

EXHIBIT R-2, RDT&E Budget Item Justification							DATE:	
							February 2003	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE			
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4					Advanced Submarine Systems Development/0603561N			
COST (\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	122.614	129.601	52.744	158.595	74.686	75.290	272.209	319.708
Adv. Sub. Systems Development/S2033	47.644	47.655	25.404	77.011	28.629	28.590	126.375	163.098
Advanced Composite Sail/S2861	3.946	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Electromechanical Actuator Dev/S9188	0.000	0.977	0.000	0.000	0.000	0.000	0.000	0.000
Rotary Electromagnetic Torpedo Launcher/S9191	0.000	0.977	0.000	0.000	0.000	0.000	0.000	0.000
Adv. Sub. Comb. Sys. Dev/S0223	60.686	71.092	27.340	81.584	46.057	46.700	145.834	156.610
Conf Array Vel Sensor/S2753	2.084	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fiber Optic Multi-Line Towed Array/S9189	0.000	2.445	0.000	0.000	0.000	0.000	0.000	0.000
Universal Gravity Module/S9190	0.000	0.977	0.000	0.000	0.000	0.000	0.000	0.000
MK 48 ADCAP M M P/ARCI/S9039	8.254	5.478	0.000	0.000	0.000	0.000	0.000	0.000
Defense Emergency Response Funds (DERF) Funds: N/A								
A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:								
This program element supports innovative research and development in submarine hull and combat systems technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible. The program element also supports programs transitioning from Future Naval Capabilities (FNC's).								
Project Unit S2033: The Advanced Submarine Research and Development (R&D) program performs three functions: it is the fundamental transition point for Hull, Mechanical and Electrical (HM&E) technologies from Science and Technology (S&T) to platforms, it is the starting point for serious submarine platform design & naval architecture products, and it is the sponsor to operate unique R&D experimentation, modeling and simulation facilities. It is a non-acquisition (non-ACAT) program. The Program also supports two Information Exchange Programs with the United Kingdom, (one on submarine electromagnetic silencing and the second on submarine platform equipment, systems, and hull technology). The program transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency. This program is structured to support near term VIRGINIA Class insertion, future submarine concepts and core technologies in Hydrodynamics/Hydroacoustics, Affordability, and Stealth. Advanced systems developed under this program have potential for backfit into existing classes of submarines, supporting emerging requirements, and systems technology insertion into future submarine designs. This program sponsors advanced submarine design development and concepts that can radically transform the design architecture of future submarines. This program operates Large Scale Vehicles to provide at-sea test capability for propulsor, acoustic and non-acoustic signature reduction, remote vehicle R&D, and large scale hydrodynamic experimentation; operates the Hydrodynamic/Hydroacoustic Technology Center to enhance the Navy's ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; and operates and supports the Intermediate Scale Measurement System.								

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RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4		Advanced Submarine Systems Development/0603561N	
Project Unit S0223: The Advanced Submarine Combat Systems Development non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives by the application of advanced development and testing of sonar and combat control systems improvements. This program element transitions technologies developed by Navy technology bases, the private sector, Office of Naval Research (ONR), Future Naval Capabilities and the Defense Advanced Research Projects Agency. The program addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battlespace preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware / software systems are developed to demonstrate technologically promising system concepts in laboratory and at-sea submarine environments. Specifically, the focus of the technology efforts will be Advanced Processing Build-Acoustic (APB-A) and Advanced Processing Build-Tactical (APB-T) tactical control. APB's develop and demonstrate improvements to current and future sonar/combat control systems. Program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific platform applications. Congress has authorized the following FY 03 funding: \$2.800M to develop Conformal Acoustic Velocity Sonar (CAVES) technology, \$3.500M for Submarine Payloads and Sensors, \$6.000M for High Performance Metal Fiber Brushes, and \$2.000M for Advanced Composite Sail. Project Unit S2861 is authorized by Congress to develop structural technology to address the incorporation of full-scale Advanced Sail design features and the complete spectrum of full-scale load specifications. Project Units S2753 and S9039 are authorized by Congress to develop Conformal Acoustic Velocity Sonar (CAVES) technology and MK48 ADCAP torpedo improvements. Project Unit S9188 is authorized by Congress to develop Electromechanical Actuators. Project Unit S9189 is authorized by Congress to develop Fiber Optic Mult-Line Towed Array. Project Unit S9190 is authorized by Congress to develop Universal Gravity Modules. Project Unit S9191 is authorized by Congress to develop Rotary Electromagnetic Torpedo Launcher.			

