

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4					R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N					
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost		116,245	124,051	113,269	121,064	118,988	124,926	117,464	0.000	719,762
Adv. Sub. Systems Development/S2033		57,075	43,898	46,084	54,774	54,906	58,891	59,397	CONT.	CONT.
Enhanced Performance Metal Brush/S2756		0.000	2,287	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adv. Sub. Combt Sys. Dev/V0223		59,170	69,911	67,185	66,290	64,082	66,035	58,067	CONT.	CONT.
Conf Array Vel Sensor/V2753		0.000	2,983	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Common Towed Array Prog/V2754		0.000	1,989	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Afford Adv Acoustic Arrays/V2755		0.000	2,983	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<p>A. (U) Mission Description and Budget Item Justification: A Comparability Adjustment by Issue #64088 for this RDT&E Budget line and NAVSEA restructure by Issue #66765 to transfer all the RDT&E funds from PE 0603504N/V0223, V2389 Advanced Submarine Combat Systems Development into PE 0603561N under Project V0223 for FY2000 and out. Each page will cite which Project Unit is being described.</p> <p>(U) 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 feasible.</p> <p>(U) Project Unit S2033: The Advanced Submarine Research & Development Office identifies the most promising and emerging technologies for VIRGINIA Class Submarine and other submarine platform insertion and transitions them into specific demonstration/validation efforts. The program element is non-ACAT and transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency Tactical Technology Office. 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. Research and development investment factors used to select these technologies include: economic environment and return on investment; mission enhancement; and safety and survivability. The program office 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); operates the Large Scale Vehicle 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; operates and supports</p>										

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<p>the Intermediate Scale Measurement System; and provides life cycle support for the R&D Submarine modifications. In addition, the program is designing and constructing a second large scale vehicle, LSV2.</p> <p>This Program has been structured to support near term VIRGINIA Class insertion as well as core technologies in Hydrodynamics/Hydroacoustics, Affordability, and Stealth. (U) Project S2756 is authorized by Congress under Committee Report - Senate Rpt. 106-50 - for Advanced Metal Fiber Brush Technology. Metal Fiber electric motor brushes have the potential to significantly improve shipboard quality of life, reduce total ownership costs of ships and increase the survivability and operational reliability of electric motors and generators.</p> <p>(U) Project Unit V0223: This non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives through the application of advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to address the technology challenges that marginalize tactical control in littoral and open ocean environments during the performance of a variety of missions including peacetime engagement, surveillance, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware and/or software systems are developed to demonstrate technologically promising system concepts in Laboratory and at-sea submarine environments. Technology areas specific to this program include transducers, hull-mounted and towed arrays, on-board monostatic and bistatic sonar signal processing, target motion analysis (TMA), multiple contact processing and test and evaluation. This program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship and aircraft applications. (U) Projects V2753, V2754, and V2755 are authorized by Congress to pursue the application of fiber optic technology in submarine acoustic array systems as potential cost and performance improvements to future operational sonar array systems.</p>																							
<table border="0"> <tr> <td>B. (U) Program Change Summary:</td> <td>FY 1999</td> <td>FY 2000</td> <td>FY 2001</td> </tr> <tr> <td>FY 2000 President's Budget:</td> <td>60,520</td> <td>115,767</td> <td>114,926</td> </tr> <tr> <td>Appropriated Value:</td> <td>60,520</td> <td>126,067</td> <td></td> </tr> <tr> <td>Adjustment to FY 1999 Appropriated Value/ FY2000 President's Budget</td> <td>55,725</td> <td>-2,016</td> <td>-1,657</td> </tr> <tr> <td>FY2001 PRES Budget Submit</td> <td>116,245</td> <td>124,051</td> <td>113,269</td> </tr> </table>				B. (U) Program Change Summary:	FY 1999	FY 2000	FY 2001	FY 2000 President's Budget:	60,520	115,767	114,926	Appropriated Value:	60,520	126,067		Adjustment to FY 1999 Appropriated Value/ FY2000 President's Budget	55,725	-2,016	-1,657	FY2001 PRES Budget Submit	116,245	124,051	113,269
B. (U) Program Change Summary:	FY 1999	FY 2000	FY 2001																				
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APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N	
<p>(U) Change Summary Explanation:</p> <p>(U) FY 2000 Total Program Funding: \$2.005M of the extramural program is reserved for SBIR assessment IAW 15 USC 638.</p> <p>(U)S2033 Funding: The FY99 decrease of (-\$3,445M) is attributed to Undistributed Adjustments (-\$.199K), Small Business Innovative Research (-\$1,129M). RDTEN Jun Btr Update (-\$500K) and FY99 Midyear Review Btr's (-\$1,181), (-\$274K) for Inflation Savings, (-\$152K) BS 1002 Actual Update and (-\$10K) for FY99 BTR . The FY 2000 increase of (\$.57K) is attributed to restore issue 62288 outsourcing and a decrease of (-\$51K) for SSP (Contracts), also received (-\$243K) across the board reduction. FY 2001 decrease attributed to Advanced Submarine Technology (-\$12,200K) and an increase of (\$11,739) for the Buyback of same Technology, increase to Restore issue 62288 Outsourcing (\$.371K), SSP Contracts decrease of (-\$160K), NWCF increase of (\$.101K), SSP - NUWC Functionality Assessment decrease (-\$2K) and SSP - NUWC Contract Efficiencies decrease (-\$7K). (\$77) increase from PBD 411, (\$16K) decrease from PBD 606 Military/Civilian pay rates, (-\$315K) from PBD 604 Nonpay r Purchase Inflation and (-\$121K) decrease from PBD 0222C2 Active Navy Ops.</p> <p>(U)S2756 Funding: The FY00 decrease of (-\$.13K) is due to an Across-the-Board Reduction</p> <p>(U)V0223 Funding: The FY99 increase of (\$59,718) is for a Comparability adjustment and decreases of (-\$.538K) for BSO 1002 Update and (-\$.10K) for a FY99 BTR. The FY2000 decrease of (\$-1,333K) attributed to Advanced Undersea Warfare adjustments and an Across-the-Board Reductions of (-\$.388K). The FY 2001 Advanced Sub Technology reduction (-\$13,740K) and buyback (\$13,740K), NWCF Rate increase of (\$.852K), SSP - NUWC Functionality Assessment decrease of (-\$52K), SSP - NUWC Contract Efficiencies decrease (-\$168K) and a Advanced Undersea Warfare decrease of (-\$1,270K), increase of (\$.83K) for PBD 411 adjustments, increase of (\$.35K) for Mil/Civ Pay Rates, decrease of (-\$.459K) for Nonpay Purchase Inflation and a reduction of (-\$.177K) for Active Navy Ops.</p> <p>(U)V2753 Funding: The FY00 decrease of (-\$17K) is due to an Across-the Board Reduction. (U)V2754 Funding: The FY00 decrease of (-\$.11K) is due to an Across-the-Board Reduction. (U)V2755 Funding: The FY00 decrease of (-\$.17K) is due to an Across-the-Board Reduction.</p>		

