	14.632
Hardware Dev (AdvHDR)	WX	NUWC, Newport, RI	0.000	0.000		0.000		0.000		0.000	0.000	0.000
Hardware Dev (Trans Eng)	CPAF	Sippican Marion, MA	1.410	0.500	03/07					0.000	0.000	1.410
Hardware Dev (CSD)	CPAF	Apogen, CA		0.500	03/07							
Systems/Hardware Dev (CSD)	CPAF	TBD	5.374	2.855	03/07	14.300	03/08	4.000	TBD			
Hardware Dev (OE-538)	CPAF	TBD				1.500		2.700				
Systems Engineering (OE-538)	CPAF	TBD				1.000		1.300				
Systems Engineering (OE-538)	WX	NUWC, Newport, RI				1.000		1.600				
Systems Engineering (SubHDR)	CPFF	Raytheon, Marlboro, MA	5.395	0.921	03/07	0.351	02/08	3.350	02/08	1.492	118,143.509	12.438
System Engineering (SubHDR)	WX	NUWC, Newport, RI	11.626	0.670		0.275		1.970		3.897	18.438	0.000
Systems Engineering (AdvHDR)	TBD	TBD		3.602		4.993		5.184		40.493	54.272	56.134
System Engineering (Trans Eng)	WX	NUWC, Newport, RI	14.237	3.900		3.850		3.900			25.887	
System Engineering (CSD)	WX	SSC-SD, San Diego, CA				0.900		1.150				
Systems Engineering (CSD)	WX	NUWC, Newport, RI	5.204	2.157		2.300		2.200		Continuing	Continuing	0.000
Subtotal Product Development			70.508	16.135		30.469		27.354		45.882	190.348	0.000
Remarks:												
Development Support											0.000	0.000
Software Development	WX	NUWC, Newport, RI	0.739	0.600		0.712		0.880			2.931	0.000
Software Development	CPAF	TBD				0.750		0.500				
Training Development											0.000	0.000
Integrated Logistics Support	Various	Various	1.728	0.791		1.151		1.324			4.994	0.000
Configuration Management											0.000	0.000
Technical Data											0.000	0.000
GFE											0.000	0.000
Subtotal Support			2.467	1.391		2.613		2.704		0.000	9.175	0.000
Remarks:												

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CLASSIFICATION:												
Exhibit R-3 Cost Analysis (page 2)										DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5			PROGRAM ELEMENT 0604503N SSN 688 & Trident Modernization			PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Evaluation (CSD)	WX	SSC-SD, CA		0.028				0.850			0.878	0.000
Test & Evaluation (CSD)	WX	COTF		0.010				0.010				
Test & Evaluation (OE-538)	WX	COTF				0.750		0.000				
Test & Evaluation (SubHDR)	WX	NUWC, Newport, RI						0.750			0.750	0.000
Developmental/Operational T&E	Various	Various	1.267	0.000		0.000		0.000		0.000	1.267	0.000
Test Assets											0.000	0.000
Tooling											0.000	0.000
GFE								0.750			0.750	0.000
Subtotal T&E			1.267	0.038		0.750		2.360		0.000	4.415	0.000
Remarks:												
Contractor Engineering Support											0.000	0.000
Government Engineering Support											0.000	0.000
Program Management Support	Various	Various	4.390	0.950		0.950		1.250			7.540	0.000
Travel											0.000	0.000
Subtotal Management			4.390	0.950		0.950		1.250		0.000	7.540	0.000
Remarks:												
Total Cost			78.632	18.514		34.782		33.668		Continuing	Continuing	0.000
Remarks:												

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CLASSIFICATION:

EXHIBIT R4, Schedule Profile	DATE: December 2006
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CLASSIFICATION:

RDT&E, N / PE: 0604503N TITLE: SSN 688 & TRIDENT MODERNIZATION	0742 Submarine Integrated Antenna System
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Fiscal Year	2006				2007				2008				2009				2010				2011				2012				2013			
	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	1	2	3	4
Acquisition (SubHDR) Milestones	FOT/\$HF								FOT/\$HF OC																							
System Development																																
Production Representative/ EDM Deliveries					FOT/\$HF PRR →				△																							
Software Delivery					△																											
Initial Build					△																											
Final Build									△																							
Test & Evaluation Milestones																																
Development Testing					FOT/\$HF																											
Technical Evaluation									△																							
Operational Evaluation									△																							
FOT/\$HF Contract Award									FOT/\$HF				△																			
Production Deliveries																	FOT/\$HF Kits															
UNDEX Contract Award																	UNDEX				△											
Production Deliveries																									UNDEX Kits							

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* Not required for Budget Activities 1, 2, 3, and 6

UNCLASSIFIED

CLASSIFICATION:

Exhibit R-4a, Schedule Detail				DATE: February 2007					
APPROPRIATION/BUDGET ACTIVITY RDT&BA-5	PROGRAM ELEMENT PE: 0604503N TITLE: SSN 688 & TRIDENT MODERNIZATION			PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System					
Schedule Profile (SubHDR)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
FOT/SHF Critical Design Review (CDR)	4Q								
FOT/SHF Production Representative			2Q						
FOT/SHF Developmental Testing (DT)		3Q --	4Q						
FOT/SHF Technical Evaluation (TECHEVAL)			4Q						
FOT/SHF Operational Evaluation (OPEVAL)				1Q					
FOT/SHF Preproduction Readiness Review (PRR)			4Q						
FOT/SHF Software Delivery (Initial Build)			2Q						
FOT/SHF Software Delivery (Final Build)			3Q						
FOT/SHF IOC				1Q					
FOT/SHF Contract Award				1Q					
FOT/SHF Full Rate Production (FRP) First Delivery					2Q				
UNDEX Contract Award						2Q			
UNDEX Full Rate Production (FRP) First Delivery							2Q		

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Exhibit R-4a, Schedule Detail
(Exhibit R-4a, page 36 of 59)

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CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT				PROJECT NUMBER AND NAME					
RDT&E, N / BA5	PE: 0604305N TITLE: SSN 688 & TRIDENT MODERNIZATION				0742 Submarine Integrated Antenna System					
Schedule Profile (AdvHDR)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	
Milestone B Decision (MS B)					2Q					
Milestone B Decision (MS C)							2Q			
Analysis of Alternatives (AoA)			3Q--	1Q						
Capabilities Development Document (CDD)				3Q--	1Q					
Capabilities Production Document (CPD)							3Q--	2Q		
System Design Review (SDR)					4Q					
Preliminary Design Review (PDR)						2Q				
Design Readiness Review (DRR)						3Q				
Critical Design Review (CDR)							4Q			
Test Readiness Review (TRR)						1Q				
Operational Assessment (OA)								2Q		
LRIP Delivery									2Q--3Q	
Development Test (DT)									2Q	
Operational Test (OT)									4Q	

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Exhibit R-4a, Schedule Detail
(Exhibit R-4a, page 38 of 59)

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R4, Schedule Profile												DATE: February 2007																
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA5						PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System																						
Fiscal Year	2008				2009				2010				2011				2012				2013							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Acquisition (OE-538/P3I) Milestones		MS B △					DRR △		MS C △												FRP DR △							
Requirements		CDD △									CPD △																	
System Development			System Development																									
Engineering Dev. Model			EDM Development																									
Source Selection			△				Lab 1																					
Deliveries							△																					
Developmental Testing							DT △																					
LRIP Contract Award											△																	
LRIP Production Delivery													Low Rate Initial Production															
Production Contract Award																											△	
Full Rate Production Delivery																					Full Rate Production							

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CLASSIFICATION:

Exhibit R-4a, Schedule Detail				DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA5	PROGRAM ELEMENT PE:0604305N TITLE: SSN 688 & Trident Modernization			PROJECT NUMBER AND NAME 0742 Submarine Integrated Antenna System		
Schedule Profile (OE538/P3I)	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Approval of Capability Development Document (CDD)	1Q					
Milestone B Decision (MS B)	2Q					
Development Contract Award	3Q					
Engineering Development Model Development	3Q--	1Q-2Q				
Design Readiness Review (DRR)		3Q				
Eng Dev Model (EDM) - Lab 1 Delivery		2Q				
Developmental Test (DT)		3Q-4Q				
Operational Test (OT)				4Q		
Approval of Capability Production Document (CPD)		4Q				
Milestone C (MS C) Decision			1Q			
LRIP Contract Award			2Q			
Low Rate Initial Production			3Q--	1Q--	1Q	
Production Contract Award					1Q	
Full Rate Production					1Q--	1Q--

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Exhibit R-4a, Schedule Detail
(Exhibit R-4a, page 42 of 59)

CLASSIFICATION:									
EXHIBIT R-2a, RDT&E Project Justification								DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5		PROGRAM ELEMENT NUMBER AND NAME PE 0604503N Title: SSN 688 & Trident Modernization				PROJECT NUMBER AND NAME 1411 Submarine Tactical Communications System			
COST (\$ in Millions)		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY2012	FY2013
Project Cost Project Cost		14.235	16.394	16.548	14.287	9.476	9.054	9.208	9.365
RDT&E Articles Qty									
<p>U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Submarine Tactical Communications System project (1411) provides submarines with communications systems designed to: (a) enhance data throughput through automation and integrated network management; (b) convert to ForceNet and tactical data networks, (c) provide submarines Internet Protocol (IP) connectivity; (d) be interoperable with other joint United States (U.S.) and combined allied military networks; and (e) improve reliability, maintainability, and availability. This is accomplished by providing the submarine with a properly integrated mix of fully interoperable Navy standard and Commercial Off-The-Shelf (COTS) communication equipment covering a wide range of frequencies and modes. The Common Submarine Radio Room (CSRR) integrates COTS and Government Off-The-Shelf (GOTS) components into a single radio room configuration for all classes of submarines. CSRR will leverage the development of VIRGINIA Class Exterior Communications System (ECS) which includes Open Systems Architecture (OSA) design. The project provides for the development of a single Land-Based Integration Test Facility that consolidates existing Land -Based Testing Facilities into one facility supporting all classes of submarines. This project funds the development of a replacement Simulation/Stimulation (SIM/STIM) suite to support testing and training requirements. The project includes system engineering efforts associated with demonstration of new technology which will allow the submarine to connect to the Global Information Gig (GiG) and participate in strike group, as well as joint operations. The new technology will ensure the submarine's continued ability to participate in Network-Centric Warfare and exploit its inherent stealth capabilities in support of the joint and combined fight to achieve total battlespace dominance.</p> <p>U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEMS DEVELOPMENT and DEMONSTRATION because it encompasses development and demonstration of new end-items prior to production approval decision.</p>									

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2007
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & TRIDENT MODERNIZATION	PROJECT NUMBER AND NAME 1411 Submarine Tactical Communications System

(U) B. Accomplishments/Planned Program

Common Submarine Radio Room (CSRR)/ Submarine Communications Support System (SCSS)	FY06	FY07	FY08	FY09
	13.392	15.741	15.887	13.630
RDT&E Articles Quantity				

