

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: February 2007
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APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE							
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	Advanced Submarine System Development/0603561N							
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	158.115	156.875	134.882	143.050	155.335	138.511	127.936	115.084
Adv. Sub. Systems Development/2033	77.275	85.032	81.659	97.875	105.259	85.094	75.080	61.250
Adv. Sub. Combat Sys. Dev/0223	59.972	54.758	53.223	45.175	50.076	53.417	52.856	53.834
Issue 9999 - Congressional Adds	20.868	17.085	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 (FNCs).

Project Unit 2033: The Advanced Submarine Research and Development (R&D) Program is a non-acquisition program that transitions Hull, Mechanical, and Electrical (HM&E) technologies from Science and Technology (S&T) to platforms, develops submarine design and naval architecture products destined for backfit, forward fit, and/or future submarines, and operates unique R&D experimentation, modeling, and simulation facilities to enhance submarine stealth, maneuverability, and affordability. The program is structured to support near term VIRGINIA Class technology insertion, future submarine concepts, and core technologies. Focus is on the four SEA POWER 21 warfighting pillars, SEA BASE, SEA SHIELD, FORCENET, and SEA STRIKE. Focus is also on SEA TRIALS. SEA TRIALS emphasize warfighting capabilities in the areas of Anti-Submarine Warfare, Mine Countermeasures, Strike Warfare, and Counter Weapons of Mass Destruction. Payloads and Sensors demonstrations and SEA TRIALS conducted in a joint warfighting context with other services, i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force, enable early assessment of warfighting capabilities contributing to better technology selection decisions for potential spiral development. This program also supports Information Exchange Programs with the United Kingdom and Canada.

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE: February 2007
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	R-1 ITEM NOMENCLATURE Advanced Submarine System Development/0603561N	
<p>Project Unit 0223: 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 tactical 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, battle space 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), Advanced Processing Build-Tactical (APB-T), tactical control, and Advanced Sonar Arrays. APB's develop and demonstrate improvements to current and future sonar/combat control systems. Advanced Sonar Arrays develop tests and new sensors and demonstrates large array configuration. Program is funded under demonstration and validation, as it develops and integrates hardware for experimental test related to specific platform applications.</p> <p>Project Unit 9999 is comprised of FY06 congressional adds for Experimental Research Transformational Submersible and Inner, Outer Decoupler Materials for Hull Array, Fiber Optic Conformal Acoustic Velocity System, Submarine Tactical Monitor, and SSGN Unmanned Undersea Vehicle Integration Program.</p> <p>Project Unit 9999 is also comprised of FY07 congressional adds for Experimental Research Transformational Submersible and Inner & Outer Decoupler Materials for Hull Array, Cryogenic Power System for Unmanned Underwater Vehicle (UUV), Fiber Optic Conformal Acoustic Velocity, and Large Displacement UUV At Sea Launch & Recovery.</p>		

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Development	PROJECT NUMBER AND NAME 2033 & 0223/Advanced Submarine Systems Development
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B. PROGRAM CHANGE SUMMARY:

Funding:	FY 2006	FY 2007	FY 2008	FY2009
FY07 President's Controls	140.431	140.432	158.361	164.053
FY08 President's Controls	158.115	156.875	134.882	143.050
Total Adjustments	17.684	16.443	-23.479	-21.003

Summary of Adjustments

Tango Bravo Follow-on			-2.500	-5.500
DARPA Study				-3.200
Restructure Ad			-9.600	-11.400
NAVSEA - NWCF			-0.058	-0.047
Congressional Project Adds	21.700	17.085		
Miscellaneous Congressional Actions	0.098	-0.642		
Delay TB-16 NG			-1.500	-1.500
Small Business Innovation	-3.517			
Technical Correction			0.453	0.544
BRAC Changes				0.069
Regional Maritime Awareness	-0.418			
Miscellaneous Budget Changes	-0.179		-10.274	0.031
Subtotal	17.684	16.443	-23.479	-21.003

Schedule: not applicable.

Technical: not applicable.

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4		PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Development			PROJECT NUMBER AND NAME 2033/Advanced Submarine Systems Development			
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
2033/Adv. Sub. Systems Development	77.275	85.032	81.659	97.875	105.259	85.094	75.080	61.250
RDT&E Articles Qty								

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This program 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 (FNCs).

Project Unit 2033: The Advanced Submarine Research and Development (R&D) Program is a non-Acquisition program that transitions Hull, Mechanical, and Electrical (HM&E) technologies from Science and Technology (S&T) to platforms, develops submarine design and naval architecture products destined for backfit, forward fit, and/or future submarines, and operates unique R&D experimentation, modeling, and simulation facilities to enhance submarine stealth, maneuverability, and affordability. The program is structured to support near term VIRGINIA Class technology insertion, future submarine concepts, and core technologies. Focus is on the four SEA POWER 21 war fighting pillars, SEA BASE, SEA SHIELD, FORCENET, and SEA STRIKE. Focus is also on SEA TRIAL. SEA TRIALS emphasize war fighting capabilities in the areas of Anti-Submarine Warfare, Mine Countermeasures, Strike Warfare, and Counter Weapons of Mass Destruction. Payloads and Sensors demonstrations and SEA TRIALS conducted in a joint war fighting context with other services, i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force, enable early assessment of war fighting capabilities contributing to better technology selection decisions for potential spiral development. This program also supports Information Exchange Programs with the United Kingdom and Canada until FY10.

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EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2007
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Development	PROJECT NUMBER AND NAME 2033/Advanced Submarine Systems Development
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B. Accomplishments/Planned Program

	FY 06	FY07	FY08	FY09
Payloads and Sensors /Subtotal Cost	22.835	16.630	19.751	25.410
RDT&E Articles Quantity				

Develop promising technologies and/or concepts capable of revolutionizing submarine design, reducing cost, improving payload flexibility, reducing weight and space requirements, exploring alternative payload launch mechanisms, increasing reliability with concomitant decreases in required maintenance, and improving material strength. Develop payload demonstrations targeted at improving flexible ocean interface, Intelligence/Surveillance/Reconnaissance (ISR) requirements, and universal encapsulation methods from undersea platforms. Conduct joint SEA TRIALS that take the demonstrations to the Fleet in order to assess the operational value of the technologies and systems under consideration. The SEA TRIALS/experiments support examination and assessment of potential new Fleet capabilities based on the Sea Power 21 Pillars of SEA SHIELD, SEA BASING, SEA STRIKE, and FORCENET.