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APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N	
<p>(U) Schedule: Not Applicable.</p> <p>(U) Technical: Proceed with the Category II Core Technologies as identified in Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine.</p>		

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Advanced Submarine Dev/0603561N			PROJECT NAME AND NUMBER Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756						
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Adv. Submarine Systems Dev. - S2033		57.075	43.898	46.084	54.774	54.906	58.891	59.397	CONT.	CONT.
Adv. Metal Fiber Brushes - S2756		0.000	2.287	0.000	0.000	0.000	0.000	0.000	COMP.	COMP.

A. (U) 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 feasible.

(U) Project Unit S2033: The Advanced Submarine Research & Development Office identifies the most promising and emerging technologies for the VIRGINIA Class Submarine and other submarine platform insertion and transitions them into specific demonstration/validation efforts. The program element is non-ACAT and transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency Tactical Technology Office. 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. Research and development investment factors used to select these technologies include: economic environment and return on investment; mission enhancement; and safety and survivability. The program office 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); operates the Large Scale Vehicle (LSV) 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; operates and supports the Intermediate Scale Measurement System; and provides life cycle support for the R&D Submarine modifications. In addition, the program is designing and constructing a second large scale vehicle, LSV2.

U) Project S2756 is authorized by Congress under Committee Report - Senate Rpt. 106-50 - for Advanced Metal Fiber Brush Technology. Metal Fiber electric motor brushes have the potential to significantly improve shipboard quality of life, reduce total ownership costs of ships and increase the survivability and operational reliability of electric motors and generators.

(U) This Program has been structured to support near term Virginia Class insertion as well as core technologies in Hydrodynamics/Hydroacoustics, Affordability, and Stealth.