FY06 Accomplishments: Continued system engineering/design development for 688 SCSS modernization (\$.300). Commenced system engineering and development of Multi Purpose Reconfigurable Training System (MRTS) (\$1.624). Continued Information Assurance (IA) and Information Security (INFOSEC) certification of all classes CSRR and continue IA recertification of legacy 688 class radio rooms (\$.776). Commenced system engineering, design development testing, software design development supporting CSRR modernization (\$10.067), Operational test of the SEAWOLF CSRR variant (\$0.625) **FY07:** Continue system engineering/design development for SCSS modernization (\$.310). Commence software development to incorporate CSRR IA requirements to begin integrating Digital Modular Radio (DMR) capability and other component programs into the Control Management (C&M) software (\$5.373). Commence systems engineering efforts for Digital Modular Radio (DMR) 6.4 integration and Super High Frequency (SHF) integration into the CSRR architecture (\$5.072). Complete system engineering and development of MRTS for Increment I (\$1.505). Continue IA and INFOSEC certification for all CSRR platforms (\$1.740). Continue test and evaluation efforts of the CSRR SEAWOLF and OHIO platforms (\$1.741). **FY08:** Complete software integration of the CSRR IA requirements into DMR and other component programs into the C&M software (\$1.335). Complete systems engineering for DMR 6.4 and SHF integration into the CSRR architecture (\$1.125). Continue system engineering/design development for SCSS modernization (\$.372). Commence system engineering and development of MRTS for Maintenance Trainers (\$2.455). Continue implementation of security upgrades to meet Information Assurance (IA), Information Security (INFOSEC) and multiple levels of certification requirements (GENSER and SCI) for all CSRR platforms (\$3.859). Commence software integration of new technologies for CSRR Increment I Version 2 into the C&M control system (\$2.878). Commence systems engineering design development testing supporting CSRR modernization Increment I Version 2 (\$3.843). **FY09:** Continue system engineering and development of MRTS for Maintenance Trainers (\$1.474). Continue system engineering/design development for SCSS modernization (\$.448) Continue implementation of security upgrades to meet Information Assurance (IA), Information Security (INFOSEC) and multiple levels of certification requirements (GENSER and SCI) for all CSRR platforms (\$4.063). Commence software integration of new technologies for CSRR Increment II (\$4.542). Continue systems engineering design development testing supporting CSRR modernization Increment II for new technologies (\$3.103)

	FY06	FY07	FY08	FY09
BCA OPCON architecture	0.843	0.653	0.661	0.657
RDT&E Articles Quantity				

FY06 Accomplishments: Continued system engineering supporting Broadcast Authority Control/Operational Control (BCA/OPCON) architecture (\$.843). **FY07:** Continue system engineering supporting BCA/OPCON architecture (\$.653). **FY08:** Continue system engineering supporting BCA/OPCON architecture (\$.661). **FY09:** Continue system engineering supporting BCA/OPCON architecture (\$.657)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & TRIDENT MODERNIZATION	PROJECT NUMBER AND NAME 1411 Submarine Tactical Communications System			
(U) C. PROGRAM CHANGE SUMMARY:					
(U) Funding:		FY 2006	FY 2007	FY2008	FY2009
FY07 President's Budget		14.567	16.456	16.429	14.117
FY08/09 President's Budget Submit		14.235	16.394	16.548	14.287
Total Adjustments		-0.332	-0.062	0.119	0.170
Summary of Adjustments					
Miscellaneous Reductions				-0.008	-0.06
Miscellaneous Additions				0.104	0.11
Sec. 8106 Revised Economic Assumptions			-0.062		
Small Business Innovation Research (SBIR tax)		-0.343			
FY2008/2009 NWCF Rate Adjustment NUWC				-0.001	0.031
FY2008/2009 NWCF Rate Adjustment SPAWAR				0.024	0.016
Sec. 8125 Revised Economic Assumptions		0.003			
Congressional Reduction		0.008			
Subtotal		-0.332	-0.062	0.119	0.097
(U) Schedule:					
Completed CSRR SEAWOLF Technical Evaluation (TECHEVAL) 3Q FY06. SEAWOLF Operational Evaluation (OPEVAL) 4Q FY06 completed with operationally effective and operationally suitable result. CSRR SSBN TECHEVAL 2Q FY07, CSRR SSBN OPEVAL 2Q FY07, CSRR SSGN TECHEVAL 1Q FY07, CSRR SSGN OPEVAL 3Q FY07.					
(U) Technical:					
Not Applicable					