FY06 Accomplishments include the following: Conducted land-based vertical launch of a small missile in Nov 05. Used results of the land-based vertical launch of a small missile to develop universal launch technologies for encapsulated sea-based launch of Unmanned Aerial Vehicles (UAV) or any small missile. Completed the Rotary Electromagnetic Launch (REML) Energy Storage System (ESS) and Battery Management Systems design. REML prototype launch motor delivered and started integration testing. Performed full-scale static and fatigue test of representative full-scale Composite Advanced Sail section and validated against analytical techniques. Performed shock test of foam filler material for composite structures. Performed impact test to determine residual strength of composite structural components. Updated report to Congress on "Submarine Technology Insertion."

FY07 Planned Accomplishments include the following: Conduct an underwater encapsulation demonstration applicable to small missile or UAVs. Provide analytical support to the Joint Test and Evaluation (JT&E) program Joint Command and Control for War on Terror Activities (JC2WTA). Complete REML full-scale integration test and conduct land based concept demonstration test. Develop final design guidance for designing non-pressure hull structural components from composite materials. Conduct for the Concentric Canister Launch (CCL) missile fly-out test from a submerged platform to demonstrate water-piercing technology. Update report to Congress on "Submarine Technology Insertion."

FY08 Planned Accomplishments include the following: Conduct a demonstration of an underwater launch of an encapsulated All-Up Round (AUR) against a surface target in a test range. Conduct an at-sea demonstration of the procedures developed and technologies selected under the JT&E program JC2WTA. Conduct the CCL missile fly-out test to demonstrate water-piercing technology. Conduct technical review of CCL missile fly-out test data (from FY07); assess the feasibility of water-piercing technology. Provide Go/No Go recommendations. Develop Composite Advanced Structures with the goal of reducing weight and enabling use of acoustic treatments in complex composite structures at minimal cost without sacrificing performance. Update report to Congress on "Submarine Technology Insertion."

FY09 Planned Accomplishments include the following: Use results of the underwater launch of an encapsulated AUR to prepare for an at-sea demonstration launching an encapsulated small missile at a surface target from a submarine. Prepare and procure long lead items for at-sea full scale demonstration of CCL. Demonstrate reduced weight complex submarine composite structures.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Development	PROJECT NUMBER AND NAME 2033/Advanced Submarine Systems Development

B. Accomplishments/Planned Program

	FY 06	FY 07	FY08	FY09
Stealth/Subtotal Cost	14.741	10.714	14.908	15.900
RDT&E Articles Quantity				

Develop technologies and tools to increase the safety of submarines by recognizing and mitigating sources of noise, improving the probability of safe transit in the vicinity of mine fields, ensuring that submarines can penetrate contested waters by reduced acoustic observables, and remaining undetected in the littorals. Operate the Large Scale Vehicles (LSV 2) and the Intermediate Scale Measurement System (ISMS) to conduct large model experiments for submarines focusing on stealth, maneuvering and control, affordability, and operational effectiveness.

FY06 Accomplishments include the following: Continued Large Scale Vehicle operations and maintained LSV and ISMS test ranges. Completed level one qualification testing of Conformal Acoustic Velocity Sensor (CAVES) outer decoupler material. Initiated development of CAVES inner decoupler material. Developed interface requirements for tactical decision aid for mine susceptibility. Supported development plan to investigate direct radiation phenomena and it's relation to external flow noise.

FY07 Planned Accomplishments include the following: Continue Large Scale Vehicle operations and maintain LSV and ISMS test ranges. Complete CAVES outer decoupler level two and begin inner decoupler level one qualification. Perform scale measurements to support investigation of direct radiation phenomena. Develop and fabricate external damping treatment. Obtain full scale data from a naval vessel to support investigation of alternating current electromagnetic (AC EM) signatures.

FY08 Planned Accomplishments include the following: Continue Large Scale Vehicle operations and maintain LSV and ISMS test ranges. Conduct material characterization of inner decoupler material and complete level one qualification. Conduct scaled test of external damping treatment. Complete analysis of AC EM signature data.

FY09 Planned Accomplishments include the following: Continue Large Scale Vehicle operations and maintain LSV and ISMS test ranges. Complete level two qualification of inner decoupler material and conduct full scale patch test. Develop user interface and conduct performance testing of tactical decision aid.

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B. Accomplishments/Planned Program (Cont.)

	FY 06	FY 07	FY08	FY09
Total Ownership/Affordability/Subtotal Cost	2.447	2.361	4.885	7.330
RDT&E Articles Quantity				

Demonstrate technologies that have the potential to reduce total life cycle costs of the system by providing reduced construction costs, commonality of interfaces, longer life of parts, and/or lower maintenance requirements.

FY06 Accomplishments: Completed Business Case Analysis (BCA) on implementing electric vice hydraulic actuation technology for the Weapons Stowage and Handling System (WSHS). Performed on-shore qualification testing/validation on one Electric Actuation System (EAS) Advanced Development Model (ADM). Initiated BCA to eliminate 32 rotary EAS associated with the ship service hydraulic plant. Designed and fabricated external damping treatments for the free-flood area. Performed free-flood acoustic test on damping material. Developed a plan to investigate main ballast tank acoustic tile requirements for SSN-688 class submarines as a life cycle cost reduction initiative. Modified acoustic tile configuration on candidate 688 submarine to obtain full-scale data.

FY07 Planned Accomplishments: Complete BCA to replace 35 rotary 2 and 3 position hydraulic actuators with EAS's. Develop a BCA to replace the current Universal Modular Mast (UMM) hydraulic actuation system with an EAS. Study the remaining hydraulic actuators in the sail and in the external hydraulics supply system for potential replacement with EAS. Complete development of the UMM EAS performance specification and develop EAS performance specification for control surfaces. Develop a standard rotary EAS test plan and initiate qualification testing on additional 10,000 and/or 20,000 3-position rotary EAS ADMs. Conduct panel and scaled cylindrical shell testing on damping material. Modify acoustic tile configuration on candidate SSN-668i submarine. Obtain acoustic data during planned acoustic trial on candidate SSN-688 and SSN-688i submarines. Initiate development of a Common Electric Hull Penetrator (CEHP) for communications Imaging and Electronic Warfare (I&EW) sensors in the submarine sail. Develop new EAS technology and composite materials for the existing Universal Modular Mast (UMM). Complete performance specification for the UMM EAS. Complete SBIR development of two prototype composite UMM guide trunks and integrate the composite guide trunk into the UMM System design.