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EXHIBIT R-2a, RDT&E Project Justification		DATE:
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Advanced Submarine Sys Dev/0603561N	Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756
<p>(U) Program Accomplishments and Plans:</p> <p>1. (U) FY 1999 Accomplishments:</p> <ul style="list-style-type: none">- (U) (\$7.924M) Stealth: Continued development of advanced submarine propulsor technologies, internal transmission paths, hull radiation and echo formation (Advanced Coating), Advanced EM Silencing, Signature Characterization and Master Plan development.- (U) (\$8.842M) Hydrodynamics/Hydroacoustics: Continued development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Continued Rim Driven Thruster/MSW pump development. Developed and demonstrated techniques to improve hydrodynamic performance of submarines through modification of flow and lift characteristics (Powering & Resistance). Completed 1/16 scale evaluation of the Advanced Sail in the LCC. Completed construction of 1/4 scale Advanced Sail for LSV. Developed the Advanced Sail. Initiated transition of NASA's virtual wind tunnel to development of a virtual water tunnel. Initiating of SSM Master Plan.- (U) (\$28.609M) Infrastructure: Continued operations and support for the Large Scale Vehicle (LSV), Hydroacoustic/Hydrodynamic Test Center (H/HTC), Intermediate Scale Measurement System (ISMS), R&D submarine. Continued design and construction of (LSV 2).- (U) (\$4.212M) Total Ownership Cost/Affordability: Continued research and development of Elastomeric Ejection System for insertion into the Virginia Class.- (U) (\$7.488M) Initiated study for Payloads in compliance with Defense Science Board Report recommendations. Mission and Future Design (M&FD)/Hull, Mechanical & Electrical (H, M & E) Conform Studies. New Technology Assessment support, Technical Architecture support, N87 SAIC study. <p style="text-align: center;">\$57.075M TOTAL</p> <p>2. (U) FY 2000 Plan:</p> <ul style="list-style-type: none">- (U) (\$6.917M) Stealth: Continue development of advanced submarine propulsor technologies, internal transmission paths, Advanced Electromagnetic Silencing, hull radiation and echo formation (Advanced Coatings), and signature characterization.- (U) (\$13.324M) Hydrodynamics/Hydroacoustics: Continue development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Develop and demonstrate techniques to improve hydrodynamic performance of submarines through modification of flow and lift characteristics (Powering and Resistance). Complete demonstration/validation of the Advanced Sail on LSV. Continue Rim Driven Thruster/Main Seawater Pump development .		

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APPROPRIATION/BUDGET ACTIVITY RDT&E, NBA-4	PROGRAM ELEMENT NAME AND NUMBER Advanced Submarine Sys Dev/0603561N	PROJECT NAME AND NUMBER Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756
<p>- (U) (\$15.411M) Infrastructure: Continue operations and support for the Large Scale Vehicle, H/HTC, ISMS, R&D submarine. Continued design and construction of LSV 2.</p> <p>- (U) (\$5.948M) Total Ownership Cost/Affordability: Complete demonstration/validation of EES and transition to Virginia Class PE. Initiate Peel and Stick Damping study, initiate design and testing of Advanced Metal Fiber Brushes technology (\$2.3M additional funding under Project Unit S2756).</p> <p>- (U) (\$2.292M) Continue Mission and Future Design (M&FD)/Hull, Mechanical and Electrical (HM&E) Conform Studies and New Technology Assessment support.</p> <p>- (U) (\$.006) Outsourcing restructuring \$43.898M TOTAL</p> <p>3. (U) FY 2001 Plan:</p> <p>- (U) (\$18.385M) Stealth: Continue development of corporate Electric Drive, advanced submarine propulsor technologies, internal transmission paths, Advanced Electromagnetic Silencing, and signature characterization. Initiate flow noise reduction project.</p> <p>- (U) (\$5.745M) Hydrodynamics/Hydroacoustics: Continue development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Develop and demonstrate techniques to improve hydrodynamic performance of submarines through modification of flow and lift characteristics (Powering and Resistance). Complete Rim Driven Thruster/Main Seawater pump development. Complete Advanced Sail development.</p> <p>- (U) (\$16.273M) Infrastructure: Continue operations and support for the Large Scale Vehicle, Hydroacoustic/Hydrodynamic Test Center(H/HTC), Intermediate Scale Measurement System (ISMS), R&D Submarine. Complete design and construction of the LSV 2. Initiate acceptance trials.</p> <p>- (U) (\$2.899M) Total Ownership/Affordability: Complete demonstration and validation of Elastomeric Ejection System for insertion into the Virginia Class. Continue development of Advanced Metal Fiber Brushes.</p> <p>- (U) (\$2.782M) Recontinue study for Payloads in compliance with Defense Science Board Report recommendations. Continue M&FD/HM&E Conform Studies and New Technology Assessment support.</p> <p>\$46.084M TOTAL</p>		

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EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Advanced Submarine Sys Dev/0603561N	PROJECT NAME AND NUMBER Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

B. (U) Other Program Funding Summary: additional \$50M of SEALIFT National Defense Funds was appropriated in FY97, authorized in FY98 for LSV development.