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EXHIBIT R-2a, RDT&E Project Justification								DATE: February 2007																								
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA5			PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & TRIDENT MODERNIZATION				PROJECT NUMBER AND NAME 1411 Submarine Tactical Communications System																									
<p>(U) D. OTHER PROGRAM FUNDING SUMMARY:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>Line Item No. & Name</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY 2006</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY 2007</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY 2008</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY 2009</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY 2010</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY2011</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY2012</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>FY2013</u></th> <th style="text-align: center; border-bottom: 1px solid black;"><u>To Complete</u></th> <th style="text-align: center; border-bottom: 1px solid black;"><u>Total Cost</u></th> </tr> </thead> <tbody> <tr> <td>31300 Submarine Communications</td> <td style="text-align: right;">126.497</td> <td style="text-align: right;">88.941</td> <td style="text-align: right;">86.551</td> <td style="text-align: right;">104.812</td> <td style="text-align: right;">121.327</td> <td style="text-align: right;">135.544</td> <td style="text-align: right;">155.606</td> <td style="text-align: right;">144.867</td> <td style="text-align: center;">Continue</td> <td style="text-align: center;">Continue</td> </tr> </tbody> </table> <p>Related RDT&E: PE 0602232N Space and Electronic Warfare (SEW) Technology PE 0204163N Fleet Communications</p> <p>(U) E. ACQUISITION STRATEGY: *</p> <p>CSRR transforms SSN 688, SSBN 726 and SSN 21 Class radio room from suites of class-specific, closed system equipment to a common design which incorporates Open System Architecture (OSA) communications equipment. CSRR will: leverage off VIRGINIA Class Exterior Communication System (ECS) design, use VIRGINIA Class ECS control and management software, apply a systems approach to design and implementation of Joint Maritime Communication System (JMCOMS), and maximize use of COTS products and emerging technologies. Program Milestones: FY 2007 CSRR 4Q-FRP T&E Milestones : Successfully completed CSRR SEAWOLF Technical Evaluation (TECHEVAL) 2Q FY06 and SEAWOLF Operational Evaluation (OPEVAL) 4Q06. CSRR SSBN TECHEVAL 2Q FY07, CSRR SSBN OPEVAL 2Q FY07, CSRR SSGN TECHEVAL 1Q FY07, CSRR GN OPEVAL 3Q FY07</p> <p>(U) F. MAJOR PERFORMERS: Naval Undersea Warfare Center, Division Newport, RI - Technical Design Agent & System Integration Lockheed Martin/Maritime Sensors & Systems, Eagan, MN - Software Development</p> <p>* Not required for Budget Activities 1,2,3, and 6 ** Required for DON and OSD submit only.</p>											<u>Line Item No. & Name</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>To Complete</u>	<u>Total Cost</u>	31300 Submarine Communications	126.497	88.941	86.551	104.812	121.327	135.544	155.606	144.867	Continue	Continue
<u>Line Item No. & Name</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>To Complete</u>	<u>Total Cost</u>																						
31300 Submarine Communications	126.497	88.941	86.551	104.812	121.327	135.544	155.606	144.867	Continue	Continue																						