FY08 Planned Accomplishments: Initiate qualification testing on 2-position rotary EAS ADM's. Complete qualification testing on 10,000 and/or 20,000 in-lb 3-position rotary EAS's. Complete BCA to eliminate hydraulics in the sail by replacing hydraulic actuators with EAS's. Develop EAS performance specification for induction valve, head valve, and the radar in the sail. Develop BCA to replace stern plane and rudder control surface hydraulic actuators with EAS. Conduct pop up and Intermediate Scale Measurement System tests to assess damping configuration. Develop a business case for installing CEHP's on new construction VIRGINIA Class hulls. Fabricate CEHP prototype and perform shore-based testing and evaluation. Perform shore-based UMM system level tests and evaluate performance of UMM EAS and guide trunk composite material.

FY09 Planned Accomplishments: Complete qualification testing on 5,000 and/or 20,000 in-lb 2-position rotary EAS ADM's. Conduct at-sea demonstration of a 10,000 and/or 20,000 in-lb, 3-position rotary EAS ADM on SSN 688 Class hull. Develop EAS performance specification for remaining external hydraulics system applications. Complete BCA to replace stern plane and rudder control surface hydraulic actuators with EAS. Procure EAS ADM for induction valve, head valve, and the radar. Procure EAS ADM for fairwater plane control surfaces. Conduct pop up and Intermediate Scale Measurement System tests to assess damping configuration. Transition a new CEHP to VIRGINIA Class for implementation during new construction. Conduct at-sea demonstration of the UMM EAS in the mission reconfigurable bay on VIRGINIA. Evaluate performance of the composite UMM guide trunk during Fleet operations.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Development	PROJECT NUMBER AND NAME 2033/Advanced Submarine Systems Development

B. Accomplishments/Planned Program (Cont.)

	FY 06	FY 07	FY08	FY09
Advanced Propulsion/Ship Concept Development/Subtotal Costs	37.252	55.327	42.115	49.235
RDT&E Articles Quantity				

Overcome selected technological barriers that are expected to have significant impact on submarine hull, maintenance and electrical (HM&E) systems to enable design options for a submarine with VIRGINIA Class capability in three technical areas: Shaftless Propulsion, External Weapon Stow and Launch, and Radical Ship HM&E Infrastructure Reduction. Develop submarine alternative propulsion and stern configurations with potential to significantly reduce submarine acquisition cost. Demonstrate critical performance parameters via Appropriate Scale Demonstrators in realistic environmental conditions. Evaluate integration of technologies and approaches for cost reduction in future nuclear submarines. Develop understanding of ship concept studies and submarine cost drivers and model analysis. This work will apply to future submarine designs and will begin the long-lead concept work on the next undersea strategic deterrent platform, for which design work must begin in earnest early next decade. Conduct concept studies and mission utility studies for variant submarine designs, including VIRGINIA derivatives. Develop a future undersea superiority system alternative to the reduced submarine program.

FY06 Accomplishments include the following: Provided conceptual design, analysis and component-level or small-scale demonstrations of TANGO BRAVO technologies. Provided Go/No Go Assessment and Phase 2 contract award for TANGO BRAVO Shaftless Propulsion technology area. Conducted independent studies to inform Navy on the costs, benefits, and risks associated with sustaining nuclear submarine design capabilities. Identified submarine construction drivers and improved submarine cost models. Developed an improved definition of technologies and approaches for cost reduction in current and future nuclear submarines.

FY07 Planned Accomplishments: Complete small scale TANGO BRAVO demonstrations and concept development. Provide Go/No Go Assessment and Phase 2 contract awards for TANGO BRAVO External Weapons Stow and Launch and Radical Ship Infrastructure Reduction technology areas. Demonstrate Shaftless Propulsion at component level. Continue development of innovative technologies to support the undersea superiority initiative.

FY08 Planned Accomplishments: Complete component level TANGO BRAVO technology demonstrations. Assess Go/No Go for TANGO BRAVO Phase 3 awards. Continue development of innovative technologies to support the undersea superiority initiative.

FY09 Planned Accomplishments: Complete TANGO BRAVO Prototype level demonstrations. Continue development of innovative technologies to support the undersea superiority initiative. Commence Submarine Shaftless Stern Demonstrator (S3D) program. Initial efforts will include concept studies, demonstration platform downselect and specification development.

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4		PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Development			PROJECT NUMBER AND NAME 2033/Advanced Submarine Systems Development					
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>
Not applicable.										
D. ACQUISITION STRATEGY:										
Sole source conform studies contracts with Electric Boat (EB) and Northrup Grumman Newport News (NGNN).										
E. MAJOR PERFORMERS:										
Northrop Grumman Newport News, Newport News, VA	10/05	04/07	11/07	11/08						
Electric Boat Corp., Groton, CT	10/05	11/06	11/07	11/08						
Naval Surf Warfare Ctr, Carderock, MD	10/05	10/06	10/07	10/08						
Naval Undersea Warfare Ctr, Newport, R.I	10/05	10/06	10/07	10/08						
Raytheon, Portsmouth, RI	12/05	11/06	12/07	12/08						