(U) Related RDT&E: Not applicable.

C. (U) Acquisition Strategy: Not applicable.

D. (U) Schedule Profile:

	FY 1998	FY 1999	FY 2000	FY 2001
PROGRAM MILESTONES	Complete Advanced Submarine Propulsion System concepts. Conduct LSV propulsor testing for VIRGINIA propulsor development/improvement program	Advanced coating effort deferred to FY02. Advanced decks & mounts effort restructured	Complete demonstration/validation of advanced sail on LSV, transition to VIRGINIA class PE. Hydroacoustic/Hydrodynamic Test Center computer refresh upgrade Acoustic Research Detachment Range upgrade	Initial operating capability of LSV 2 Complete Rim Driven Thruster/main seawater pump development
ENGINEERING MILESTONES	Complete EES 1st generation elastomeric disk life cycle test Design and fab prototype Adv. Sail & test instrumentation Complete initial phase of development of enabling component and analytical techniques needed for main propulsion electric drives Complete concept design for Large Scale Vehicle 2 (LSV 2)	Closeout and final documentation for development of enabling components and analytical techniques needed for electric drive Complete design of advanced mount and hull attachment Completed fabrication of 1/4 scale Advanced Sail for LSV evaluation	Complete construction of LSV 2 modules Assemble LSV 2 modules at Lake Pend Oreille Initiate advanced truss/deck design, continue shock mount testing, test air mount design Initiate prototype design of flow management Install replacement battery in LSV 1 Begin upgrade/replace LSV range acoustic array Complete 2nd design option for LSV 2 coating	LSV 2 acceptance and characterization trials Initiate electric drive development Complete upgrade/replace LSV range acoustic array

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EXHIBIT R-2a, RDT&E Project Justification

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APPROPRIATION/BUDGET ACTIVITY

RDT&E, N/BA-4

PROGRAM ELEMENT NAME AND NUMBER

Advanced Submarine Sys Dev/0603561N

PROJECT NAME AND NUMBER

Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

FY 1998

FY 1999

FY 2000

FY 2001

ENGINEERING
MILESTONES

Deliver full length composite shaft

Complete development of Stealth Master Plan

Completed 1st design option for
Large Scale Vehicle 2 (LSV 2) coating

Concept for LSV evaluation

T&E
MILESTONES

Conduct SAS Sea Test II

Completed evaluation of 1/16 Advanced
Sail in LCC

Complete EES 2nd generation disk life
cycle aging test

Begin testing of 2nd gen. Elastomeric Disk
for life cycle and aging

Conduct hydroacoustic evaluation of
Advanced Sail prototype on LSV 1

Conduct pass/fail test of flow mgmt.
concepts

Weapons effect testing of advanced decks
and mounts

Begin EES EDM equipment testing

CONTRACT
MILESTONES

Award LSV 2 detailed design/
build contract

Award concept formulation contract

Award Virtual Water Tunnel contract

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Exhibit R-2a, RDT&E Project Justification
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Exhibit R-3 Cost Analysis (page 1)	DATE: February 2000
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APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NAME AND NUMBER						
RDT&E, N/BA-4		Advanced Submarine Sys Dev/0603561N				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 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Systems Engineering	S/CPFF	NNS Newport News, VA	40.420	1.781	12/98	4.700	02/00	8.000	12/00	24.200	79.101	67.800
Systems Engineering	S/CPFF	NNS Newport News, VA	0.000	11.267	02/99	4.091	02/00	2.200	12/00	59.200	76.758	80.000
Systems Engineering	S/CPFF	EB Groton, CT	43.900	3.976	12/98	0.707	02/00	4.500	12/00	CONT.	CONT.	37.300
Systems Engineering	WR	NSWC Bethesda, MD	112.190	22.825	10/98	18.600	10/99	17.600		CONT.	CONT.	
Systems Engineering	S/CPFF	ARL/PSU, State College, PA	30.100	1.624		1.600	01/00	3.000	12/00	CONT.	CONT.	
Systems Engineering	WR	NUWC Newport, RI	66.500	3.128	10/98	0.900	10/99	0.800		CONT.	CONT.	
Systems Engineering	S/CPFF	KAPL Schenectady, NY	0.000	2.000	03/99	3.300				CONT.	CONT.	
Systems Engineering		Cortana		1.400		1.400		3.324		CONT.	CONT.	
Subtotal Product Development			293.110	48.001		35.298		39.424				

Remarks:

EB's PY cost is greater than total value of contract due to a new contract award.

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: Not applicable.