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Exhibit R-2, RDTEN Budget Item Justification
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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2003	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine Systems Development				PROJECT NUMBER AND NAME S2033/Advanced Submarine Systems Development			
COST (\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost	47.644	47.655	25.404	77.011	28.629	28.590	126.375	163.098
RDT&E Articles Qty								

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B. Accomplishments/Planned Program

	FY 02	FY 03	FY 04	FY 05
Stealth & Propulsion/Subtotal Cost	10.984	17.300	6.072	19.940
RDT&E Articles Quantity				

Develop advanced Electromagnetic (EM) silencing techniques for VIRGINIA Class insertion (FY02, FY03). Provide design guidance, tools, and hardware for the control of radiated noise levels in current and future submarines through the mitigation of Internal Transmission Paths (decks, mounts etc...) (FY02, FY03). Develop advanced coating materials and distribution strategies to facilitate the application of new passive and active sonar array concepts (FY02, FY03). Continued development of advanced submarine propulsor technologies (FY02 - FY05). Continues development of distributed pump propulsion technology and electric drive technologies (FY02 - FY05).

	FY 02	FY 03	FY 04	FY 05
Hydrodynamics/Hydroacoustics/Subtotal Cost	4.111	8.458	1.870	12.412
RDT&E Articles Quantity				

Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control) (FY02, FY03, FY05). Continue and transition Composite Sail (FY02 - FY05).

	FY 02	FY 03	FY 04	FY 05
Infrastructure/Subtotal Cost	17.685	14.149	13.563	22.933
RDT&E Articles Quantity				

Continue operations and support for the Large Scale Vehicle (largest unmanned autonomous submarine in the world), Hydroacoustic/Hydrodynamic Test Center(H/HTC), Intermediate Scale Measurement System (ISMS) (all years).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine Systems Development	PROJECT NUMBER AND NAME Advanced Submarine Systems Development/S0223															
B. Accomplishments/Planned Program (Cont.)																	
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 15%;">FY 02</th><th style="width: 15%;">FY 03</th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th></tr></thead><tbody><tr><td>Total Ownership/Subtotal Cost</td><td style="text-align: center;">2.500</td><td style="text-align: center;">1.167</td><td style="text-align: center;">1.305</td><td style="text-align: center;">1.185</td></tr><tr><td>RDT&E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>				FY 02	FY 03	FY 04	FY 05	Total Ownership/Subtotal Cost	2.500	1.167	1.305	1.185	RDT&E Articles Quantity				
	FY 02	FY 03	FY 04	FY 05													
Total Ownership/Subtotal Cost	2.500	1.167	1.305	1.185													
RDT&E Articles Quantity																	
Initiated full scale land based testing of Advanced Metal Fiber Brushes (FY02 - FY05). Install on submarine a complete set of Advanced Metal Fiber Brushes on a ship service motor generator set. Test on submarine a complete set of Advanced Metal Fiber Brushes on a ship service motor generator set. Install and evaluate on submarine a production of Advanced Metal Fiber Brushes on ship service motor generator sets.																	
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 30%;"></th><th style="width: 15%;">FY 02</th><th style="width: 15%;">FY 03</th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th></tr></thead><tbody><tr><td>Payloads & Sensors/Subtotal Cost</td><td style="text-align: center;">8.786</td><td style="text-align: center;">2.941</td><td style="text-align: center;">0.000</td><td style="text-align: center;">18.000</td></tr><tr><td>RDT&E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>				FY 02	FY 03	FY 04	FY 05	Payloads & Sensors/Subtotal Cost	8.786	2.941	0.000	18.000	RDT&E Articles Quantity				
	FY 02	FY 03	FY 04	FY 05													
Payloads & Sensors/Subtotal Cost	8.786	2.941	0.000	18.000													
RDT&E Articles Quantity																	
At-sea SSGN transformational Payloads & Sensors Demonstration, stealthy affordable capsule system and ISR&TA processing demonstration (FY02, FY03).																	
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	FY 02	FY 03	FY 04	FY 05													
Other/Subtotal Cost	3.578	3.640	2.594	2.541													
RDT&E Articles Quantity																	
Continued Mission and Technology Assessment (M&TA)/Hull, Mechanical & Electrical (HM&E) Conform Studies and New Technology Assessment support (all years).																	

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EXHIBIT R-2a, RDT&E Project Justification			DATE:	
			February 2003	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME		
RDT&E, N / BA-4	PE0603561N Advanced Submarine Systems Development	S2033/Advanced Submarine Systems Development/0603561N		
C. PROGRAM CHANGE SUMMARY:				
Funding:	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY 03 Pres Controls)	49.457	48.784	54.204	53.601
Current BES/President's Budget: (FY04/05 Pres Controls)	47.644	47.655	25.404	77.011
Total Adjustments	-1.813	-1.129	-28.800	23.410
Summary of Adjustments				
Management Refo	-0.437			
SBIR/STTR Transfer	-0.866			
PL 107-206	-0.105			
Business Process Reform		-0.195		
IT cost growth		-0.09		
Contractor Support Services			-0.345	-0.383
Technical Process Reengineering			-0.152	-0.144
Business Process Reengineering			-0.114	-0.108
Streamlining training initiative			-0.038	-0.036
Reduction in Support Contractors			-0.19	-0.18
Overhead and direct cost reduction			-0.074	-0.053
Economic Assumption	-0.133	-0.274		
Contractor support			0.002	0.003
FFRDC		-0.053		
Inflation Savings		-0.517		
NWCF rates			0.124	0.157
Repogrammings	-0.272		-27.423	25.814
Non pay inflation			-0.590	
FY05/09 inflation				-1.660
Subtotal	-1.813	-1.129	-28.800	23.410
Schedule: not applicable.				
Technical: not applicable.				