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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER								
RDT&E, N/BA-4			PE0603561N Advanced Submarine System Development			2033/Advanced Submarine Systems Development								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY06 Cost	FY 06 Award Date	FY07 Cost	FY 07 Award Date	FY08 Cost	FY 08 Award Date	FY09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Targ Value of Contract
Product Development	S/CPFF	EB Groton, CT	2.940										2.940	
Product Development	S/CPFF	NNS Newport News, VA	25.222	0.223	Various								25.445	
Product Development	S/CPFF	NNS Newport News, VA		0.540	Various	0.050	04/07	1.042	12/07	0.324	12/08		1.956	
Product Development	S/CPFF	EB Groton, CT	81.378	20.594	Various								101.972	
Product Development	S/CPFF	EB Groton, CT				0.837	Various	16.603	12/07	28.562	12/08		46.002	
Product Development	S/CPFF	Raytheon		4.518	Various	4.500	11/06	1.712	12/07	6.760	12/08		17.490	
Product Development	WR	NSWC Bethesda, MD	266.776	20.506	Various	20.184	Various	19.398	10/07	24.177	10/08		351.041	
Product Development	S/CPFF	ARL/PSU, State College, PA	36.833	0.671	Various	0.517	Various	0.275	12/07	0.245	12/08		38.541	
Product Development	S/CPFF	UT/ARL,		2.000	05/06	3.000	03/07						5.000	
Product Development	S/CPFF	Noesis	5.682										5.682	
Product Development	Various	Various	181.873	1.400	Various	14.154	Various	11.962	Various	18.944	Various		228.333	
Product Development	WX	NUWC Newport, RI	3.071	3.010	Various	1.837	Various	1.112	10/07	1.042	10/08		10.072	
Product Development	RX	NUWC Newport, RI	9.350	9.397	Various	14.297	Various	12.000	12/07	1.000	12/08		46.044	
Product Development	RX	ONR, Arlington, VA		0.372	Various	3.561	Various	1.000	Various	0.805	Various		5.738	
	BTR	Funds Being Reprogrammed				9.999	Various						9.999	
Subtotal Product Development			613.125	63.231		72.936		65.104		81.859		0.000	896.255	
Remarks:														
Development Support Equipment														
Software Development														
Training Development														
Integrated Logistics Support														
Configuration Management														
Technical Data														
GFE														
Subtotal Support			0.000	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 2007				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER								
RDT&E, N/BA-4			PE0603561N Advanced Submarine System Development			2033/Advanced Submarine Systems Development								
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 & Evalua	S/CPFF	EB	0.000	0.413	Various	0.100	02/07			1.000	12/08		1.513	
Developmental Test & Evalua	S/CPFF	Raytheon	0.931	4.000	Various	3.882	Various	4.138	12/07	5.500	12/08		18.451	
Developmental Test & Evalua	WX	NAVAIR	0.000	0.868	Various	0.260	05/07	0.942	10/07				2.070	
Developmental Test & Evalua	Various	Various	25.290	3.303	Various	3.860	Various	6.297	10/07	1.250	10/08		40.000	
Developmental Test & Evalua	WX	NUWC Newport	0.650	0.116	Various	0.310	10/06						1.076	
Developmental Test & Evalua	WX	NSWC Carderock	0.000	1.604	Various	0.810	10/06	2.694	10/07	5.792	10/08		10.900	
Subtotal T&E			26.871	10.304		9.222		14.071		13.542			74.010	
Remarks:														
Contractor Engineering Support	CPFF	Various	6.492	2.654	Various	1.469	11/06	1.314	10/07	1.289	10/08		13.218	
Government Engineering Support	WR	Various	4.273	1.026	Various	1.345	10/06	1.110	10/07	1.125	10/08		8.879	
Travel			0.332	0.060	10/05	0.060	10/06	0.060	10/07	0.060	10/08		0.572	
Subtotal Management			11.097	3.740		2.874		2.484		2.474			22.669	
Remarks:														
Total Cost			651.093	77.275		85.032		81.659		97.875			992.934	

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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-4		PE0603561N Advanced Submarine System Development				2033/Advanced Submarine Systems Development			
PAYLOADS & SENSORS PROJECT		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Full Scale Validation of Composite Adv. Sail			▲ Deliver Design Criteria to PMS 450						
Material Hybridization & Demo of Composite Structures			▲ Land Based Demo		▲ Material Hybridization	▲ Acoustic Optimization	▲ Issue Guidance		
Full Scale Demo of Composite Structures									
Prototype Rotary Electromagnetic Launcher Demo		▲ Land Test	▲ Underwater Demo	▲ Underwater AUR Test	▲				
Small Missile Encapsulation Demonstration									
Concentric Canister Launch Demo			▲ Missile Fly-Out Test	▲ Open Sea Confidence Test	▲ At-sea Full Scale Demo				
JT&E JC2WTA				▲ Fleet Experiment					
Submarine Technology Insertion Report		▲	▲	▲					
ADV PROPULSION/SHIP CONCEPT DEV PROJECT		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Tango Bravo Shaftless Propulsion		▲ System Design Downselect	▲ Component Demonstration	▲ Prototype Demo					
Tango Bravo External Weapon Stow & Launch		▲ System Design/Downselect	▲ Demonstrate Development	▲ In Water Demo					
Tango Bravo Infrastructure Reduction			▲ System Design	▲ Laboratory					
Undersea Superiority - VA Cost Reduction		▲ Transition to VA Class							
Undersea Superiority - ASW							▲ Transition to ASW Community		
Full Scale Prototypes									
Submarine Shaftless Stern Demonstration (S3D)									
STEALTH PROJECT		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Wake Signature Model			▲ Deliver Wake Model						
Coupled Wake Signature Model Improvement			▲ Outer Coating Mat1			▲ Inner Coating Mat1	▲ Transition to VA		
Caves Multi-Layer Coating Development		▲ Dev Outer Coating		▲ Prototype Tests & Inner coating dev.					
Tactical Decision Aid Development					▲ Transition to VA				
VIRGINIA Composite Duct Evaluation on LSV2		▲							
Install Hull Treatment on LSV2				▲ LSV2 Trials w/ Hull Treatment					
ISMS & LSV2 Technology Refresh						▲ LSV2 & ISMS Tech Refresh		▲	
CACTISS		▲ IV WHITEFISH							
Aft Flow Noise Trial				▲					
Adv Propulsor Duct Evaluation				▲					
Low Cost VIRGINIA Propulsor Trial									
Advanced Sail Trial							▲ Preparation	▲ Trial	▲
TOTAL OWNERSHIP/AFFORDABILITY PROJECT		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Complete Metal Fiber Brushes Demonstration		▲ AC end of 500KW SSMG	▲ Expanded Apps						
Business Case Analysis for Electric Actuation Systems (EAS)		▲ Weapon Storage Handling	▲ 2 & 3 Pos Internal Rotary	▲ Actuator for UMM					
Fabricate/Procure Prototypes EAS		▲ 3 Position Rotary		▲ 3 Position Rotary	▲ 2 Position/linear	▲ Linear & External			
Qualification Testing of EAS Prototypes			▲ 3 Position Rotary	▲ 2 Position Rotary	▲ Linear		▲ External		
Develop EAS Specifications			▲ UMM Actuator & Linear		▲ External				
Demonstrate EAS Prototypes					▲ 2 & 3 Position Rotary	▲ UMM & Linear Actuator		▲ External	▲ Transition to PMS450
Damping Material Development & Testing		▲ Acoustic Test					▲ Data Analysis & Design Guidance	▲ Transition to PMS450	
Common Electric Hull Penetrator (CEHP)			▲ Pane & Scaled Cylindrical Shell Test	▲ Pop up & ISMS Test	▲ Pop up & ISMS Test	▲ LSV Test			
Universal Modular Mast (UMM) Composite Electric Mast			▲ CEHP Design	▲ Develop BCA & Fabricate CEHP & Test	▲ Transition CEHP to VA				
			▲ BCA & Specification & Deliver Composite Guide	▲ Shore-Based Testing of UMM EAS & Composite Guide Trunk	▲ At-Sea Testing of UMM EAS & Composite Guide Trunk				