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Exhibit R-3 Cost Analysis (page 2)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4			PROGRAM ELEMENT Advanced Submarine Sys Dev/0603561N			PROJECT NAME AND NUMBER 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 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Bethesda, MD	16.634	1.042	10/98	3.000	10/99	3.853		CONT.	CONT.	
Developmental Test & Evaluation	S/CPFF	NNS Norfolk, VA	0.000	1.817	12/98	3.000	02/00	2.000	12/00	66.800	73.617	67.800
Developmental Test & Evaluation	S/CPFF	EB Groton, CT	15.901	1.805	12/98	1.000	02/00	0.807	12/00	21.000	40.513	37.300
Developmental Test & Evaluation	S/CPFF	DARPA Fairfax, VA	0.000	3.000	05/99	0.000		0.000		0.000	3.000	3.000
Developmental Test & Evaluation	S/CPFF	NOESIS	0.200	1.000	03/99	0.700		0.000		0.000	1.900	1.200
Developmental Test & Evaluation	S/CPFF	SPA		0.410	02/99	0.900		0.000		0.000	1.310	0.600
Subtotal T&E			32.535	9.074		8.600		6.660				
Remarks:												
Contractor Engineering Support	S/CPFF	NNS Norfolk, VA	1.700								1.700	
Contractor Engineering Support	S/CPFF	EB Groton, CT	1.700								1.700	
											0.000	
Government Engineering Support	WR	NSWC Bethesda, MD	1.000								CONT.	
											0.000	
											0.000	
Subtotal Management			4.400	0.000		0.000		0.000		0.000	4.400	
Remarks:												
Total Cost			330.045	57.075		43.898		46.084				
Remarks:												

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COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	0.000	59.170	69.911	67.185	66.290	64.082	66.035	58.067	CONT.	CONT.
RDT&E Articles Qty										

A. (U) 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 feasible.

(U) Project Unit V0223: This non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives through the application of advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to address the technology challenges that marginalize tactical control in littoral and open ocean environments during the performance of a variety of missions including peacetime engagement, surveillance, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware and/or software systems are developed to demonstrate technologically promising system concepts in Laboratory and at-sea submarine environments. Technology areas specific to this program include transducers, hull-mounted and towed arrays, on-board monostatic and bistatic sonar signal processing, target motion analysis (TMA), multiple contact processing and test and evaluation. This program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship and aircraft applications.

(U) Program Accomplishments and Plans:

FY 2000 Plan (V0223):

(\$7.200) Advanced Tactical Control – Begin development of Tactical Control Build 2 software. Further define functional priorities and initiate development of 3D tactical scene rendering, improved use of ARCI data and integrated vulnerability information management. Conduct at-sea evaluation. Develop performance quantification metrics and data collection, storage and analysis methodologies.. Develop and deliver SFMPL 6.2. Identify potential information management solutions including cooperative Common Teactical Decisions Aids from DARPA, ONR, industry and academia. Evaluate for inclusion in Tactical Control Builds.

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER				PROJECT NAME AND NUMBER					
RDT&E, N/BA-4	Advanced Submarine Dev/0603561N				Advanced Submarine Combat Systems Development/V0223					
COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	0.000	59.718	70.299	67.848	67.003	64.839	66.972	59.066	CONT.	CONT.
RDT&E Articles Qty										
<p>- (\$35.204) Advanced Sonar System and Processing – Complete APB 99 sea test and transition to ARCI Phase III. Complete development and integration, conduct MF and HF, continued automation enhancements, matched field localization, passive torpedo alertment, extension of 3-line MLTA processing, defensive multi-static, signal processing extensions for beamformerless detection, improved OMI, and environmental sensors.</p> <p>- (\$7.107) Advanced Towed Arrays - Continue 3-line array development. Complete fabrication of 1-line array. Develop NTMLTA signal processing design. Conduct 1-line lake test and Critical Item Tests. Complete 3-line ADM design. Conduct 3-line ADM CDR.</p> <p>- (\$11.800) Advanced Hull Arrays – Continue development of CAVES technology. Perform analysis on CAVES pre-patch test data. Install CAVES Patch arrays on USS San Juan. Conduct Post-patch SRA Sea Test. Investigate current coatings CAVES performance. Continue planning for integration of CAVES technology with other Hull arrays. Perform CAVES Outer decoupler buckling experiment. Continue documentation of CAVES program. Investigate impact of outer decoupler on inner decoupler. Initiate CACTISS III test planning. Initiate CAVES WAA transition planning. Initiate conformal array technology in conjunction with Advanced Sail to maintain current capability. Initiate Integrated Bow Conformal Array technology to replace spherical array, HF sail array, and HF chin array. Extend Noise Audit Model for Integrated Conformal Array. Initiate planning for FY04 Lake Test/Demonstration and FY05 Sea Test/Demonstration. Design Bow Dome for demonstration tests. Initiate sensor development. Initiate acoustic source development. Initiate processor software development.</p> <p>- (\$8.100) High Frequency Sonar Program - Complete development, evaluation and testing of Build 2+ build and transition and integration into ARCI program. Complete Test bed upgrades. Initiate integration of ACOMMS processing and hardware into HF suite. Continue sail and conformal array studies. Continue processing improvements for HF APB 01 including bottom and target mapping, ASW improvements, bottom tracking and navigation, and adaptive signal design. Initiate processing improvements to support LMRS precision mapping efforts.</p> <p>- (\$500) Test and Evaluation – Conduct Towed Array APB lake test. Continue at-sea data gathering program. Initiate planning for HF APB Sea Test.</p> <p>\$69,911 TOTAL</p> <p>2. (U) FY 2001 Plan:</p> <p>- (\$7.037) Advanced Tactical Control – Complete Tactical Control Build 2. Incorporate upgrades based on at-sea evaluation and deliver to CCS MK 2 and NSSN for integration. Conduct combat system performance assessment based on the defined metrics. Evaluate candidate technologies for Tactical Control Build 3. Conduct at-sea evaluation. Develop, test and deliver SFMPL update.</p>										