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine Systems Developme			PROJECT NUMBER AND NAME Advanced Submarine Systems Development/S2033			
D. OTHER PROGRAM FUNDING SUMMARY:									
<u>Line Item No. & Name</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>To Complete</u>
Not applicable.									
E. ACQUISITION STRATEGY:									
Competitively awarded contracts from Broad Agency Announcement (BAA) solicitations.									
F. MAJOR PERFORMERS:									
Newport News Shipbuild, Newport News, Va R&D Support	12/02	12/03	12/04						
Electric Boat Corp., Groton, CT. R&D support	12/02	12/03	12/04						
Noesis, Inc., Manassas, Va. Fiber Brush R&D	12/02	12/03	12/04						
Naval Surf Warfare Ctr, Carderrock, MD. R&D support									
Naval Undersea Warfare Ctr, Newport, R.I. R&D support									
Penn State University/AR Lab, State College, PA	12/02	12/03	12/04						
John Hopkins/APL, Laurel, MD R&D support	12/02	12/03	12/04						

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Exhibit R-3 Cost Analysis (page 1)								DATE: February 2003				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-4			PE0603561N Advanced Submarine Systems Development			Advanced Submarine Systems Development/S2033						
Cost Categories (Tailor to WBS, or System Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Targ Value of Contract
Systems Engineering	S/CPFF	NNS Newport News, VA	47.750	0.500	12/02	0.000		0.000		24.200	78.450	67.800
Systems Engineering	S/CPIF	NNS Newport News, VA	19.932	1.000	12/02	2.000	12/03	5.000	12/03	59.200	87.784	80.000
Systems Engineering	S/CPFF	EB Groton, CT	51.460	3.023	12/02	1.500	12/03	5.000	12/03	CONT.	CONT.	37.300
Systems Engineering	WR	NSWC Bethesda, MD	176.662	11.400		7.828		14.000		CONT.	CONT.	
Systems Engineering	S/CPFF	ARL/PSU, State College, PA	30.060	5.800	12/02	3.304	12/03	7.000	12/03	CONT.	CONT.	
Systems Engineering	S/CPFF	APL/JHU	0.950	0.400		0.400		3.000				
Systems Engineering	WR	NUWC Newport, RI	72.867	0.600		0.710		5.000		CONT.	CONT.	
Systems Engineering	WR	NRAD San Diego, CA	1.410	0.200		0.410		0.420				
Systems Engineering	S/CPFF	KAPL Schenectady, NY	14.800							CONT.	CONT.	
Systems Engineering	S/CPFF	ADI	0.674									
Program Management	CPFF	Anteon	0.525	0.704	10/02	0.200	10/03	0.028	10/03			
Program Management	CPFF	SPA	0.025									
Subtotal Product Development			417.115	23.627		16.352		39.448				
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)								DATE: February 2003				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-4			PE0603561N Advanced Submarine Systems Development			Advanced Submarine Systems Development/S2033						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY05 Cost	FY05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Bethesda, MD	33.815	15.135		6.000		15.000		CONT.	CONT.	
Developmental Test & Evaluation	S/CPFF	NNS Norfolk, VA	11.837	0.600	12/02	0.500	12/03	5.000	12/04	66.800	83.086	67.800
Developmental Test & Evaluation	S/CPFF	EB Groton, CT	21.403	1.480	12/02	0.500	12/03	5.000	12/04	21.000	45.383	37.300
Developmental Test & Evaluation	S/CPFF	DARPA Fairfax, VA	3.650							0.000	3.650	3.000
Developmental Test & Evaluation	S/CPFF	RAYTHEON	7.670	2.292		0.000		10.143				
Developmental Test & Evaluation	S/CPFF	NOESIS	7.501	1.665	12/02	1.302	12/03	1.200	12/04	0.000	10.486	1.200
Developmental Test & Evaluation		RAND	0.555	0.500		0.000						
Developmental Test & Evaluation	S/CPFF	SPA	2.072	0.700		0.200		0.500		0.000	3.472	0.600
Subtotal T&E			88.503	22.372		8.502		36.843				
Remarks:												
Contractor Engineering Support	S/CPFF	NNS Norfolk, VA	3.100								3.100	
Contractor Engineering Support	S/CPFF	EB Groton, CT	3.027								3.027	
Travel			0.215	0.100	11/02	0.050	11/03	0.100	11/04			
Government Engineering Support	WR	NSWC Bethesda, MD	1.000								CONT.	
Contractor Engineering Support		Rosenblatt	0.325								0.325	
Contractor Engineering Support		SPA	0.620	0.100		0.080		0.200				
Contractor Engineering Support		DDL Omni	0.040									
Contractor Engineering Support		EG&G	0.280									
Contractor Engineering Support		JJMA	0.589									
Contractor Engineering Support		ADI	0.155								0.155	
Contractor Engineering Support		Various	0.488	1.456	12/02	0.420	12/03	0.420	12/04			
Subtotal Management			9.839	1.656		0.550		0.720		0.000	11.387	
Remarks:												
Total Cost			478.822	47.655		25.404		77.011				