R-1 SHOPPING LIST - Item No. 108

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CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-5			0604503N SSN 688 & TRIDENT MODERNIZATION			1411 Submarine Tactical Communications System						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Hardware Development*	CPFF	SSC-SD/NUWC Newport, RI	2.776								2.776	
Hardware Development**	CPFF	SSCs/NUWC Newport, RI	0.211								0.211	
MCS Development	Various	Motorola, misc labs	10.214		Various						10.214	
H/W Development Facilities	Various	NUWC Newport, RI										
Software Development	CPFF/WX	SSC-SD San Diego, CA	2.068								2.068	
Software Development	WX	NUWC Newport, RI	5.498								5.498	Continuing
MRTS Development	CFFF	NAVAIR, Orlando	1.738	1.505	1/07	2.455	1/08	3.474	1/09		9.172	2.238
Systems Engineering	Various	Misc Labs	14.927	2.879	12/06	3.691	12/07	3.735	12/08	Continuing	25.232	Continuing
Systems Eng/Design 688 Class	Various	Misc Labs	3.074	0.300	12/06	0.325	12/07	0.348	12/08	Continuing	4.047	
Site Platform Integration/Certification	Various	NUWC Newport, RI	9.676	0.498	12/06	0.588	12/07	0.323	12/08	Continuing	11.085	
BCA/OPCON architecture	WX	NUWC Newport, RI	2.533	0.653	12/06	0.661	12/07	0.667	12/08	Continuing	4.514	
Subtotal Product Development			52.715	5.835		7.720		8.547		Continuing	Continuing	Continuing
Remarks: * SCSS Development for SSN 688 Class submarines **CSRR Development for OHIO Class submarines												
Development Support												
Software Development (CSRR)	CPAF	Lockheed Martin Tech Sys	11.393	5.279	1/07	2.860	1/08	1.492	1/09	Continuing	21.024	21.024
Integrated Logistics Support	WX	NUWC Newport, RI	0.300	0.944	12/06	0.584	12/07	0.478	12/08	Continuing	2.306	2.306
Software Engineering	WX	SSC-SD San Diego, CA	1.153								1.153	1.153
Configuration Management												
INFOSEC/IA Certification	Various	Various	1.666	1.740	1/07	3.859	1/08	1.770			9.035	9.035
Studies & Analyses											0.000	0.000
GFE											0.000	0.000
Award Fees											0.000	0.000
Subtotal Support			14.512	7.963		7.303		3.740		0.000	33.518	33.518
Remarks: *Supports the development of the Multi-Link Training Simulator replacement												

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Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 47 of 59)

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CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-5			0604503N SSN 688 & TRIDENT MODERNIZATION			1411 Submarine Tactical Communications System						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Developmental/Operational T&E	Various	Various	6.165	1.741	12/06	0.677	12/07	1.252	12/08		9.835	Continuing
Test Assets											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal T&E			6.165	1.741		0.677		1.252		Continuing	Continuing	Continuing
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support	Various	Various	6.240	0.855	Various	0.848	Various	0.748	Various	Continuing	Continuing	Continuing
Travel											0.000	
Transportation											0.000	
SBIR Assessment											0.000	
Subtotal Management			6.240	0.855		0.848		0.748		Continuing	Continuing	Continuing
Remarks:												
Total Cost			79.632	16.394		16.548		14.287		Continuing	Continuing	Continuing
Remarks:												

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Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 48 of 59)

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CLASSIFICATION:

EXHIBIT R4, Schedule Profile																										DATE:															
APPROPRIATION/BUDGET ACTIVITY																										PROGRAM ELEMENT NUMBER AND NAME								PROJECT NUMBER AND NAME							
RDT&E, N / BA5																										PE: 0604503N TITLE: SSN 688 & TRIDENT MODERNIZATION								1411 Submarine Tactical Communications System							
Fiscal Year	2006				2007				2008				2009				2010				2011				2012				2013												
	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	1	2	3	4									
Acquisition (CSRR) Milestones								★				☆												☆																	
Test & Evaluation Milestones																																									
Development Test																																									
Operational Test																																									
Production Milestones																																									
LRIP																																									
FRP																																									
Deliveries																																									