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification							DATE:							
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4							PROGRAM ELEMENT NAME AND NUMBER Advanced Submarine Dev/0603561N				PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223			
COST (\$ in Millions)		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost			
Project Cost		0.000	59.170	69.911	67.185	66.290	64.082	66.035	58.067	CONT.	CONT.			
RDT&E Articles Qty														
<p>- (\$40.848) Advanced Sonar System and Processing - Complete development, integration, conduct performance assessment and initiate transition of APB 01 to BQQ-10 project and NSSN. Initiate APB 02 including offensive multistatics enhancements, multi-mode low frequency, continued automation enhancements, extend processing large hull arrays.</p> <p>- (\$4.500) Advanced Towed Arrays- Continue 3-line array development. Conduct subsystem CITs. Fabricate 3-line array ADM. Fabricate 3-line signal processor ADM. Conduct system integration & testing.</p> <p>- (\$9.000) Advanced Hull Arrays- Continue CAVES technology development. Conduct CACTISS III test. Perform data analysis of CAVES Post-SRA Sea Test. Complete update of noise audit model. Initiate planning of CAVES Patch Array Sea Test II. Continue documentation of CAVES program. Continue CAVES WAA transition planning. Continue development of conformal array technology. Continue development of Integrated Conformal Array technology. Complete Noise Audit Model for Integrated Bow Conformal Array. Complete Bow Dome Design. Construct Bow Dome and mold inner decoupler. Construct acoustic sources and sensors, test and evaluate. Continue processor software development. Continue planning for demonstration tests.</p> <p>- (\$5.300) High Frequency Sonar Program- Continue processing improvements, evaluation and testing of HF APB01 initiatives. Continue ACCOMMS integration. Finalize study results. Transition on-going processing developments to advance processing. Continue processing improvements associated with LMRS precision mapping efforts.</p> <p>- (\$.500) Test & Evaluation - conduct TCP sea tests, HF sea tests, MLTA demonstration and hull array testing.</p> <p>\$67,185 TOTAL</p> <p>B. (U) Other Program Funding Summary: Not applicable.</p> <p>(U) Related RDT&E: Not applicable.</p> <p>C. (U) Acquisition Strategy: Plan to use competitively awarded contracts from Board Agency Announcement (BAA) solicitations.</p>														