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Exhibit R-3, Project Cost Analysis

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Exhibit R-3, Project Cost Analysis
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EXHIBIT R4, Schedule Profile																								DATE: February 2003															
APPROPRIATION/BUDGET ACTIVITY										PROGRAM ELEMENT NUMBER AND NAME										PROJECT NUMBER AND NAME																			
RDT&E, N / BA-4										PE0603561N Advanced Submarine Systems Development										Advanced Submarine Systems Development/S2033																			
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009										
	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											
ADV. PROPUSLOR DESIGN DEVELOPMENT	Initiate				hardware manu.				hardware comp.				next generation propulsor/hull/control/surface concept development																										
	▲				△				△																														
Transition propulsor component tech. to VA class												△																											
ADV. COMPOSITE SAIL			▲	vendor qualification					△	fab & demo prototype																													
Transition Adv. comp. sail to VA class														△																									
INFRASTRUCTURE					▲	LSV 2 delivery	△	LSV 2 774 support	△	LSV 2 battery																													
Planned replacement of class/unclass computer server at Hydrotech Center																△																							
Technology refresh of Intermediate Scale Meas. Sys.						△																																	
ADV. METAL FIBER BRUSHES			△	full scale demo commutator																																			
Transition Adv. Metal Fiber Brushes to PMS 392														△																									

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Exhibit R-4a, Schedule Detail					DATE: February 2003			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT&BA-4	PE0603561N Advanced Submarine Systems Development				Advanced Submarine Systems Development/S2033			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Initiate propulsor advanced design developments	2Q							
Begin hardware manufacture for Adv. Propulsor concepts		1Q						
Complete manufacture of Advanced Propulsor concepts			1Q					
Adv. Propulsor concepts LSV trial			2Q					
Transition propulsor component technology to VA class			3Q					
Next generation propulsor/hull/control surface concept dev.				1Q				
Complete VA 4th gen. propulsor trial		1Q						
Initiate Advanced Maneuvering and Control development	3Q							
Demo Adv. Maneuvering & Control concepts on LSV 2			2Q					
Conduct Composite Adv. Sail vendor qualification	3Q							
Select Composite Adv. Sail Vendor	4Q							
Fabricate and demo full scale composite Adv. Sail prototype			1Q					
Comp.Adv. Sail complete design criteria and req. document				1Q				
Complete Comp. Adv. Sail development, transition to VA class				1Q				
VA 4th generation propulsor trail LSV 1	4Q							
Troubleshoot SEAWOLF acoustic issues LSV 1	3Q, 4Q	1Q, 2Q, 3Q, 4Q						
Conduct LSV 1 maneuvering characterization trial	3Q							
Accept delivery of LSV 2 to Navy		1Q						
SEAWOLF steel sail trail, LSV 1		2Q						
LSV evaluation of propulsor component improvements		2Q						
LSV 2 hydrodynamic performance trial		3Q						
LSV 2 maneuvering characterization trial		4Q						
LSV 2 SSN 774 support		3Q						
LSV 2 RAV install hull treatment on pressure hull and sail		4Q						
Complete "no sail" trials, LSV 1		2Q						
Procure new LSV 2 battery		3Q						
Initiate VA advanced sea trials, LSV 2			3Q					
Complete VA advanced sail trials, LSV 2			4Q					
LSV 2 RAV install, new LSV 2 battery			2Q					
LSV 2 ODAS refresh				1Q				
Procure new LSV 2 battery						1Q		
Planned replacement of class/unclass comp. serv. @ HTC					4Q			
Technology refresh of Intermediate Scale Meas. System		4Q						
Demo commutator operation for Adv. Brush - full scale	3Q							
Comp. Adv. Metal Brushesh transition to PMS 392				3Q				

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Exhibit R-4a, Schedule Detail
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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2003	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603561N/Advanced Submarine System Development				PROJECT NUMBER AND NAME S0223/Submarine Combat System Improv (Adv)			
COST (\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost	60.686	71.092	27.340	81.584	46.057	46.700	145.834	156.610
RDT&E Articles Qty								

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently available.

