

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification				DATE: JUNE 2001						
APPROPRIATION/BUDGET ACTIVITY			R-1 ITEM NOMENCLATURE							
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5			VIRGINIA Class Design Development/0604558N							
COST (\$ in Millions)	FY 2000	FY 2001	FY 2002							
Total PE Cost	236.660	212.127	201.596							
VIRGINIA Class HM&E Development/F1947	157.410	132.629	121.178							
VIRGINIA Class Combat Systems Dev/F1950	71.506	72.562	80.418							
Enhanced Sonar Dome Demo/Validation/F2429	0.000	0.000	0.000							
Adv Sub Tactical Electronic Sys/Int. Mast/F2430	0.000	0.000	0.000							
VIRGINIA Class Advance Tech Insertion/F2644	0.000	4.954	0.000							
NON-Propulsion Electronics System/F2645	7.744	1.982	0.000							
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: The U.S. Navy must maintain a submarine fleet that is of sufficient capability and numbers to defend American interests. The VIRGINIA Class Submarine formerly the New Attack Submarine (New SSN) is being designed to fulfill this need. It will counter the potential threats of the next century in a multi-mission capable submarine that has the ability to provide covert, sustained combat presence in denied waters. The primary goal of the program is to develop an affordable yet capable submarine by evaluating a broad range of system and technology alternatives, and pursuing cost reduction, producibility improvement, and technical risk management. This Program Element (PE) provides the technology, prototype components, and systems engineering needed to design and construct the VIRGINIA Class Submarine and build and its Command, Control, Communications, and Intelligence (C3I) System. This PE directly supports the following VIRGINIA Class Submarine missions: (1) covert strike warfare; (2) anti-submarine warfare; (3) covert intelligence collection/surveillance, indication and warning, and electronic warfare; (4) anti-surface ship warfare; (5) special warfare; (6) mine warfare; and (7) battle group support.

(U) Project F2429: Plus up continued a FY97 special congressional interest item that includes B.F. Goodrich, Electric Boat and Naval Surface Weapons Center as participants. The line funded investigation into new manufacturing processes for a submarine bow SONAR dome.

(U) Project F2430: The congressional plus-up for Advance Submarine Tactical Electronic Combat System (ASTECS) and Integrated Electronic Support (ES) Measures Mast (IEM) restored several highly desirable elements of the ASTECS/IEM programs to improve platform performance. These items were eliminated due to fiscal constraints. Improvements included enhancements to ship's radar intercept, emitter identification, and signal intercept capabilities.

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Exhibit R-2, RDT&E Budget Item Justification