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Exhibit R-4a, Schedule Detail						DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT& BA-4	PROGRAM ELEMENT PE0603561N Advanced Submarine System Development				PROJECT NUMBER AND NAME 2033/Advanced Submarine Systems Development			
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Payloads & Sensors								
Fabricate and demo full scale composite Adv. Sail prototype	1Q - 4Q							
Complete Comp. Adv. Sail development, transition to VA class		1Q-3Q						
Comp. Adv. Structures complete design criteria/req. doc./testing			1Q - 4Q	1Q - 2Q				
Full Scale Demo of Composite Structures				3Q - 4Q	1Q - 4Q	1Q - 2Q		
Rotary Electromagnetic Launcher Land Based Demo		2Q - 3Q						
Small Missile Encapsulation Land Based Test	1Q							
Small Missile Encapsulation Underwater Demo		4Q						
Small Missile Encapsulation All-Up Round Test				4Q				
Concentric Canister Launch Fly Out Test		3Q - 4Q						
Concentric Canister Launch Open Sea Confidence Test				2Q				
Concentric Canister Launch At-Sea Demo					3Q			
JT&E JC2WTA - Fleet Experiment			3Q - 4Q					
Advanced Propulsion/Ship Concept Development								
Tango Bravo Shaftless Propulsion	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q-2Q				
Tango Bravo External Weapon Stow & Launch	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q-2Q				
Tango Bravo Infrastructure Reduction	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q-2Q				
Undersea Superiority - VA Cost Reduction	1Q - 4Q							
Undersea Superiority - ASW		1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q		
Submarine Shaftless Stern Demonstration (S3D)				1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q

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Exhibit R-4a, Schedule Detail						DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT& BA-4	PE0603561N Advanced Submarine System Development				2033/Advanced Submarine Systems Development			
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Stealth								
VA Wake Signature Study	1Q - 4Q	1Q - 3Q						
Deliver VA Wake Signature Model		4Q						
Coupled Wake Signature Model Development		3Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q		
CAVES Multi-Layer Coating Development	1Q - 4Q	1Q						
New Coating Material		2Q			3Q			
Prototype Tests for Outer Material and Dev Inner Material		3Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 3Q			
Tactical Decision Aid Interface Development & Testing	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q				
EM Silencing Evaluate & Integrate Advanced Sys on VA Class	1Q - 4Q	1Q - 4Q	1Q - 4Q	1Q - 3Q				
Composite Duct Eval, LSV2 (VIRGINIA Cost Savings)		1Q						
LSV2 RAV install hull treatment on pressure hull and sail		2Q - 4Q	1Q - 3Q					
Complete VA advanced sail trials, LSV2							2Q - 4Q	1Q - 3Q
VIRGINIA Aft Flow Noise trial, LSV2			3Q - 4Q					
Advanced Propulsor Duct Eval, LSV2			4Q					
Low Cost VIRGINIA Propulsor, LSV2				3Q - 4Q				
LSV2 Technology refresh			2Q		2Q	4Q	1Q	
LSV2 Advanced Propulsor Duct Evaluation			4Q					
LSV2 Low Cost VIRGINIA Propulsor				3Q - 4Q				
Technology refresh of Intermediate Scale Meas. System	4Q					1Q - 3Q		
Total Ownership/Affordability								
Comp. Adv. Metal Brushes transition to PMS 392	3Q - 4Q	3Q						
Complete three Business Case Analyses for implenting EAS's	2Q - 4Q	1Q - 4Q	1Q - 4Q					
Develop four new EAS performance specifications		1Q - 4Q	1Q - 4Q	1Q - 4Q				1Q - 4Q
Initiate/complete shore-based testing/validation on nine ADM's	4Q	1Q - 4Q	1Q - 4Q	1Q - 4Q		1Q - 4Q		
Conduct six at-sea full scale EAS demonstrations				1Q - 4Q	1Q - 4Q		1Q - 4Q	1Q - 4Q
Damping Material Acoustic Test								
Damping Material Panel & Scaled Cylindrical Shell Tests	3Q - 4Q		4Q					
Pop Up & ISMS Tests on Damping Material			4Q					
Pop Up & ISMS Tests on Damping Material				4Q				
Large Scale Test of Damping Material					4Q			
Develop/Demo Universal Hull Penetrators and Cabling				1Q - 4Q	1Q - 4Q			
Develop and Test Common Hull Penetrator (CEHP)		1Q - 4Q	1Q - 4Q	1Q - 4Q				
Develop and Test UMM Composite Electric Mast		1Q - 4Q	1Q - 4Q	1Q - 4Q				

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Exhibit R-4a, Schedule Detail

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4		PROGRAM ELEMENT NUMBER AND NAME 0603561N/Advanced Submarine System Development			PROJECT NUMBER AND NAME 0223/Submarine Combat System Improv (Adv)			
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
0223/Adv. Submarine Combat Sys. Improv.	59.972	54.758	53.223	45.175	50.076	53.417	52.856	53.834
RDT&E Articles Qty								
<p>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</p> <p>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.</p> <p>Project Unit 0223: 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 tactical 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), Advanced Processing Build-Tactical (APB-T), tactical control, and Advanced Sonar Arrays. APB's develop and demonstrate improvements to current and future sonar/combat control systems. Advanced Sonar Arrays develop tests and new sensors and demonstrates large array configuration. Program is funded under demonstration and validation, as it develops and integrates hardware for experimental test related to specific platform applications.</p>								