Project Unit S0223: The Advanced Submarine Combat Systems Development non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives by the application of advanced development and testing of sonar and combat control systems improvements. This program element transitions technologies developed by Navy technology bases, the private sector, Office of Naval Research Future Naval Capabilities and Defense Advanced Research Projects Agency. The program addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battlespace preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware / software systems are developed to demonstrate technologically promising system concepts in Laboratory and at-sea submarine environments. Specifically, the focus of the technology efforts will be Advanced Processing Build-Acoustic (APB-A) and Advanced Processing Build-Tactical (APB-T). APB's develop and demonstrate improvements to current and future sonar/combat control systems. Program office supports international information exchange agreements. Program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to platform applications. Congress has authorized the following FY 03 funding: \$2.800M to develop Conformal Acoustic Velocity Sonar (CAVES) technology, \$3.500M for Submarine Payloads and Sensors, \$6.000M for High Performance Metal Fiber Brushes, and \$2.000M for Advanced Composite Sail.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2003		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603561N/Advanced Submarine System Development	PROJECT NUMBER AND NAME S0223/Submarine Combat System Improv (Adv)		
B. Accomplishments/Planned Program				
	FY 02	FY 03	FY 04	FY 05
Advanced Sonar System Processing/Subtotal Cost	26.128	23.092	18.840	39.784
RDT&E Articles Quantity				
Advanced Processing Build-Acoustic (APB-A) has continued improvements in sonar detection and classification via improved algorithms and automation for the thin line towed arrays, is implementing the initial Precision Underwater Mapping functionality, improved sonar planning and environmental monitoring and initiated processing enhancements for the Hull and Sphere Arrays. Future efforts will focus on improved High Frequency Active capabilities, and enhanced processing capabilities for the Sphere, Hull and TB-16 Arrays as well as test equipment upgrades.				
	FY 02	FY 03	FY 04	FY 05
Advanced Tactical Control/Subtotal Cost	10.000	10.000	8.500	16.500
RDT&E Articles Quantity				
Advanced Processing Build-Tactical (APB-T) delivered the first automated Close Encounter Management tool-set for submarine combatants. Future efforts will focus on enhancing this functionality through refined all source data fusion algorithms and in improving the tactical commander's ability to manage close in and high density scenarios through advanced target motion analysis, contact management, tactical scene rendering, sensor performance prediction models, search planning, uncertainty management, acoustic and non-acoustic vulnerability management, close encounter decision management, automation. In FY 05 start advanced processing techniques in data fusion and state estimation leveraged from ONR/DARPA as well as test equipment upgrades.				
	FY 02	FY 03	FY 04	FY 05
Advanced Hull Arrays/Subtotal Cost	2.500	9.800	0.000	13.000
RDT&E Articles Quantity				
The Advanced Hull Arrays project is developing improved, larger aperture sonars in order to restore acoustic superiority over potential threat submarines. The end products will be large aperture sail, flank and bow array Advanced Development Models (ADMs). Efforts continue development and testing of a Conformal Acoustic Velocity Sonar (CAVES) Large Vertical Array (LVA) for ultimate transition to VIRGINIA Class. In FY 05, commence Second Low Cost Conformal Array (SLCCA) with active capability and start improvements to a Sail Window Conformal Array (SWCA) ADM both of which support collision avoidance and mine detection.				

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Exhibit R-2a, RDTEN Project Justification
(Exhibit R-2a, page 13 of 22)

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EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2003	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603561N/Advanced Submarine System Development	PROJECT NUMBER AND NAME S0223/Submarine Combat System Improv (Adv)		
B. Accomplishments/Planned Program				
	FY 02	FY 03	FY 04	FY 05
High Frequency Sonar Program/Subtotal Cost	5.700	2.800	0.000	3.500
RDT&E Articles Quantity				
The High Frequency Sonar Program develops products to support Battlespace Preparation and Anti-Submarine Warfare. These include advanced Computer Aided Detection (CAD) for Precision Underwater Mapping (PUMA), Computer Aided Classification (CAC) and Low Probability of Intercept and Adaptive Clutter Suppression capabilities for Advanced Submarine Warfare (ASW). Deliverables will be PUMA and ASW CAC source code for incorporation into APB. In FY 05, make further improvements in HF Sonar Tactical Decision Aids, PUMA, CAD/CA and Auto Sonar Calibration.				
	FY 02	FY 03	FY 04	FY 05
Multi-Line Towed Array Test & Evaluation/Subtotal Cost	0.900	0.900	0.000	2.000
RDT&E Articles Quantity				
Evaluated single line array self noise at Lake Pend Oreille (LPO) test. Evaluated 3 different VIM configurations at lake test. Completed 3 line array design and fabrication. The Multi-Line Towed Array Test & Evaluation program conduct 3-line sea test on Research Vehicle and submarine, perform data analysis, and initiate transition to Engineering Development Model (EDM) development. In FY 05, start advanced development of next generation submarine towed array concepts leveraging innovative mechanical, fiber optic and other sensor technologies.				
	FY 02	FY 03	FY 04	FY 05
Payloads/Sensors Program/Subtotal Cost	12.600	16.500	0.000	6.800
RDT&E Articles Quantity				
Payloads/Sensors Program - Two industry consortia (Team 2020 and the Forward Pass Consortium) are executing five demonstrations in the component development phase of this effort. Additionally the consortia will continue an industry technology incubator effort aimed at defining new start demonstrations to be selected in FY-03. The team 2020 demonstrations started late in FY-01 and complete by FY-04 are the Flexible Payload Module (FPM), Stealthy Affordable Capsule System (SACS), Processing, and Small UAV (SUAV). Team Forward Pass will execute the Broaching Universal Buoyant Launcher (BUBL) demonstration with the same schedule. For FY-03, interim testing will be conducted for all demonstrations started in FY-01. In FY 05, start up new technology demonstrations.				