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE: JUNE 2001																					
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5		R-1 ITEM NOMENCLATURE VIRGINIA Class Design Development/0604558N																					
<p>(U) Project F2644: The Congressional Plus-Up provided additional funding to insert new technologies on the VIRGINIA Class Submarine. With these funds, three technology insertions were initiated for VIRGINIA Class Submarine specific development: High Frequency Remote Ahead Profiling; Total Ship Monitoring System (TSMS) Improvements; and Advanced Sail. FY01 Submarine Congressional Plus-Up is for Multi Purpose Processor (MPP) SBIR follow-on for Technology Insertion and refresh for Virginia SSN Combat System.</p> <p>(U) Project F2645: The congressional plus-up is for VIRGINIA Class Submarine Non-Propulsion Electronics System (NPES) inter-system engineering and integration efforts. FY01 Submarine Congressional Plus-Up is for Submarine Common Architecture.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 45%;"></th> <th style="width: 15%;">FY 2000</th> <th style="width: 15%;">FY 2001</th> <th style="width: 15%;">FY 2002</th> </tr> </thead> <tbody> <tr> <td>FY 2001 President's Budget:</td> <td style="text-align: right;">247.982</td> <td style="text-align: right;">207.091</td> <td style="text-align: right;">160.880</td> </tr> <tr> <td>Appropriated Value:</td> <td style="text-align: right;">249.456</td> <td style="text-align: right;">214.091</td> <td></td> </tr> <tr> <td>Adjustment to: FY2000/2001 Appropriated Value/ FY2001 Presidents Budget</td> <td style="text-align: right;">-12.796</td> <td style="text-align: right;">-1.964</td> <td style="text-align: right;">40.716</td> </tr> <tr> <td>FY 2002 PRES Budget Submit:</td> <td style="text-align: right;">236.660</td> <td style="text-align: right;">212.127</td> <td style="text-align: right;">201.596</td> </tr> </tbody> </table> <p>(U) Change Summary Explanation:</p> <p>(U) F1947 Funding: The FY2000 decrease of (-\$8.933M) is attributed to an increase of (\$0.291M) for Restoration issue 62288 for Outsourcing and decreases of (-\$0.360M) for SSP (contracts), (-\$0.918M) for Undistributed Adjustments, (-\$0.648M) for Section 8055: Proportionate Reduction, (-\$0.346M) for BTR 00-43, (-\$4.674M) for Small Business Innovative Research (SBIR), (-\$1,580M) for various minor program adjustments and (-\$0.698M) for FY2000 actuals adjustment. The FY2001 decrease of (-\$1.228) is attributed to a (-\$0.937M) adjustment for Section 8086: Pro Rata Reduction and a (-\$0.291M) for Government-Wide Rescission. The FY2002 increase of (+21.059M) is attributed to increases of (\$23.101M) for program increases and (\$0.319M) for Program Support and decreases of (-\$1.678M) for various program adjustments and (-\$0.683M) for NWCF rate adjustments.</p> <p>(U) F1950 Funding: The FY2000 decrease of (-\$3.607M) is attributed to an increases of (\$0.122M) for Restoration issue 62288 for Outsourcing, (\$0.075M) for FY2000 actuals adjustment and decreases of (-\$0.151M) for SSP (contracts), (-\$0.414M) for Undistributed Adjustments, (-\$0.293M) for Section 8055: Proportionate</p>					FY 2000	FY 2001	FY 2002	FY 2001 President's Budget:	247.982	207.091	160.880	Appropriated Value:	249.456	214.091		Adjustment to: FY2000/2001 Appropriated Value/ FY2001 Presidents Budget	-12.796	-1.964	40.716	FY 2002 PRES Budget Submit:	236.660	212.127	201.596
	FY 2000	FY 2001	FY 2002																				
FY 2001 President's Budget:	247.982	207.091	160.880																				
Appropriated Value:	249.456	214.091																					
Adjustment to: FY2000/2001 Appropriated Value/ FY2001 Presidents Budget	-12.796	-1.964	40.716																				
FY 2002 PRES Budget Submit:	236.660	212.127	201.596																				

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APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5	R-1 ITEM NOMENCLATURE VIRGINIA Class Design Development/0604558N	
<p>Reduction (-\$1.490M) for SBIR and (-\$1.456M) for BTR 00-46. The FY2001 decrease of (-\$0.672M) is attributed to a (-\$0.513) adjustment for Section 8086; Pro Rata Reduction and a (-\$0.159M) for Government-Wide Rescission. The FY2002 increase of (+19.657M) is attributed to increases of (\$20.086M) for program increases and (\$0.196M) for Program Support and decreases of (-\$0.074M) for various minor program adjustments, (-\$0.433M) for VA NPES Functionality Improvement and (-\$0.118M) for NWCF rate adjustments.</p> <p>(U) F2644 Funding: The FY2001 decrease of (-\$0.046M) is attributed to a (-\$0.035M) adjustment for Section 8086: Pro Rata Reduction and (-\$0.011M) for Government-Wide Rescission.</p> <p>(U) F2645 Funding: The FY2000 decrease of (-\$0.0256M) is attributed to an increase of (\$0.019M) for various minor program adjustments and decreases of (-\$0.044M) for Undistributed Adjustments, (-\$0.031M) for section 8055: Proportionate Reduction, and (-\$0.200M) for SBIR. The FY2001 decrease of (-\$0.018M) is attributed to a (-\$0.014M) adjustment for Section 8086: Pro Rata reduction and (-\$0.004M) for Government-Wide Recission.</p>		

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EXHIBIT R-2a, RDT&E Project Justification				DATE: JUNE 2001						
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5	PROGRAM ELEMENT NAME VIRGINIA Class Design Dev		PROJECT NAME AND NUMBER VIRGINIA Class HM&E Development/F1947							
COST (\$ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	157.410	132.629	121.178							
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: (U) This project encompasses all the ship system development efforts for the VIRGINIA Class Submarine. This project is essential to achieve balanced platform capability, affordability, and flexibility in a low rate production environment. The thrust of these efforts will be to develop and apply multiple, advanced system technologies which are integrated into the design of the VIRGINIA Class Submarine. New technologies are being transitioned from industry and Government research and development programs where doing so offers substantial performance and/or affordability payoffs. This project applies to completing system developments for the lead ship construction as well as transitions, technologies for insertion on future VIRGINIA Class Submarines.