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EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603561N/Advanced Submarine System Development	PROJECT NUMBER AND NAME 0223/Submarine Combat System Improv (Adv)		
B. Accomplishments/Planned Program				
	FY 2006	FY 2007	FY 2008	FY 2009
Advanced Sonar System Processing/Subtotal Cost	31.702	32.350	25.859	25.835
RDT&E Articles Quantity				
<p>Advanced Processing Build-Acoustic (APB-A) transitioned to PMS401 for fleet introduction in FY05. FY06 APB(A) has continued improvements in sonar detection and classification via improved algorithms and automation for towed arrays, and initiated improvements to medium and high frequency active systems. These enhancements will continue to be refined over the near term in concert with a special focus on improved sonar planning and environmental monitoring, initial work on twin line and/or high gain towed array signal processing and systems engineering, as well as processing enhancements for Sphere Arrays. Efforts for FY07 and FY08 will focus on the initial steps required to automate combat systems operations, in support of reduced workload and manning, while continuing efforts on improving the acoustic contribution to ASW in the littorals. Primary improvements are planned for sphere array signal processing, contact followers, trackers, refined automation, ranging tools, search space reduction tools, environmental prediction, and monitoring and active systems. Recently implemented Signal processing for the TB-29 Towed Array will be refined to ensure improved performance in shallow water and through maneuvers. FY09 will begin work with Low Frequency Active (LFA) systems and improvements for TB-23 and TB-16 towed arrays.</p>				
	FY 2006	FY 2007	FY 2008	FY 2009
Advanced Tactical Control/Subtotal Cost	10.000	8.000	13.864	13.000
RDT&E Articles Quantity				
<p>Advanced Processing Build-Tactical (APB-T) transitioned to PMS425 for fleet introduction in FY04. FY06 APB(T) focused on display sharing across acoustic and tactical systems, improving automated state estimation and the introduction of Command Information Management tools and displays. FY07 and FY08 efforts will focus on enhancing functionality through integrated imaging capabilities, continued improvements in Command Information Management and automated state estimation, and the initial steps required to automate combat systems operations, in support of work load and manning reductions. Work will continue on improving the tactical commander's ability to manage close in and high density scenarios through advanced target motion analysis, contact management, tactical scene rendering, uncertainty management, and close encounter decision management. FY09 efforts will focus on all source data fusion algorithms and route planning, acoustic and non-acoustic vulnerability management, and other forms of automation.</p>				

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EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2007
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603561N/Advanced Submarine System Development	PROJECT NUMBER AND NAME 0223/Submarine Combat System Improv (Adv)
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B. Accomplishments/Planned Program

	FY 2006	FY 2007	FY 2008	FY 2009
Advanced Sensors/Subtotal Cost	18.270	14.408	13.500	6.340
RDT&E Articles Quantity				

The Advanced Sensor Systems project is developing improved, larger aperture sonars and digital acoustic communications systems in order to achieve acoustic superiority. Current projects include: Low Cost Conformal Array (LCCA), a modular High Frequency (HF) contact management sonar that could be mounted on submarine sails; Large Vertical Array (LVA), a CAVES-based MF ASW sonar that may be either stand alone or combined with two other LVAs to form a Large Wide Aperture Array (LgWAA) for VIRGINIA forward-fit; Fiber-Optic CAVES (FOCAVES) sensors and processing; Advanced Towed Array Technology (ATAT - provides Twin Line Towed Array Capability (TLTAC)); and ACOMMS, a digital acoustic communications system for submarines and surface ships. In FY06 install and test the LCCA Advanced Development Model (ADM); begin development of the LCCA Engineering Development Model (EDM) and begin ATAT concept studies; begin development of a FOCAVES test patch and Time Domain Multiplexed (TDM) telemetry; begin development of low heat, small footprint, high processing power inboard electronics (RCINextGen - Rapid COTS Insertion Next Generation); and develop improved MF ACOMMS performance. In FY07, continue development of ATAT; coordinate with PMS 401 on development of the LCCA EDM; begin fabrication of the LVA ADM; build and test an LVA mockup; test a FOCAVES array component; continue development of RCINextGen; and begin MF ACOMMS surface ship development. In FY08, continue development of ATAT; install LVA ADM; complete surface ship MF ACOMMS development; continue coordination with PMS401 developing the LCCA EDM; complete development of RCI NextGen; and build ADM electronics for the LCCA ADM ship. In FY09, test LVA; test RCI NextGen; begin transition of CAVES to PMS450; complete ACOMMS encryption and Information Assurance (IA) development; continue development of twin line array prototype.

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EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4		PROGRAM ELEMENT NUMBER AND NAME 0603561N/Advanced Submarine System Development			PROJECT NUMBER AND NAME 0223/Submarine Combat System Improv (Adv)					
C. OTHER PROGRAM FUNDING SUMMARY:										
<u>Line Item No. & Name</u>	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	<u>To Complete</u>	<u>Total Cost</u>
Not applicable.										
 D. ACQUISITION STRATEGY: * Plan to use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations.										
 E. MAJOR PERFORMERS: **										
<p>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. General Dynamic/Advanced Information Systems, 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)).</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-4			0603561N/Advanced Submarine System Development			0223/Submarine Combat System Improv (Adv)								
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
Product Development	WR	NUWC Newport, RI	89.811	15.526	10/05	14.473	10/06	13.213	10/07	13.024	10/08	CONT.	CONT.	
Product Development	RCP	NUWC Newport, RI	1.000										1.000	
Product Development	WR	NRL/Washington	5.039	0.356	10/05	0.356	10/06	0.600	10/07	0.050	10/08	CONT.	CONT.	
Product Development	RCP	NRL/Washington	0.490										0.490	
Product Development	WR	NSWC Carderock, MD	12.176	2.705	10/05	2.000	10/06	1.000	10/07	1.000	10/08	CONT.	CONT.	
Product Development	RCP	NSWC Carderock, MD	0.036			2.000	10/06	1.500	10/07	1.000	10/08	CONT.	CONT.	
Product Development	WR	NSWC Dahlgren	0.258	0.080	10/05	0.080	10/06	0.050	10/07	0.050	10/08	CONT.	CONT.	
Product Development	PD	ONI, Washington	4.692	1.007	12/05	0.900	12/06	0.950	12/07	0.800	12/08	CONT.	CONT.	
Product Development	C/CPFF	Lockheed Martin, VA	20.880	3.466	12/05	3.818	12/06	3.900	12/07	3.000	12/08	CONT.	CONT.	
Product Development	C/CPFF	BAE, NH	3.402										3.402	
Product Development	RCP	NSMA	1.035	0.180	11/05	0.180	11/06	0.180	11/07	0.180	11/08	CONT.	CONT.	
Product Development	MIPR	U.S. Army/MITRE	8.925	1.800	12/05	1.800	12/06	1.800	12/07	1.800	12/08	CONT.	CONT.	
Product Development	MIPR	U.S. Air Force/MIT Lincoln Lab	8.064	1.744	12/05	1.744	12/06	1.744	12/07	1.744	12/08	CONT.	CONT.	
Product Development	RCP	ONR/MCCI	2.800										2.800	
Product Development	MIPR	METRON	3.673	1.508	12/05	1.508	12/06	1.508	12/07	1.000	12/08	CONT.	CONT.	
Product Development	C/CPFF	Progeny, VA	2.527	0.237	12/05	0.237	12/06	0.250	12/07	0.250	12/08	CONT.	CONT.	
Product Development	C/CPFF	BBN, VA	2.836										2.836	
Product Development	RCP	ONR/GTRI	2.050	0.250	12/05	0.500	12/06	0.500	12/07	0.500	12/08	CONT.	CONT.	
Product Development	SS/CPFF	APL/JHU, MD	43.290	10.339	12/05	10.139	12/06	7.882	12/07	9.000	12/08	CONT.	CONT.	
Product Development	SS/CPFF	APL/UW, WA	0.275	0.050	12/05	0.050	12/06	0.050	12/07	0.050	12/08	CONT.	CONT.	
Product Development	SS/CPFF	ARL/UT, TX	29.588	4.601	12/05	4.001	12/06	4.500	12/07	3.500	12/08	CONT.	CONT.	
Product Development	SS/CPFF	ARL/PSU, PA	2.082	0.350	12/05	0.350	12/06	0.350	12/07	0.172	12/08	CONT.	CONT.	
Product Development	MD	ARL/PSU, PA	1.050	0.150	01/06	0.150	01/06	0.150	01/07	0.150	01/08	CONT.	CONT.	
Product Development	WR	NAVAIR PAX/NSWC Indian H	0.170	0.030	10/05	0.030	10/06	0.030	10/07	0.030	10/08	CONT.	CONT.	
Product Development	WR	SPWAR, CA	0.713	0.140	10/05	0.140	10/06	0.100	10/07	0.100	10/08	CONT.	CONT.	
Product Development	PD	SPWAR, CA	1.436	0.400	10/05	0.400	10/06		10/07		10/08	CONT.	CONT.	
Product Development	C/CPFF	DSR, VA	20.353	8.151	10/05	4.128	10/06	2.500	10/07	3.000	10/08	CONT.	CONT.	
Product Development	WR	COMSUBLANT	0.573	0.100	10/05	0.100	10/06	0.100	10/07	0.100	10/08	CONT.	CONT.	
Product Development	C/CPFF	Electric Boat, CT	5.603										5.603	
Product Development	CPFF	Lockheed Martin	4.139	1.590	12/05	2.420	10/06	1.000	10/07	1.000	10/08	CONT.	CONT.	
Product Development	MIPR	DARPA, VA	21.600										21.600	
Product Development	Various	Various	2.645										2.645	
Product Development	C/CPFF	Northrop Grumman	1.100	0.400	12/05	0.600	12/06	0.650	12/07	0.650	12/08	CONT.	CONT.	
SBIRs / BAAs	C/CPFF	Various	10.684	1.787	Various	0.579	Various	5.691	Various	0.000	Various	CONT.	CONT.	
Advanced Towed Array BAA	C/CPFF	Lockheed Martin, NY	1.315										1.315	
Subtotal Product Development			316.310	56.947		52.683		50.198		42.150		CONT.	CONT.	
Remarks:														