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B. Accomplishments/Planned Program				
	FY 02	FY 03	FY 04	FY 05
Advanced Sonar System Processing/Subtotal Cost	2.858	0.000	0.000	0.000
RDT&E Articles Quantity				
Fiber Optic Technology Transition - Risk reduction to assure smooth transition of Fiber Optic Towed Array technology to the Fiber Optic TB-29 program.				
	FY 02	FY 03	FY 04	FY 05
Adv. Sub. Systems Dev./Subtotal Cost	0.000	8.000	0.000	0.000
RDT&E Articles Quantity				
BRUSH - metal fiber brush and brush holder design suitable for transition to a program to install them on fleet SSMG sets. SAIL - Further development of damage prediction techniques for transient events by developing and validating models that predict damage development in thick section composites. .				
	FY 02	FY 03	FY 04	FY 05
Subtotal Cost				
RDT&E Articles Quantity				

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EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2003	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine Systems Development	PROJECT NUMBER AND NAME S0223/Advanced Submarine Systems Development/0603561N		

C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY 03 Pres Controls)	61.309	58.605	59.925	57.589
FY04/05 Congressional Controls	60.686	71.092	27.340	81.584
Total Adjustments	-0.623	12.487	-32.585	23.995
Summary of Adjustments				
Reprogrammings			-32.655	23.906
Management Refo	-0.541			
PBD-630 FFRDC	-0.117			
FY2002 SBIR (dtd 5-15-02)	-1.204			
SYSKOM Contractor support		0.000	0.009	0.012
Sec. 313, PL 107-206: Revised	-0.129			
NWC F rates			0.061	0.077
FY02 BTR (July-02)	1.858			
Business Process Reform		-0.297		
Economic Assumptions (Sec. 813)	-0.170	-0.419		
IT Cost Growth (Sec. 8109)		-0.137		
Undistributed Reductions	-0.320	-0.960		
Conformal Acoustic Velocity Sensors		2.800		
High Performance Metal Fiber Brushes		6.000		
Advanced Composite Sail		2.000		
Submarine Payloads and Sensors		3.500		
Subtotal	-0.623	12.487	-32.585	23.995

Schedule:

Not Applicable.

Technical:

Not Applicable.

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EXHIBIT R-2a, RDT&E Project Justification							DATE:		February 2003		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT NUMBER AND NAME			PROJECT NUMBER AND NAME					
RDT&E, N / BA-4			0603561N/Advanced Submarine System Development			S0223/Submarine Combat System Improv (Adv)					
D. OTHER PROGRAM FUNDING SUMMARY:											
<u>Line Item No. & Name</u>		<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	To <u>Complete</u>	Total <u>Cost</u>
Not applicable.											
E. ACQUISITION STRATEGY: * Plan to use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations.											
F. MAJOR PERFORMERS: **											
Naval Undersea Warfare Center, Newport, R.I. R&D support. Naval Research Laboratory, Washington, DC. Naval Surface Warfare Center, Carderock, MD. R&D Support. John Hopkins University/Applied Physics Lab, Laurel, MD R&D support. Applied Research Lab., The University of Texas, Austin, TX. R&D Support. MITRE Corporation, McLean, VA R&D Support. Lincoln Lab, Cambridge, MA R&D Support. Digital Systems Resource, Fairfax, VA. R&D Support. Lockheed Martin, Manassas, VA R&D Support. Raytheon, Portsmouth, RI R&D Support. (All performers support APB (A) and APB(T).											