(U) Program Accomplishment and Plans:

1. (U) FY 2000 Accomplishments:

(U) (\$130.013M) Continued design, manufacturing, and qualification testing of prototype technologies and components such as: ship service turbine generator (SSTG), weapons stowage, and handling systems; propulsor improvement, electromagnetic signature reduction; and ship control system. Continued shock qualification testing and analyses of various components. Continued system verification studies, tests, and analyses in support of ship design including signature, hydrodynamics, materials, and survivability analyses and tests. Provided Integrated Product and Process Development (IPPD) (Design/Build) team support at shipyards, Navy laboratories and in-house. Supported ship design and construction efforts with engineering evaluations and ship integration assessments for emergent ship design and systems development issues. Continued transitions and engineering developments for new technology insertions into the VIRGINIA Class Submarine including Accelerated Electromagnetic (EM) Silencing, Total Ship Monitoring System (TSMS) Improvements, Towed Array Handling Control System, Acoustic Comms, Conformal Acoustic Velocity Sensor (CAVES) Wide Aperture Array (WAA) and Advanced Sail Development.

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EXHIBIT R-2a, RDT&E Project Justification		DATE:
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5	PROGRAM ELEMENT NAME AND NUMBER VIRGINIA Class Design Dev/0604558N	JUNE 2001
PROJECT NAME AND NUMBER VIRGINIA Class HM&E Development/F1947		
<p>(U) (\$12.861M) Continued effectiveness analyses and evaluations relating to force effectiveness. Conducted analysis in support of force effectiveness assessment and component performance tradeoffs. Maintained cost based approach to VIRGINIA Class Submarine construction through use of IPPD's concurrent engineering philosophy. Continued coordination of VIRGINIA Class Submarine specification at the shipbuilder. Continued cost estimating and validation of cost reduction ideas for VIRGINIA Class Submarine overall design development. Continued environmental compliance and pollution prevention efforts.</p> <p>(U) (\$9.647M) Continued development of: Human System Integration (HSI), Technology Refresh/COTS support concepts, Ship Configuration & Logistics Support Information System (SCLISIS) Studies, Reliability, Maintainability and Availability (RM&A) modeling analyses, Onboard Team Trainer Master Controller (OBTT MC) and trainers/training support.</p> <p>(U) (\$4.889M) Continued the development of the Test and Evaluation Master Plan (TEMP), Vulnerability Analysis Report (VAR) and Total Ship Survivability Trial (TSST). Planned and coordinated second shipbuilder Test and Evaluation efforts. Provide IPPD support to Commander Operational Test and Evaluation Force (COTF) operational assessments. Prepared test plans, schedules and support associated with developmental testing, conducted Command and Control System Off-hull Test Series, Shock, Acoustic and Launchers Trials Testing, Weapons Accuracy Testing and Technical Evaluation. Conducted engineering evaluation of test results. LFT&E modeling and analysis. Continued development of the total ship test plan in support of DT/OT-IIA-IIIF.</p>		

