

EXHIBIT R-2, RDT&E Budget Item Justification				DATE: February 2004			
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE			
RESEARCH DEVELOPMENT TEST & EVALUA` BA-5				0604558N/VIRGINIA Class Design Development			
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	234.592	144.576	143.270	153.485	140.045	144.033	117.015
1947/VIRGINIA Class HM&E Development	122.189	74.242	99.719	110.095	98.863	105.699	87.892
1950/VIRGINIA Class Combat Systems Dev	88.676	38.573	39.805	40.725	38.459	35.555	26.262
2887/SSN Combat Sys Tech Insert/Refresh	4.761	10.816	0.000	0.000	0.000	0.000	0.000
3062/Submarine Multi Mission Team Trainer	16.207	6.000	3.746	2.665	2.723	2.779	2.861
9231/Shipmates for VIRGINIA Class	1.618	0.000	0.000	0.000	0.000	0.000	0.000
9232/COTS Combat Control Framework	1.141	0.000	0.000	0.000	0.000	0.000	0.000
9386/SSN Development - SBIR Phase III Research	0.000	4.945	0.000	0.000	0.000	0.000	0.000
9387/VIRGINIA Class SSN Development	0.000	10.000	0.000	0.000	0.000	0.000	0.000
Quantity of RDT&E Articles							
Defense Emergency Response Funds (DERF): NOT APPLICABLE							
<p>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.</p> <p>(U) Project 2887: The Congressional plus-up is for MPP SBIR follow-on for Technology Insertion and refresh for VIRGINIA SSN Combat System.</p> <p>(U) Project 3062: The Submarine Multi-Mission Team Trainer (SMMTT) program replaces the proprietary mainframe computer system by re-hosting functions on industry standard Local Area Network (LAN) workstations. The mainframes can no longer be upgraded due to service life. The SMMTT modification applies to both the Combat Control System (CCS) trainers and the Acoustic trainers and will occur in three distinct phases. SMMTT Phase 1 and Phase 2 were funded in OPN BLI 5661 to complete the trainer-unique software offload and enables further enhancements. SMMTT Phase 3, funded in this RDT&E line will provide the architectural foundation to replace all MIL Standard hardware with commercial emulation hardware, and rehost existing proprietary based software into COTS software systems, therefore enabling platform independence and wide area network capability. The use of open architecture trainer systems allows for the continuous growth of functional flexibility, ultimately leading to employment training conducted for any submarine combat system.</p> <p>(U) Project 9231: The Congressional plus-up is for Shipmates for the VIRGINIA Class. Develop a Non-Tactical Data Application Processing System application for the shipboard LAN.</p> <p>(U) Project 9232: The Congressional plus-up is for COTS Combat Control Framework to develop a software architecture that supports migration of the Global Command and Control System-Maritime (GCCS-M) segments into the planned IT-21 server.</p> <p>(U) Project 9386: Thew Congressional plus-up is for VIRGINIA Class SSN Development SBIR Phase III Reserach to establish and extend a Technology Insertion program.</p> <p>(U) Project 9387: The Congressional plus-up is for VIRGINIA Class SSN Development of Navigation Upgrades and critical HM&E technology development.</p>							

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EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5			PROJECT NUMBER AND NAME 1947/VIRGINIA Class HM&E DEVELOPMENT				
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost	122.189	74.242	99.719	110.095	98.863	105.699	87.892
RDT&E Articles Qty							

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

A (U) Mission Description and Budget Item Justification: (U) This project encompasses all the ship system development efforts for the VIRGINIA Class Submarine and the Technology Insertion Program for reducing cost and upgrading performance of future hulls by virtue of improvements in ship and combat systems. Technology developments, training, and logistics for developmental items, and VIRGINIA Class test & evaluation are included. 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 improvement and/or affordability payoffs. Transition opportunities include those from the Defense Advanced Research Projects Agency (DARPA) Sensors & Payloads program.

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Exhibit R-2a, RDTEN Project Justification
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development	PROJECT NUMBER AND NAME 1947/VIRGINIA Class HM&E DEVELOPMENT
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B. Accomplishments/Planned Program

	FY 03	FY04	FY 05	FY 06
Accomplishments/Effort/Subtotal Cost	87.037	21.541	32.668	
RDT&E Articles Quantity				

HM&E DEVELOPMENT

FY03 Accomplishments: Continued 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. Initiated shock qualification of weapons handling module and other major components and completed shock qualification of air flasks. 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. Completed the design of concept to reduce propulsor change out time and improve acoustic performance. Completed Baseline Ship Control System and initiated Ship Control System Block Upgrades. Completed limited evaluation of common VIRGINIA/SEAWOLF Acoustic Lessons Learned. Technology Insertions include (1) initiating the development of Non-Tactical Data Processing Improvements (NTDPS) (SUBLAN), APB (A) 03, (2) continuing APB (T) 01-02, and (3) completion of APB (A) 01-02.

FY04 Plan: Continue design, manufacturing, and qualification testing of prototype technologies and components such as: ship service turbine generator (SSTG), weapons stowage and handling systems; electromagnetic signature reduction; and ship control system block upgrades. Continue shock qualification of weapons handling module and other major components. Continue system verification studies, tests, and analyses in support of ship design including signature, hydrodynamics, materials, and survivability analyses and tests. Complete development of Diesel Generator. 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.