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000																			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER				PROJECT NAME AND NUMBER																					
RDT&E, N/BA-4	Advanced Submarine Dev/0603561N				Advanced Submarine Combat Systems Development/V0223																					
COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost																
Project Cost	0.000	59.170	69.911	67.185	66.290	64.082	66.035	58.067	CONT.	CONT.																
RDT&E Articles Qty																										
<p>D. (U) Schedule Profile:</p> <table border="0"> <thead> <tr> <th></th> <th><u>FY 1999</u> (PE0603504N)</th> <th><u>FY 2000</u></th> <th><u>FY 2001</u></th> </tr> </thead> <tbody> <tr> <td>Program Milestones</td> <td>2Q - Delivered Range Dependent Search Capability to SFMPL 3Q - Transition TA-APB 99 to ARCI 4Q - Transition TCP Bld 1</td> <td>2Q - SFMPL 6.2 Complete 3Q - Complete TCP APB-2 3Q - Transition TA-APB00 & HF APB99 to ARCI</td> <td>3Q - CAVES WAA Transition Decision</td> </tr> <tr> <td>Engineering Milestones</td> <td>1Q - Initiate TA-APB00 1Q - Initiate TCP APB-2 2Q - MLTA 1-line CDR 2Q - Complete TSOA 3Q - Deliver TCP Bld 1</td> <td>1Q - Initiate TA-APB01 1Q - Deliver SFMPL 6.1 4Q - MLTA 3-line CDR</td> <td>1Q - Initiate TCP APB -3 1Q - Initiate TA-APB01 3Q - MLTA System Integration 4Q - Deliver TCP APB-2</td> </tr> <tr> <td>Test & Evaluation Milestones</td> <td>3Q - CACTISS II Test 3Q - TA-APB99 Sea Test 4Q - CAVES Pre-Patch Test</td> <td>3Q - HF APB99 Sea Test 3Q - TA APB00 Sea Test 3Q - TCP APB 1 Sea Test 3Q - MLTA Self Noise Test</td> <td>3Q - TCP APB-2 Sea Test 3Q - CACTISS III test 3Q - HF APB01 Sea Test 4Q - MLTA RV Sea Test</td> </tr> </tbody> </table>												<u>FY 1999</u> (PE0603504N)	<u>FY 2000</u>	<u>FY 2001</u>	Program Milestones	2Q - Delivered Range Dependent Search Capability to SFMPL 3Q - Transition TA-APB 99 to ARCI 4Q - Transition TCP Bld 1	2Q - SFMPL 6.2 Complete 3Q - Complete TCP APB-2 3Q - Transition TA-APB00 & HF APB99 to ARCI	3Q - CAVES WAA Transition Decision	Engineering Milestones	1Q - Initiate TA-APB00 1Q - Initiate TCP APB-2 2Q - MLTA 1-line CDR 2Q - Complete TSOA 3Q - Deliver TCP Bld 1	1Q - Initiate TA-APB01 1Q - Deliver SFMPL 6.1 4Q - MLTA 3-line CDR	1Q - Initiate TCP APB -3 1Q - Initiate TA-APB01 3Q - MLTA System Integration 4Q - Deliver TCP APB-2	Test & Evaluation Milestones	3Q - CACTISS II Test 3Q - TA-APB99 Sea Test 4Q - CAVES Pre-Patch Test	3Q - HF APB99 Sea Test 3Q - TA APB00 Sea Test 3Q - TCP APB 1 Sea Test 3Q - MLTA Self Noise Test	3Q - TCP APB-2 Sea Test 3Q - CACTISS III test 3Q - HF APB01 Sea Test 4Q - MLTA RV Sea Test
	<u>FY 1999</u> (PE0603504N)	<u>FY 2000</u>	<u>FY 2001</u>																							
Program Milestones	2Q - Delivered Range Dependent Search Capability to SFMPL 3Q - Transition TA-APB 99 to ARCI 4Q - Transition TCP Bld 1	2Q - SFMPL 6.2 Complete 3Q - Complete TCP APB-2 3Q - Transition TA-APB00 & HF APB99 to ARCI	3Q - CAVES WAA Transition Decision																							
Engineering Milestones	1Q - Initiate TA-APB00 1Q - Initiate TCP APB-2 2Q - MLTA 1-line CDR 2Q - Complete TSOA 3Q - Deliver TCP Bld 1	1Q - Initiate TA-APB01 1Q - Deliver SFMPL 6.1 4Q - MLTA 3-line CDR	1Q - Initiate TCP APB -3 1Q - Initiate TA-APB01 3Q - MLTA System Integration 4Q - Deliver TCP APB-2																							
Test & Evaluation Milestones	3Q - CACTISS II Test 3Q - TA-APB99 Sea Test 4Q - CAVES Pre-Patch Test	3Q - HF APB99 Sea Test 3Q - TA APB00 Sea Test 3Q - TCP APB 1 Sea Test 3Q - MLTA Self Noise Test	3Q - TCP APB-2 Sea Test 3Q - CACTISS III test 3Q - HF APB01 Sea Test 4Q - MLTA RV Sea Test																							

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Exhibit R-2a, RDT&E Project Justification