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5	PROGRAM ELEMENT NAME AND NUMBER VIRGINIA Class Design Dev/0604558N	PROJECT NAME AND NUMBER VIRGINIA Class HM&E Development/F1947
<p>2. (U) FY 2001 Plan:</p> <p>(U) (\$103.737M) Continue design, manufacturing, and qualification testing of prototype technologies and components such as: ship service turbine generator (SSTG), weapons stowage and handling systems; propulsor improvements, electromagnetic signature reduction; and ship control system. Continue shock qualification testing and analyses of various components. Continue system verification studies, tests, and analyses in support of ship design including signature, hydrodynamics, materials, and survivability analyses and tests. Provide Integrated Product and Process Development (IPPD) (Design/Build) team support at shipyards, Navy laboratories and in-house. Support ship design and construction efforts with engineering evaluations and ship integration assessments for emergent ship design and systems development issues. Continue transitions and engineering developments for new technology insertions into the VIRGINIA Class submarine including Accelerated Electromagnetic (EM) Silencing, Total Ship Monitoring System (TSMS) Improvements, Towed Array Handling Control System, Acoustic Comms, Sonar Processing Improvements, Improved Submarine Launched Mobile Mine (ISLMM) Ship Integration, Conformal Acoustic Velocity Sensor (CAVES) Wide Aperature Array (WAA), and Advanced Sail Development.</p> <p>(U) (\$13.225M) Continue effectiveness analyses and evaluations relating to force effectiveness. Conduct analysis in support of force effectiveness assessment and component performance tradeoffs. Maintain cost based approach to VIRGINIA Class submarine construction through use of IPPD's concurrent engineering philosophy. Continue coordination of VIRGINIA Class submarine specification at the shipbuilder. Continue cost estimating and validation of cost reduction ideas for VIRGINIA Class submarine overall design development. Continue environmental compliance and pollution prevention efforts.</p> <p>(U) (\$5.173M) Continue development of: COTS support concepts and unique logistics development. Trainers/training to support the VIRGINIA Class funded under this line include: VIRGINIA Ship Contro; Operator Trainer (VSCOT), OBTT MC, Submarine Multi-Mission Team Trainer(SMMTT) and Ship Contro; Maintenance Trainer.</p> <p>(U) (\$10.494M) Continue the development of the Test and Evaluation Master Plan (TEMP), Vulnerability Analysis Report (VAR) and Total Ship Survivability Trial (TSST). Plan and coordinate second shipbuilder Test and Evaluation efforts. Provide IPPD support to Commander Operational Test and Evaluation Force (COTF) operational assessments. Prepare test plans, schedules and support associated with developmental testing, conduct Command and Control System Off-hull Test Series, Shock, Acoustic and Launchers Trials Testing, Weapons Accuracy Testing and Technical Evaluation. Conduct engineering evaluation of test results. LFT&E modeling and analysis. Continue development of the total ship test plan in support of DT/OT-IIA-IIF.</p>		

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<p>3. (U) FY 2002 Plan:</p> <p>(U) (\$89.335M) Continue design, manufacturing, and qualification testing of prototype technologies and components such as: ship service turbine generator (SSTG), main propulsion unit improvements, weapons stowage and handling systems; propulsor improvements, electromagnetic signature reduction; and ship control system. Continue shock qualification testing and analyses of various components. Continue system verification studies, tests, and analyses in support of ship design including signature, hydrodynamics, materials, and survivability analyses and tests. Provide Integrated Product and Process Development (IPPD) (Design/Build) team support at shipyards, Navy laboratories and in-house. Support ship design and construction efforts with engineering evaluations and ship integration assessments for emergent ship design and systems development issues. Continue transitions and engineering developments for new technology insertions into the VIRGINIA Class submarine including Accelerated Electromagnetic (EM) Silencing, Towed Array Handling Control System, Acoustic Comms, and Sonar Processing Improvements, Passive Ranging, Improved Submarine Launched Mobile Mine (ISLMM) Ship Integration, Conformal Acoustic Velocity Sensor (CAVES) Wide Aperature Array (WAA), and Advanced Sail Development.</p> <p>(U) (\$15.292M) Continue effectiveness analyses and evaluations relating to force effectiveness. Conduct analysis in support of force effectiveness assessment and component performance tradeoffs. Maintain cost based approach to VIRGINIA Class submarine construction through use of IPPD's concurrent engineering philosophy. Continue coordination of VIRGINIA Class submarine specification at the shipbuilder. Continue cost estimating and validation of cost reduction ideas for VIRGINIA Class submarine overall design development. Continue environmental compliance and pollution prevention efforts.</p> <p>(U) (\$6.189M) Continue development of: Trainers/training to support the VIRGINIA Class funded under this line include: VSCOT, OBTT MC, Common Basic Operator Trainer, SMMTT, Ship Control Maintenance Trainer , and Non-Tactical Data Processing System (NTDPS)</p> <p>(U) (\$10.362M) Continue the development of the Test and Evaluation Master Plan (TEMP), Vulnerability Analysis Report (VAR) and Total Ship Survivability Trial (TSST). Plan and coordinate second shipbuilder Test and Evaluation efforts. Provide IPPD support to Commander Operational Test and Evaluation Force (COTF) operational test OT-IIB at the COATS facility. Prepare test plans, schedules and support associated with developmental testing, conduct Command and Control System Off-hull Test Series, Shock, Acoustic and Launchers Trials Testing, Weapons Accuracy Testing and Technical Evaluation. Conduct engineering evaluation</p>		

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		JUNE 2001

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-5	VIRGINIA Class Design Dev/0604558N	VIRGINIA Class HM&E Development/F1947

of test results. LFT&E modeling and analysis. Continue development of the total ship test plan in support of DT/OT-IIA-IIF.