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Exhibit R-3 Cost Analysis (page 3)											DATE: February 2007			
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME								
RD&E, N / BA-4			0603561N/Advanced Submarine System Development			0223/Submarine Combat System Improv (Adv)								
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
Developmental Test & Evaluation	WR	NUWC Newport, RI	2.693										CONT.	
Developmental Test & Evaluation	C/CPFF	Raytheon	4.211										4.211	
Operational Test & Evaluation														
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			6.904	0.000		0.000		0.000		0.000		0.000	4.211	
Remarks:														
Contractor Engineering Support														
Government Engineering Support														
Program Management Support	C/CPFF	Integrated Product Dec, CT	0.450										0.450	
Program Management Support	C/CPFF	Stanley Associates, VA	6.388	1.000	12/05	1.000	12/06	1.000	12/07	1.000	12/08	CONT.	CONT.	
Program Management Support	C/CPFF	Various	2.240	1.000	12/05	1.000	12/06	1.000	12/07	1.000	12/08	CONT.	CONT.	
Program Management Support	C/CPFF	EG&G	1.787	0.950	12/05			0.950	12/07	0.950			1.787	
Program Management Support	C/CPFF	Anteon Corporation	0.198										0.198	
Travel			0.425	0.075		0.075		0.075		0.075		CONT.	CONT.	
Transportation														
SBIR Assessment														
Subtotal Management			11.488	3.025		2.075		3.025		3.025		CONT.	CONT.	
Remarks:														
Total Cost			342.702	59.972		54.758		53.223		45.175		CONT.	CONT.	
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-4		PE 0603561N Advanced Submarine Systems Development								0223 Advanced Submarine Combat Systems Development																														
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								
Advanced Processing Build (Acoustic & Tactical)	APB-05				APB-06				APB-07				APB-08				APB-09				APB-10				APB-11				APB-12											
Conformal Acoustic Velocity Sonar / Large Vertical Array	VA Class Risk Reduction								Mockup Build				Construct Array				Install ADM Array				Test ADM				Transition to VA Class															
Low Cost Conformal Array (LCCA)	Install LCCA ADM				Test LCCA ADM				Install 2nd Pass. Array & active to ADM								Transition to SSNs																							
RCI Next Generation	Develop and test RCI NexGen								Install RCI NexGen				Transition to TI-08																											
ACOMMS	Fleet Demos				Complete Surface Ship Development				Install and Test Surface Ship				Develop encrypted solution																											
Advanced Towed Arrays Technology	Develop array								Prototype handler				Build and Install ADM				Demonstration																							
	Develop array								Prototype arrays																															

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

LEGEND: Transition Sea Test

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Exhibit R-4a, Schedule Detail					DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY RDT&E BA-4		PROGRAM ELEMENT PE 0603561N Advanced Submarine Systems Development			PROJECT NUMBER AND NAME 0223 Advanced Submarine Combat Systems Development				
Schedule Profile		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Advanced Processing Builds (Acoustic/Tactical)									
Transition APB-05 to ARCI		2Q							
APB-06 Sea Test		4Q							
Transition APB-06 to ARCI/BYG-1			2Q						
APB-07 Sea Test			4Q						
Transition APB-07 to ARCI/BYG-1				2Q					
APB-08 Sea Test				4Q					
Transition APB-08 to ARCI/BYG-1					2Q				
APB-09 Sea Test					4Q				
Transition APB-09 to ARCI/BYG-1						2Q			
APB-10 Sea Test						4Q			
Transition APB-10 to ARCI/BYG-1							2Q		
APB-11 Sea Test							4Q		
Transition APB-11 to ARCI/BYG-1								2Q	
APB-12 Sea Test								4Q	
Transition APB-12 to ARCI/BYG-1									2Q
APB-13 Sea Test									4Q