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Exhibit R-3 Cost Analysis (page 1)							DATE: February 2003					
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-4			0603561N/Advanced Submarine System Development			S0223/Submarine Combat System Improv (Adv)						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development	WR	NUWC Newport, RI	52.017	12.275	10/02	7.175	10/03	29.175	10/04	CONT.	CONT.	
Product Development	RCP	NUWC Newport, RI	1.000	0.000	-	0.000	-	0.000	-	CONT.	CONT.	
Product Development	WR	NRL/Washington	3.900	0.800	10/02	0.800	10/03	1.100	10/04	CONT.	CONT.	
Product Development	RCP	NRL/Washington	0.490	0.000	-	0.000	-	0.000	-	CONT.	CONT.	
Product Development	WR	NSWC Carderock, MD	9.359	1.400	10/02	0.000	10/03	1.900	10/04	CONT.	CONT.	
Product Development	RCP	NSWC Carderock, MD	0.036	0.000	-	0.000	-	0.000	-	CONT.	CONT.	
Product Development	WR	NSWC Dahlgren	0.128	0.080	10/02	0.080	10/03	0.080	10/04	CONT.	CONT.	
Product Development	PD	ONI, Washington	1.885	0.900	12/02	0.900	12/03	0.900	12/04	CONT.	CONT.	
Product Development	C/CPFF	Lockheed-Martin,VA	9.621	4.314	12/02	0.800	12/03	1.800	12/04	CONT.	CONT.	
Product Development	C/CPFF	Sanders Assoc. (L-M),NH	2.652	0.750	12/02	0.000	12/03	0.000	12/04	CONT.	CONT.	
Product Development	RCP	NSMA	0.495	0.180	11/02	0.180	12/03	0.180	11/04	CONT.	CONT.	
Product Development	MIPR	U.S. Army/MITRE	5.240	1.800	12/02	1.200	12/03	1.800	12/04	CONT.	CONT.	
Product Development	MIPR	U.S. Air Force/MIT Lincoln Labs	4.120	1.500	12/02	1.500	12/03	1.500	12/04	CONT.	CONT.	
Product Development	RCP	ONR/MCCI	2.800	0.000		0.000		0.000		CONT.	CONT.	
Product Development	MIPR	METRON	1.050	0.000		0.000		0.000		CONT.	CONT.	
Product Development	C/CPFF	Progeny, VA	1.650	0.440	12/02	0.000	12/03	0.940	12/04	CONT.	CONT.	
Product Development	C/CPFF	BBN, VA	2.309	0.927	-	0.000	-	0.000	-	CONT.	CONT.	
Product Development	RCP	ONR/GTRI	2.050	0.000	-	0.000	-	0.000	-	CONT.	CONT.	
Product Development	SS/CPFF	APL/JHU, MD	22.901	7.200	01/03	7.200	01/04	11.200	01/05	CONT.	CONT.	
Product Development	SS/CPFF	APL/UW, WA	0.125	0.050	12/02	0.050	12/03	0.050	12/04	CONT.	CONT.	
Product Development	SS/CPFF	ARL/UT, TX	18.143	3.415	12/02	1.500	12/03	1.500	12/04	CONT.	CONT.	
Product Development	SS/CPFF	ARL/PSU, PA	1.525	0.350	12/02	0.000	12/03	0.350	12/04	CONT.	CONT.	
Product Development	MD	ARL/PSU, PA	0.692	0.150	01/03	0.150	01/04	0.150	01/05	CONT.	CONT.	
Product Development	WR	NAVAIR PAX/NSWC Indian H	0.110	0.030	10/02	0.030	10/03	0.030	10/04	CONT.	CONT.	
Product Development	WR	SPWAR, CA	0.500	0.140	10/02	0.140	10/03	0.140	10/04	CONT.	CONT.	
Product Development	PD	SPWAR, CA	0.738	0.400	10/02	0.400	10/03	0.400	10/04	CONT.	CONT.	
Product Development	C/CPFF	DSR, VA	13.300	3.600	12/02	3.216	12/03	5.515	10/04	CONT.	CONT.	
Product Development	WR	COMSUBLANT	0.195	0.100	10/02	0.100	10/03	0.100	10/04	CONT.	CONT.	
Product Development	C/CPFF	Electric Boat, CT	5.603	0.000		0.000		0.000		CONT.	CONT.	
Product Development	CPFF	NNS, VA	0.000	0.000		0.000		0.000		CONT.	CONT.	
Product Development	MIPR	DARPA, VA	21.600	16.500	12/02	0.000	12/03		12/04	CONT.	CONT.	
Product Development	Various	Various	2.645	0.000	Various	0.000	Various	4.397	Various	CONT.	CONT.	
Product Development	C/CPFF	Northrop Grumman	0.000	1.100	02/03	0.000		0.000		CONT.	CONT.	
SBIRs / BAAs	C/CPFF	Various	5.625	1.625	Various	0.000	Various	10.177	Various	CONT.	CONT.	
Advanced Towed Array BAA	C/CPFF	Lockheed Martin, NY	1.315	0.000		0.000		0.000		CONT.	CONT.	
Subtotal Product Development			195.819	60.026		25.421		73.384		0.000	354.650	
Remarks:												
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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 18 of 22)												