B. (U) Other Program Funding Summary: (Dollars in Millions)

	FY 2000	FY 2001	FY 2002
SCN Line 201300 PE: 0204281N	744.475	1700.769	2093.202
SCN Line 201310 PE: 0204281N	0.000	0.000	0.000
O&M,N BA-2 1B2B PE: 0204283N	0.000	0.000	0.000
OPN BA-8 Line Item 094200	0.000	0.000	0.000

(U) Related RDT&E:

- (U) PE 0603561N (Advanced Submarine System Development)
- (U) PE 0603570N (Advanced Nuclear Power Systems)
- (U) PE 0602121N (Surface Ship Technology)

C. (U) Acquisition Strategy: The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The VIRGINIA Class Submarine Program Office has collocated the engineering and program management personnel necessary to plan and pursue total ship system design management and life cycle acquisition responsibilities. The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach will also facilitate a smoother transition from design to manufacturing, and reduce the number of changes typically encountered during construction of the Lead and early follow ships. In September 1997, Congress passed a law allowing the two companies to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, Electric Boat remained the design yard for the VIRGINIA Class Submarine and Newport News Shipyard became a part of the IPPD process.

D. (U) Schedule Profile: See attached.

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Exhibit R-3 Cost Analysis (page 1)								DATE: JUNE 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			VIRGINIA Class Design Dev/0604558N			VIRGINIA Class HM&E Development/F1947						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Primary Hardware Development												
Ancillary Hardware Development												
Component Development	SS/CPFF	EB-2103 Groton, CT	329.087	48.349	Various	25.502	Various	36.913	Various			
Main Propulsion Complex Dev	SS/CPFF	EB-4030 Groton, CT	182.556	29.800	Various	15.700	Various	21.000	Various			
Component Development	WR	NSWC Carderock, MD	282.088	34.162	11/99	27.058	11/00	34.727	11/01			
Component Development	WR	NAWC Orlando, FL	10.344	6.062	11/99	3.954	11/00	3.217	11/01			
Component Development	WR	NUWC Newport, RI	59.807	5.799	11/99	7.620	11/00	3.497	11/01			
Technology Insertion	Various	Miscellaneous	9.400	5.551	Various	14.748	Various	2.792	Various			
Component Development	Various	Miscellaneous	178.705	15.924	Various	22.918	Various	3.409	Various			
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			1051.987	145.647		117.500		105.555				
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				
Remarks: Not Applicable.												

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Exhibit R-3 Cost Analysis (page 2)							DATE: JUNE 2001					
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			VIRGINIA Class Design Dev/0604558N			VIRGINIA Class HM&E Development/F1947						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Developmental Test & Evaluation												
Operational Test & Evaluation												
Test & Evaluation	WR	NSWC Carderock, MD	1.977	1.516	11/99	2.903	11/00	4.526	11/01			
Test & Evaluation	WR	NUWC, Newport, RI	5.184	1.607	11/99	2.476	11/00	2.665	11/01			
Test & Evaluation	C/CPAF	EG&G-C6411 Rockville, MD	2.224	1.190	Various	1.227	Various	1.273	Various			
Test & Evaluation	Various	Miscellaneous	6.174	0.576	Various	1.388	Various	1.898	Various			
Tooling												
GFE												
Subtotal T&E			15.559	4.889		7.994		10.362				
Remarks:												
Contractor Engineering Support												
Contractor Support Services	C/CPAF	EG&G-C6411 Rockville, MD	10.321	5.360	Various	5.608	Various	0.000	Various			
Contractor Spt Services/Award Fees	C/CPAF	EG&G-C6411 Rockville, MD	1.032	0.000	Various	0.000	Various	0.000	Various			
Contractor Support Services	Various	Miscellaneous	17.718	1.514	Various	1.527	Various	5.261	Various			
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			29.071	6.874		7.135		5.261				
Remarks:												
Total Cost			1096.617	157.410		132.629		121.178				
Remarks:												