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CLASSIFICATION:										
EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5			PROGRAM ELEMENT NUMBER AND NAME PE 0604503N Title: SSN 688 & Trident Modernization			PROJECT NUMBER AND NAME 1950C Common Submarine Radio Room				
COST (\$ in Millions)			FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY2013
Project Cost			0.958	3.985	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty										
<p>(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Common Submarine Radio Room (CSRR) integrates COTS and GOTS components into a single radio room configuration for all classes of submarines. CSRR will leverage the development of VIRGINIA Class Exterior Communications System (ECS) which includes Open Systems Architecture (OSA) design. The project provides for the development of a single Land-Based Integration Test Facility that consolidates existing Land -Based Testing Facilities into one facility supporting all classes of submarines. This project funds the development of a replacement Simulation/Stimulation (SIM/STIM) suite to support testing and training requirements. The project includes system engineering efforts associated with demonstration of new technology which will allow the submarine to connect to the Global Information Grid (GIG) and participate in strike group, as well as joint operations. The new technology will ensure the submarine's continued ability to participate in Network-Centric Warfare and exploit its inherent stealth capabilities in support of the joint and combined fight to achieve total battlespace dominance.</p> <p>U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEMS DEVELOPMENT and DEMONSTRATION because it encompasses development and demonstration of new end-items prior to production approval decision.</p>										

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & TRIDENT MODERNIZATION	PROJECT NUMBER AND NAME 1950C Common Submarine Radio Room		
(U) B. Accomplishments/Planned Program				
Common Submarine Radio Room (CSRR)/	FY06	FY07	FY08	FY09
Submarine Communications Support System (SCSS)	0.958	3.985	0.000	0.000
RDT&E Articles Quantity				
<p>FY06 Accomplishments: Developed changes to CSRR architecture to address obsolescence in the operating system, specifically the Solaris and Versa-Module-Eurocard (VME) UltraSPARC Themis processor and associated hardware as governed by the Q-70 program. FY07: Provide Information Assurance (IA) necessary to achieve the maximum level of integrated control and management of radio room communications equipment to enhance operability and situational awareness.</p>				

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<u>Line Item No. & Name</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>To Complete</u>	<u>Total Cost</u>																						
3130000 Submarine Communications	126.497	88.941	86.551	104.812	121.327	135.544	155.606	144.867	Continue	Continue																						
<p>* Not required for Budget Activities 1,2,3, and 6 ** Required for DON and OSD submit only.</p>																																

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CLASSIFICATION:									
EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5		PROGRAM ELEMENT NUMBER AND NAME PE 0604503N Title: SSN 688 & Trident Modernization				PROJECT NUMBER AND NAME 9842N Submarine Launched Expendable Communications			
COST (\$ in Millions)		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY2012	FY2013
Project Cost	Project Cost	1.724	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty									
(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:									
<p>The Navy is currently investing in new technologies to provide communications to submarines operating at speed and depth. Submarine Communications at Speed and Depth (CSD) extends the principles of FORCEnet below the ocean surface to provide the submarine force with two-way networked connectivity when operating submerged, and within operationally acceptable timelines. The goal of CSD is to increase the effectiveness of submarines in support of Navy, Joint, and Coalition warfighters by enabling two-way communications and Network Centric Warfare while preserving their unique stealth posture. This increased capability is expected to provide improved connectivity to submarines during missions such as coordinated Anti-Submarine Warfare (ASW), supporting Special Operations Forces, coordinated Strike, and Intelligence, Surveillance & Reconnaissance (ISR) collections.</p> <p>The Mission Reconfigurable Expendable Buoy System (MREBS) will enable a two-way global satellite communications capability when the submarine is operating over a broad speed/depth envelope. This has been identified by Chief of Naval Operations (CNO) N87 (Undersea Warfare) as a high priority capability, and this technical concept was recommended for acquisition by the CSD Analysis of Alternatives (AoA) performed in 2005. In addition, MREBS could be the basis for future evolutionary acquisition in the CSD program, since it enables the integration of other communications payloads and sensors utilizing a reconfigurable package rather than requiring a complete redesign for each future capability.</p>									
U) JUSTIFICATION FOR BUDGET ACTIVITY:									
This program is funded under ENGINEERING AND MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.									