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Exhibit R-3, Project Cost Analysis
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Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 3)								DATE: February 2003				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-4			0603561N/Advanced Submarine System Development			S0223/Submarine Combat System Improv (Adv)						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NUWC Newport, RI	0.750	0.758	10/02	0.000	10/03	2.000	10/04	CONT.	CONT.	
Developmental Test & Evaluation	Various	Various	2.011	0.000		0.000	12/03	4.281		CONT.	CONT.	
Operational Test & Evaluation											0.000	
Live Fire Test & Evaluation											0.000	
Test Assets											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal T&E			2.761	0.758		0.000		6.281		0.000	9.800	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support	C/CPFF	Integrated Product Dec, CT	0.450							CONT.	CONT.	
Program Management Support	C/CPFF	Stanley Associates, VA	2.999	1.389	12/02	1.000	12/03	1.000	12/04	CONT.	CONT.	
Program Management Support	Various	Various	0.200	0.844	12/02	0.844	12/03	0.844	12/04	CONT.	CONT.	
Program Management Support	Various	EG&G	1.787	0.000	-	0.000	-	0.000	-	CONT.	CONT.	
Program Management Support	Various	Anteon Corporation	0.198	0.000	-	0.000	-	0.000	-	CONT.	CONT.	
Travel			0.200	0.075		0.075		0.075		CONT.	CONT.	
Transportation											0.000	
SBIR Assessment											0.000	
Subtotal Management			5.834	2.308		1.919		1.919		0.000	11.980	
Remarks:												
Total Cost			204.414	71.092		27.340		81.584		0.000	384.430	
Remarks:												

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EXHIBIT R4, Schedule Profile																								DATE: February 2003								
APPROPRIATION/BUDGET ACTIVITY								PROGRAM ELEMENT NUMBER AND NAME												PROJECT NUMBER AND NAME												
RDT&E, N / BA-4								PE 0603561N Advanced Submarine Systems Development												S0223 Advanced Submarine Combat Systems Development												
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009			
	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				
Advanced Processing Build (Acoustic)			APB(A)-01				APB(A)-02				APB(A)-03				APB(A)-04				APB(A)-05				APB(A)-06				APB(A)-07				APB(A)-08	
Advanced Processing Build (Tactical)		APB(T)-01					APB(T)-02				APB(T)-03				APB(T)-04				APB(T)-05				APB(T)-06				APB(T)-07				APB(T)-08	
	Lake test single line evaluation				3-line lake tow test																											
TB-16 Multi-Line Towed Array (MLTA)		Procure third line																														

Legend:



Sea Test



Transition



Lake Test

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

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Exhibit R-4a, Schedule Detail (Exhibit R-4a, page 21 of 22)

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Exhibit R-4a, Schedule Detail						DATE: February 2003			
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT&E BA-4		PE 0603561N Advanced Submarine Systems Development				S0223 Advanced Submarine Combat Systems Development			
Schedule Profile		FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Advanced Processing Builds (Acoustic)									
	APB(A)-01 Sea Test	1Q							
	Transition APB-01 to ARCI	2Q							
	APB(A)-02 Sea Test including HFSP		1Q						
	Transition APB-02 to ARCI		2Q						
	APB(A)-03 Sea Test			1Q					
	Transition APB-03 to ARCI			2Q					
	APB(A)-04 Sea Test				1Q				
	Transition APB-04 to ARCI				2Q				
	APB(A)-05 Sea Test					1Q			
	Transition APB-05 to ARCI					2Q			
	APB(A)-06 Sea Test						1Q		
	Transition APB-06 to ARCI						2Q		
	APB(A)-07 Sea Test							1Q	
	Transition APB-07 to ARCI							2Q	
	APB(A)-08 Sea Test								1Q
	Transition APB-08 to ARCI								2Q
Advanced Processing Builds (Tactical)									
	APB(T)-01: Sea Test. Transition to CCS	4Q							
	APB(T)-02 Sea Test		1Q						
	APB(T)-03 Sea Test			1Q					
	APB(T)-04 Sea Test				1Q				
	APB(T)-05 Sea Test					1Q			
	APB(T)-06 Sea Test						1Q		
TB-16 Multi-Line Towed Array (MLTA)									
	Lake test single line evaluation	1Q							
	Procure third line	2Q							
	Three-line critical design review	3Q							
	Three-line lake tow test		2Q						
	Three-line R/V sea test		3Q						
	Three-line submarine sea test		4Q						
Large Vertical Array (LVA)									
	LVA Studies	1Q-2Q							
	Design and Component Test	1Q-4Q	1Q-4Q						
	Preliminary Navy Design		4Q						
Integrated Bow Conformal Array (IBC)									
	Requirements and Tradeoff Studies	1Q-4Q	1Q-4Q						
	Quarter Scale Bow Dome Preparation	1Q-4Q							
	Preliminary Studies		4Q						

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Exhibit R-4a, Schedule Detail

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