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EXHIBIT R-2a, RDT&E Project Justification				DATE:				JUNE 2001			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5			PROGRAM ELEMENT NAME AND NUMBER VIRGINIA Class Design Dev/0604			PROJECT NAME AND NUMBER VIRGINIA Class Combat System Development/F1950					
COST (\$ in Millions)			FY 2000	FY 2001	FY 2002						
Project Cost			71.506	72.562	80.418						
RDT&E Articles Qty											
<p>A. (U) Mission Description and Budget Item Justification: (U) This project encompasses the top level systems development, tested integration into the ship of the VIRGINIA Class Submarine C3I System (formerly referred to as Combat Systems), which includes multiple subsystems. The scope of the system is expanded from Sonar and Combat Control subsystems to include AN/BLQ-10 Electronic Support (ES) Measures, Exterior Communications, Submarine Regional Warfare System, Navigation, Total Ship Monitoring, Imaging, Tactical Acoustic Communications, Radar, Interior Communications, Tactical Support Devices, Fiber Optic Cable Subsystem, and Special Purpose Subsystems, such as Battle Force Team Trainer and others. VIRGINIA Class Submarine specific development efforts including requirements definition, software, hardware development, software/hardware test, prototype production, and electronic integration as well as physical integration into the platform.</p> <p>(U) VIRGINIA Class Submarine implementation approach is based on Open System, Commercial-off-the -Shelf (COTS) Non-Developmental Items or subsystems. The program leverages on-going subsystems developments or developing new subsystems where needed to satisfy VIRGINIA Class requirements. The recurring cost of VIRGINIA Class Submarine C3I Systems is being reduced to meet the program's affordability goals. Modifications to many subsystems must be developed to: (1) reduce the shipbuilding and construction recurring costs through the use of COTS components; (2) use proven computer technologies to evolve to an Open System design; (3) enhance capabilities to support expanded operational requirements, reduced manning, and reduced shipboard component footprint.</p> <p>(U) To meet the collective future threat, the submarine force must operate as effectively in littoral regions as it traditionally has in open ocean. Close coordination with surface battle groups and airborne units is essential to mission accomplishment. To meet the VIRGINIA Class Submarine mission, the following capabilities are provided by the VIRGINIA Class Submarine C3I System: (1) Passive and Active detection of multiple contacts, including early warning threat determination through processing and analysis of sensor data; (2) classification of sensor data for the purpose of identifying contacts; (3) localization (tracking) of contacts through target motion analysis; (4) preset, launch, and control of weapons and countermeasures; (5) improved communication and connectivity with other battle group elements, airborne units, and special operations forces; (6) incorporation of vertical launch system to enhance strike warfare; and (7) more effective covert surveillance through video imaging with onboard digital enhancement capabilities, and improved electronic warfare analysis capabilities.</p>											

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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-5	VIRGINIA Class Design Dev/0604558N	VIRGINIA Class Combat System Development/F1950
<p>(U) Accomplishments and Plans:</p> <p>1. (U) FY 2000 Accomplishments:</p> <ul style="list-style-type: none">- (U) (\$20.426M) System level development activities continued in the following areas: SIE electronic integration; development and validation of C3I System test and evaluation procedures to support integration testing and installation/test into the platform; and conducted system engineering functions such as requirements management, interface control, test and evaluation planning to support formal DT/OT; C3I Subsystem platform integration and external interface integration planning. Completed delivery of Pre-Cable Kits and Installation support hardware, COATS installation and test planning, conducted Environmental Qualification Testing. Began development of PSA deliveries of technology refreshment changes to C3I System/subsystems.- (U) (\$51.080M) Completed Combat Control, Sonar and Architecture (S/CC/A) subsystem preliminary product baseline development; completed initial phase of subsystem System Design Certification testing (SDCT 1). Completed Architecture subsystem Functional Certification Testing. Continued inter-subsystem integration in preparation for November 2000 delivery of the NSSN preliminary product baseline subsystem. Began detailed S/CC/A engineering support to shipyard intra- and inter-subsystem integration. Began development of PSA deliveries of technology refreshment changes to S/CC/A subsystems. <p>2. (U) FY 2001 Plan:</p> <ul style="list-style-type: none">- (U) (\$21.846M) System level development activities continue in the following areas: development and validation of C3I System test and evaluation procedures to support integration testing and installation/test into the platform; conduct system engineering functions such as requirements management, interface control, test and evaluation planning to support formal DT/OT; and begin C3I System Integration and Interface Operability Testing. Begin development of system changes identified by integration efforts. Continue development of PSA deliveries of technology refreshment changes to C3I System/subsystems.		