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 5	PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & Trident Modernization	PROJECT NUMBER AND NAME 9842N Submarine Launched Expendable Communications		
(U) B. Accomplishments/Planned Program				
	FY06	FY07	FY08	FY09
Mission Reconfigurable Expendable Buoy System	1.724	0.000	0.000	0.000
RDT&E Articles Quantity				
<p>FY06 Accomplishments: Developed a Mission Reconfigurable Expendable Buoy System (MREBS) to accommodate critical, below periscope depth communication and sensing needs.</p>				

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5			PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & Trident Modernization			PROJECT NUMBER AND NAME 9842N Submarine Launched Expendable Communications				
(U) C. OTHER PROGRAM FUNDING SUMMARY:										
<u>Line Item No. & Name</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>To Complete</u>	<u>Total Cost</u>
3130 Submarine Communications	126.497	88.941	86.551	104.812	121.327	135.544	155.606	144.867	Continue	Continue
Related RDT&E: PE 0602232N Space and Electronic Warfare (SEW) Technology PE 0303109N Satellite Communications - Provides for the EHF transmitter and receiver that utilized the antenna developed under this program.										
(U) D. ACQUISITION STRATEGY: *										
Program Milestones: T&E Milestones: Contract Milestones:										
* Not required for Budget Activities 1,2,3, and 6										

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CLASSIFICATION:									
EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5		PROGRAM ELEMENT NUMBER AND NAME PE 0604503N Title: SSN 688 & Trident Modernization				PROJECT NUMBER AND NAME 9843N Submarine-Enabling Airborne Data Exchange (SEADEEP)			
COST (\$ in Millions)		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	Project Cost	1.915	2.391	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty									
<p>(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provide Navy RDT&E funding to build an adaptive communication signal processor for the Submarine-Enabling Airborne Data Exchange (SEADEEP) at-sea demonstration. Because submarine communication depth and data rate for SEADEEP are limited by both the environment and time of day, coding and communications signal processing which can dynamically adapt to the propagation channel conditions can provide significant performance improvement and enhance operational utility. This program will develop an advanced communications signal processor that will employ concatenated coding to maximize link performance without adding additional laser power or increasing receiver aperture. In addition, this processor will optimize available average laser power and laser pulse repetition characteristics to maximize performance in adverse conditions. Advanced coding and decoding techniques will improve the detection of unequal energy laser pulses without any additional parity bits or symbols. This is especially important for the dynamic SEADEEP optical communications link to maintain optimum link parameters under the fast changing propagation channel conditions. The impact of this communications signal processing approach is to provide improved communications link performance, which also can be used to lower overall system cost through design simplification. This SEADEEP adaptive communications processor would be integrated into the SEADEEP ONR technology deliverables (airborne and submarine transceivers) for use during the at-sea demonstration (FY08-09).</p> <p>U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING AND MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.</p>									

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 5	PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & Trident Modernization	PROJECT NUMBER AND NAME 9843N Submarine-Enabling Airborne Data Exchange (SEADEEP)		
(U) B. Accomplishments/Planned Program				
	FY06	FY07	FY08	FY09
SEADEEP	1.915	2.391	0.000	0.000
RDT&E Articles Quantity				
<p>FY06 Accomplishments: Developed the communications signal processor electronics and software (source code) and related documentation.FY07: Continue to Develop the communications signal processor electronics and software (source code) and related documentation.</p>				

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EXHIBIT R-2a, RDT&E Project Justification								DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5			PROGRAM ELEMENT NUMBER AND NAME 0604503N SSN 688 & Trident Modernization			PROJECT NUMBER AND NAME 9843N Submarine-Enabling Airborne Data Exchange (SE/EEP)				
(U) C. OTHER PROGRAM FUNDING SUMMARY:										
<u>Line Item No. & Name</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>To Complete</u>	<u>Total Cost</u>
3130 Submarine Communications	126.497	88.941	86.551	104.812	121.327	135.544	155.606	144.867	Continue	Continue
Related RDT&E: PE 0602232N Space and Electronic Warfare (SEW) Technology PE 0303109N Satellite Communications - Provides for the EHF transmitter and receiver that utilized the antenna developed under this program.										
(U) D. ACQUISITION STRATEGY: *										
Program Milestones: T&E Milestones: Contract Milestones:										
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