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Exhibit R-4a, Schedule Detail				DATE: February 2007				
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NUMBER AND NAME						
RDT&E BA-4	PE 0603561N Advanced Sub	0223 Advanced Submarine Combat Systems Development						
Schedule Profile	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
TB-16 Multi-Line Towed Array (MLTA)								
24-channel acoustic module LPO self noise & shakedown test								
96-channel acoustic module and receiver integration								
96-channel system test								
96-channel system LPO tow test								
Conformal Acoustic Velocity Sonar/Large Vertical Array								
Begin detail design, advanced procurement		1Q-2Q						
Construct ADM array		2Q - 4Q						
Install ADM array			2Q - 3Q					
Test ADM				1Q-2Q				
Transition to VIRGINIA Class				1Q-4Q	1Q-4Q			
Low Cost Conformal Array (LCCA)								
Install ADM array	1Q - 2Q							
Test ADM array	3Q - 4Q	1Q						
Install 2nd Passive Array and add active staves to ADM and			1Q-4Q	1Q-4Q				
Transition to SSNs					1Q-4Q			
Production (Note: continues to FY16)					1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
RCI Next Generation								
Develop and test RCI Next Gen	2Q - 4Q	1Q - 4Q						
Install RCI Next Gen			2Q - 4Q					
Transition to T108			1Q - 4Q	1Q - 2Q				
ACOMMS								
Fleet Demos	3Q	2Q						
Complete Surface Shi Development		1Q - 4Q						
Install and Test Surface Ship ACOMMS			2Q - 3Q					
Develop Encrypted Solution			1Q - 4Q	1Q				
Advanced Towed Array Technology								
Develop handler	1Q - 4Q	1Q - 4Q						
Develop Array	4Q	1Q - 4Q	1Q - 3Q					
Prototype handler			2Q - 4Q					
Prototype arrays			4Q	1Q-3Q				
Build and install ADM				3Q-4Q	1Q-4Q	1Q-3Q		
Demonstration							1Q-3Q	

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2007
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Development	PROJECT NUMBER AND NAME 9999 Congressional Plus-Ups : VARIOUS
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CONGRESSIONAL PLUS-UPS:

	FY 06	FY 07		
9812N/9812C	2.509	4.483		
Experimental Research Transformational Submersible				

The Congressional add will provide for the initial studies, conceptual designs, and concept of operations for a transformational submersible using cutting edge commercial technologies with a focus on affordable portability, modularity, reduction of vehicle size, manning and annual operational support cost. The Experimental Research Transformation Submersible (XRTS) will support mission criteria and be affordable using commercial (COTS) based materials and equipment. In FY07, the Navy will evaluate the feasibility of performing various R&D missions with a commercially owned, commercially operated submersible, and develop a business case analysis for such use.

	FY 06	FY 07		
9813N/9813C	2.908	1.992		
Inner & Outer Decoupler Materials for Hull Array				

Develop inner and outer decoupler materials to support the development and future application of large conformal arrays on submarines while maintaining or improving ship's stealth performance. The Congressional add will be used for the development, test, evaluation, and qualification of outer decoupler materials to support large conformal arrays such as the Conformal Velocity Sonar (CAVES) Large Vertical Array (LVA) and large Wide Aperture Array (IgWAA) concepts. Analysis will be performed to determine cost effective approaches for developing novel conformal array inner decouplers. Preliminary designs will be developed and supported by laboratory performance testing at small scale.

	FY 06	FY 07		
9815N	2.412	0.000		
Submarine Tactical Monitor (SubTaM)				

The Congressional add will be used to examine technology for continual monitoring of own ship vulnerability to detection by enemy sensors and weapons and provide real time input to existing tactical analysis and display systems.

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PROJECT NUMBER AND NAME 9999 Congressional Plus-Ups : VARIOUS	

CONGRESSIONAL PLUS-UPS:

	FY 06	FY 07		
0223C	0.000	2.491		
Fiber Optic Conformal Acoustic Velocity System				

The Congressional add will be used to continue development of fiber optic functionality for the CAVES Large Vertical Array (LVA) Advanced Development Model (ADM) which is a precursor to the VIRGINIA program Large Wide Aperture Array (LgWAA) replacement array.

	FY 06	FY 07		
0223N	3.462	0.000		
(FO-CAVES) Fiber Optic Conformal Acoustic Velocity System				

The Congressional add will be used to continue development of fiber optic functionality for the CAVES Large Vertical Array (LVA) Advanced Development Model (ADM) which is a precursor to the VIRGINIA program Large Wide Aperture Array (LgWAA) replacement array.

	FY 06	FY 07		
9886N	9.577	0.000		
SSGN Unmanned Undersea Vehicle Integration				

Funding will be used to define preliminary design interfaces and documentation to facilitate rapid and affordable insertion into SSGN UUVs and other undersea payloads. In order to provide end-to-end capability these interfaces will address autonomous launch and recovery, stowage and support, and control systems. The interfaces will be developed for USS OHIO Class SSGNs while maximizing compatibility for other submarine classes.

	FY 06	FY 07		
9986N	0.000	1.295		
Cryogenic Power System for Unmanned Underwater Vehicle (UUV)				

This Congressional-add funding is for the Cryogenic Power System for Unmanned Underwater Vehicle (UUV).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE0603561N Advanced Submarine System Developmen	PROJECT NUMBER AND NAME 9999 Congressional Plus-Ups : VARIOUS
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CONGRESSIONAL PLUS-UPS:

	FY 06	FY 07		
9987N	0.000	4.483		
Large Displacement UUV At Sea Launch & Recovery				

Funding will be used to define, document and provide interfaces, modular support equipment, and launch & recovery documentation for rapid affordable integration of Large Displacement UUVs and undersea payloads into SSGN Large Tubes. Land based facilities and in-water tests will be executed to demonstrate modular integration techniques and procedures. Payload interfaces and modular integration approach will maximize compatibility for potential use on other submarine classes.

	FY 06	FY 07		
9988N	0.000	0.996		
Low Cost Thin Line Fiber Optic Towed Array				

Develop a much lower cost, very low noise, vibration resistant laser required for shipboard fiberoptic sensor applications such as TB-33, VIRGINIA Lightweight WAA, and FiberOptic CAVES. Current lasers are either expensive, or noisy.

	FY 06	FY 07		
9989N	0.000	1.345		
Submarine Automated Simulation				

The Congressional add will be used to examine technology for continual monitoring of own ship vulnerability to detection by enemy sensors and weapons and provide real time input to existing tactical analysis and display systems.