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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	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-5	VIRGINIA Class Design Dev/0604558N	VIRGINIA Class Combat System Development/F1950
<p>- (U) (\$ 49.201M) Continue detailed S/CC/A engineering support to shipyard intra- and inter-subsystem integration. Conduct operability and integration testing. Continue development of PSA deliveries for technology refreshment changes to S/CC/A subsystems. Begin integration of tactical tomahawk capability into S/CC/A.</p> <p>- (U) (\$1.515M) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.</p> <p>3. (U) FY 2002 Plan:</p> <p>- (U) (\$45.076M) Complete initial system level development activities continue in the following areas: development and validation of C3I System test and evaluation procedures to support integration testing and installation/test into the platform; conduct system engineering functions such as requirements management, interface control, test and evaluation planning to support formal DT/OT; and complete C3I System Integration and Interface Operability Testing with conduct of OT-IIB. Continue development of system changes identified during integration efforts. Continue development of PSA deliveries of technology refreshment changes to C3I System/subsystems.</p> <p>- (U) (\$35.342M) Complete detailed S/CC/A engineering support to shipyard intra- and inter-subsystem integration. Continue development of S/CC/A subsystem changes identified during integration efforts. Continue development of PSA deliveries for technology refreshment changes to S/CC/A subsystems. Continue integration of tactical tomahawk capability into S/CC/A.</p>		

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification		DATE:																				
		JUNE 2001																				
APPROPRIATION/BUDGET ACTIVITY	PROJECT NAME AND NUMBER																					
RDT&E, N/BA-5	VIRGINIA Class Combat System Development/F1950																					
<p>B. (U) Other Program Funding Summary: (Dollars in Millions)</p> <table border="0"> <thead> <tr> <th></th> <th>FY 2000</th> <th>FY 2001</th> <th>FY 2002</th> </tr> </thead> <tbody> <tr> <td>SCN Line 201300 PE: 0204281N</td> <td>744.475</td> <td>1700.769</td> <td>2093.202</td> </tr> <tr> <td>SCN Line 201310 PE: 0204281N</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> </tr> <tr> <td>O&M,N BA-2 1B2B PE: 0204283N</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> </tr> <tr> <td>OPN BA-8Line Item 094200</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> </tr> </tbody> </table> <p>(U) Related RDT&E:</p> <ul style="list-style-type: none"> (U) PE 0603504N (Advanced Submarine Combat Systems Development) (U) PE 0603561N (Advanced Submarine System Development) (U) PE 0603562N (Submarine Tactical Warfare Systems) (U) PE 0603570N (Advanced Nuclear Power Systems) (U) PE 0604503N (Submarine System Equipment Development) (U) PE 0604574N (Navy Tactical Computer Resources) (U) PE 0604777N (Navigation/ID Systems) (U) PE 0101226N (Submarine Acoustic Warfare Development) (U) PE 0604562N (Submarine Tactical Warfare System) (U) PE 0604524N (Submarine Combat System) 				FY 2000	FY 2001	FY 2002	SCN Line 201300 PE: 0204281N	744.475	1700.769	2093.202	SCN Line 201310 PE: 0204281N	0.000	0.000	0.000	O&M,N BA-2 1B2B PE: 0204283N	0.000	0.000	0.000	OPN BA-8Line Item 094200	0.000	0.000	0.000
	FY 2000	FY 2001	FY 2002																			
SCN Line 201300 PE: 0204281N	744.475	1700.769	2093.202																			
SCN Line 201310 PE: 0204281N	0.000	0.000	0.000																			
O&M,N BA-2 1B2B PE: 0204283N	0.000	0.000	0.000																			
OPN BA-8Line Item 094200	0.000	0.000	0.000																			

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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-5	VIRGINIA Class Design Dev/0604558N	VIRGINIA Class Combat System Development/F1950
<p>C. (U) Acquisition Strategy: The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The VIRGINIA Class Submarine Program Office has collocated the engineering and program management personnel necessary to plan and pursue total ship system design management and life cycle acquisition responsibilities. The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach will also facilitate a smoother transition from design to manufacturing, and reduce the number of changes typically encountered during construction of the lead and early follow ships. In September 1997, Congress passed a law allowing the two companies to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, Electric Boat remained the design yard for the VIRGINIA Class Submarine and Newport News Shipyard became a part of the IPPD process.</p> <p>D (U) Schedule Profile: See attached.</p>		