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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-4			Advanced Submarine Sys Dev/0603561N			Advanced Submarine Combat Systems Development/V0223						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development	WR	NUWC Newport, RI	0.000	0.000		29.232	10/99	21.321	10/00	CONT.	CONT.	
Product Development	RCP	NUWC Newport, RI	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	WR	NRL/Washington	0.000	0.000		1.962	10/99	2.050	10/00	CONT.	CONT.	
Product Development	RCP	NRL/Washington	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	WR	NSWC Carderock, MD	0.000	0.000		1.308	10/99	1.500	10/00	CONT.	CONT.	
Product Development	RCP	NSWC Carderock, MD AMSI	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	WR	NCCOSC San Diego, CA	0.000	0.000		0.150	10/99	0.160	10/00	CONT.	CONT.	
Product Development	RCP	NCCOSC S Diego, CA Litton	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	WR	NSMRL	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	RCP	NSMA	0.000	0.000		0.180	03/00	0.180	10/00	CONT.	CONT.	
Product Development	WR	NUWC Keyport, HI	0.000	0.000		0.100	10/99	0.000	-	CONT.	CONT.	
Product Development	MIPR	U.S. Army/MITRE	0.000	0.000		2.000	12/99	2.000	12/00	CONT.	CONT.	
Product Development	MIPR	U.S. Air Force/MIT Lincoln Labs	0.000	0.000		0.800	12/99	1.000	12/00	CONT.	CONT.	
Product Development	RCP	ONR/MCCI	0.000	0.000		1.400	01/00	1.400	01/01	CONT.	CONT.	
Product Development	RCP	ONR/University of California	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	RCP	ONR/BBN	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	RCP	ONR/GTRI	0.000	0.000		1.986		2.315	01/01	CONT.	CONT.	
Product Development	SS/CPFF	ARL/JHU, MD	0.000	0.000		7.207	12/99	7.200	01/01	CONT.	CONT.	
Product Development	SS/CPFF	APL/UW, WA	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	SS/CPFF	ARL/UT, TX	0.000	0.000		7.200	12/99	7.000	01/01	CONT.	CONT.	
Product Development	SS/CPFF	ARL/PSU, PA	0.000	0.000		0.315	12/99	0.350	10/00	CONT.	CONT.	
Product Development	MD	ARL/PSU, PA	0.000	0.000		0.130	01/00	0.150	01/01	CONT.	CONT.	
Product Development	PD	NAVAIR PAX/NSWC Indian H	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	WR	SPWAR, CA	0.000	0.000		0.100	10/99	0.100	10/00	CONT.	CONT.	
Product Development	C/FP	DSI, VA	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	C/CPFF	DSR, VA	0.000	0.000		7.000	12/99	6.000	12/00	CONT.	CONT.	
Product Development	C/CPFF	TWD Associate, VA	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development		Electric Boat, CT	0.000	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	C/CPFF	Systems Planning Analysis, VA	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
Product Development	MIPR	DARPA, VA	0.000	0.000		0.000		9.000	12/00	CONT.	CONT.	

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Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4			PROGRAM ELEMENT Advanced Submarine Sys Dev/0603561N			PROJECT NAME AND NUMBER Advanced Submarine Combat Systems Development/V0223						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
BAA's	C/CPFF	Various	0.000	0.000		1.016	Various	1.000	Various	CONT.	CONT.	
Advanced Towed Array BAA	C/CPFF	Lockheed Martin, NY	0.000	0.000		1.200	12/99	1.000	12/00	CONT.	CONT.	
Product Development	Various	Various	0.000	0.000		4.825	Various	0.000	Various	CONT.	CONT.	
Subtotal Product Development			0.000	0.000		68.111		64,389		CONT.	CONT.	
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: This is a Non Acquisition Program which therefore includes no indirect support costs.												

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Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 2)							DATE: February 2000					
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-4			Advanced Submarine Sys Dev/0603561N			Advanced Submarine Combat Systems Development/V0223						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NUWC Newport, RI	0.000	0.000		0.450	10/99	0.450	10/00	CONT.	CONT.	
Developmental Test & Evaluation	Various	Various	0.000	0.000		0.050	Various	0.164	Various	CONT.	CONT.	
Operational Test & Evaluation										0.000	0.000	
GFE										0.000	0.000	
Subtotal T&E			0.000	0.000		0.500		0.614		CONT.	CONT.	
Remarks:												
Program Management Support	C/CPFF	Integrated Product Dec, CT	0.000	0.000		0.400	Various	0.000		CONT.	CONT.	
Program Management Support	C/CPFF	Stanley Associates, VA	0.000	0.000		0.900	12/99	2.000	12/00	CONT.	CONT.	
Program Management Support	Various	Various	0.000	0.000		0.000	Various	0.000		CONT.	CONT.	
Government Engineering Support											0.000	
Travel											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		1.300		2.000		CONT.	CONT.	
Remarks:												
Total Cost			0.000	0.000		69.911		67.185		CONT.	CONT.	
Remarks:												

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Exhibit R-3, Project Cost Analysis
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