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Exhibit R-3 Cost Analysis (page 1)										DATE:			
APPROPRIATION/BUDGET ACTIVITY										PROGRAM ELEMENT		PROJECT NAME AND NUMBER	
RDT&E, N/BA-5										VIRGINIA Class Design Dev/0604558N		VIRGINIA Class Combat System Development/F1950	
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date				
C3I Prime Contract E&MD Total	C/CPAF	Lockheed Manassas, VA	151.202	43.296	Various	15.899	Various	6.799	Various				
C3I Prime Contract E&MD Award Fee	C/CPAF	Lockheed Manassas, VA	4.608	0.000		4.396	Various	1.400	Various				
C3I Prime Contract Post Delivery	C/FFP	Lockheed Manassas, VA		1.000	Various	9.035	Various	8.619	Various				
Advanced Display Sys (AN/UYQ-70)	SS/CPFF												
	CPIF	Lockheed St. Paul, MN	19.522	0.916	Various	1.840	11/00	2.000	12/00				
Multi-Purpose Processor	SS/CPIF	Digital Sys Fairfax, VA	41.449										
Multi-Purpose Processor	SS/CPIF	Lockheed Manassas, VA	1.755										
Photonics	C/CPIF	Kollmorgen Northhampton, MA	22.842	0.833	Various	0.185	11/00	0.194	12/00				
Non-Penetrating Periscope	C/CPIF	Kollmorgen Northhampton, MA	4.060										
Electronic Support Measures	C/FFP	Lockheed Syracuse, NY	37.475			0.195		0.203					
Platform Integration	SS/CPFF	EB Corp Groton, CT	18.414	1.656	Various	2.060	11/00	5.820	12/00				
Platform Integration	SS/CPFF	NNews Shipbuilding NNews, VA	2.725										
Integrated Electronic Mast	SS/CPIF	Goleta Portsmouth, RI	8.897										
Tactical Simulator	SS/CPFF	Goleta Portsmouth, RI	2.750										
High Frequency Sail Array	SS/CPFF	Applied Research Austin, TX	3.273										
Navigation/Radar	SS/CPFF	Sperry Corp Charlottesville, VA	6.153	0.071	Various	0.115	01/00	0.125	01/01				
Technology Refreshment	Various	TBD				9.389	Various	7.911	Various				
Open System Module	SS/CPFF	UNISYS Corp St. Paul, MN	2.500										
Technical Direction Agent	N/A	NUWC Newport, RI	139.290	14.964	Various	13.799	Various	12.280	Various				

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Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 1)								DATE: JUNE 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			VIRGINIA Class Design Dev/0604558N			VIRGINIA Class Combat System Development/F1950						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Systems Engineering	N/A	NSWC Cardock, MD	2.936	0.419	Various	0.400	11/00	0.345	11/00			
Systems Engineering	N/A	NSWC Crane, IN	2.685	0.100	Various	0.100	11/00	0.205	11/00			
Systems Engineering	N/A	SSC Charleston, SC	2.333									
Systems Engineering	N/A	SSC San Diego, CA	1.535									
Systems Engineering	N/A	NUWC Keyport, WA	1.941	0.458	Various	0.430	11/00	1.085	01/00			
Miscellaneous	Various	Various	21.348	1.303	Various	8.194	Various	28.982	Various			
Subtotal Product Development			499.693	65.016		66.037		75.968				
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				
Remarks: Not Applicable.												

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Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 2)							DATE: JUNE 2001					
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			VIRGINIA Class Design Dev/0604558N			VIRGINIA Class Combat System Development/F1950						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date			
Developmental Test & Evaluation												
Operational Test & Evaluation												
Test & Evaluation	Various	Various	0.000	0.000		0.230	Various	0.490	Various			
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.230		0.490				
Remarks:												
Contractor Engineering Support												
Contractor Support Services/ETS	C/CPAF	EG&G Rockville, VA	8.413	2.912	Various	4.123	Various					
CSS/ETS Award Fee	C/CPFF	EG&G Rockville, VA	0.673	0.233	Various	0.330	Various					
Contractor Support Services/ETS	C/CPFF	EG&G Rockville, VA	8.857									
Contractor Support Services/ETS	C/CPFF	SWL Inc. Vienna, VA	5.705									
Contractor Support Services/ETS	C/CPFF	American Sys Chantilly, VA	2.099									
Miscellaneous	Various	Various	3.912	3.345	Various	1.842	Various	3.960	Various			
Program Management Support												
Travel												
Subtotal Management			29.659	6.490		6.295		3.960				
Remarks:												
Total Cost			529.352	71.506		72.562		80.418				
Remarks:												

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