FY05 Plan: Continue design, manufacturing, and qualification testing of prototype technologies and components such as: weapons stowage and handling systems and ship service turbine generator (SSTG). Complete shock qualification of weapons handling module and continue shock qualification of other major 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.
Initiation of development of the Conformal Acoustic Velocity Sensor (CAVES) large Wide Aperture Array (LWAA).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development	PROJECT NUMBER AND NAME 1947/VIRGINIA Class HM&E DEVELOPMENT
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B. Accomplishments/Planned Program (continued)

	FY 03	FY04	FY 05	FY 06
Accomplishments/Effort/Subtotal Cost	9.862	6.113	7.754	
RDT&E Articles Quantity				

ADMINISTRATIVE/ENVIRONMENTAL

Continue analyses and evaluations relating to force effectiveness assessment and component performance tradeoffs. Maintain cost based approach to VIRGINIA Class submarine construction through use of IPPD's concurrent engineering processes. 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.

	FY 03	FY04	FY 05	FY 06
Accomplishments/Effort/Subtotal Cost	4.603	3.419	1.938	
RDT&E Articles Quantity				

LOGISTIC SUPPORT

FY03 Continued VIRGINIA Class trainers/training development to support VIRGINIA Class. Through FY04, these efforts include the On-board Team Trainer Master Controller (OBTT MC), VIRGINIA Ship Control Operator Trainer (VSCOT), VIRGINIA Ship Control Maintenance Trainer (VSCMT), Weapons Launch Console (WLC) Trainer upgrade and the Emergency Diesel Generator Trainer. FY05 will continue development efforts in progress.

Exhibit R-2a, RDTE Project Justification

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B. Accomplishments/Planned Program (Cont.)

	FY 03	FY04	FY 05	FY 06
Accomplishments/Effort/Subtotal Cost	20.687	43.169	57.359	
RDT&E Articles Quantity				

TEST AND EVALUATION

FY03 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. Conducted shipbuilder trials, and dockside testing. Prepared test plans, schedules and support associated with developmental testing, conduct Operational Testing - Phase IIB, Shock, Acoustic and Launchers Trials Testing, Weapons System Accuracy Trials 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-IIF.

FY04 Conduct shipbuilder at-sea trials, and dockside testing. Plan and coordinate second shipbuilder Test and Evaluation efforts. Prepare test plans, schedules and support associated with developmental testing, conduct Operational Testing - Phase IIC, Shock, Acoustic and Launchers Trials Testing, Weapons System Accuracy Trials. Conduct Hydrodynamic Performance Testing, Weapon System Accuracy Test (WSAT) and Launcher Trials. Conduct engineering evaluation of test results. LFT&E modeling and analysis. Continue the development of the Test and Evaluation Master Plan (TEMP), Vulnerability Analysis Report (VAR) and Total Ship Survivability Trial (TSST). Continue development of the total ship test plan in support of DT/OT-IIA-IIF.

FY05 Planning for Full Ship Shock Test on SSN775 to be conducted in FY06. Conduct Acoustic Trials, Lockout Trunk Testing and C3I Testing. Continue planning for TECHEVAL and OPEVAL.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development	PROJECT NUMBER AND NAME 1947/VIRGINIA Class HM&E DEVELOPMENT
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C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY 04 Pres Controls)	125.915	75.842	87.118
Current BES/President's Budget: (FY05/06 PRES Controls)	122.189	74.242	99.719
Total Adjustments	-3.726	-1.600	12.601

Summary of Adjustments

Miscellaneous adjustments			13.621
NWCF Rate Adjustments			-1.679
Miscellaneous adjustments	-1.711	-1.600	
Cancel Accounts	-0.322		
SBIR Assessment	-1.693		
Subtotal	-3.726	-1.600	11.942

Schedule:

"Not Applicable"

Technical:

"Not Applicable."

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APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-5	0604558N/VIRGINIA Class Design Development	1947/VIRGINIA Class HM&E DEVELOPMENT

D. OTHER PROGRAM FUNDING SUMMARY:

<u>Line Item No. & Name</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>To Complete</u>	<u>Total Cost</u>
SCN Line 201300 PE: 0203281N	2479.2	2427.4	2670.1	2453	2339.8	2710.3	3053.3	5388.5	43353.9	74776.7
SCN Line 201310 PE: 0203281N	0	0	0	0	0	0	0	0	0	589.2
O&M/N BA-2 1B2B PE: 0204283N	0	0	15.7	18.6	24.7	40.2	57.4	57.8	cont.	cont.
OPN BA-8 Line Item 094200	0	0	0	56.1	189.1	187.3	192.7	218.7	cont.	cont.

(U) Related RDT&E

(U) PE 0603561N (Advanced Submarine System Development)

(U) PE 0603570N (Advanced Nuclear Power Systems)

(U) PE 0602121N (Surface Ship Technology)

E. ACQUISITION STRATEGY:

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing, with Design expected to complete this year, and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing Electric Boat (EB) and Northrop Grumman Newport News (NGNN) to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, EB remained the design yard for the VIRGINIA Class Submarine and NGNN became a part of the IPPD process. The Program Office is expected to continue the EB/NGNN teaming arrangement and is considering a block buy for FY03 and is also considering other alternate strategies. Future focus will be to complete ship design, continuance of Logistics product development, Technology Insertion and testing for the VIRGINIA Class submarines.

F. MAJOR PERFORMERS:

1. Electric Boat Corporation, Groton CT - Virginia Class Lead Shipbuilder - Contract Award Date 28 Sept. 1998.
2. Naval Surface Warfare Center, Carderock Division, Bethesda, MD - Research, Development, Test & Evaluation Laboratory
3. Naval Undersea Warfare Center, Newport, RI - Research, Development, Test & Evaluation Laboratory

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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2004		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT				PROJECT NUMBER AND NAME					
RDT&E, N / BA-5			0604558N/VIRGINIA Class Design Development				1947/VIRGINIA Class HM&E DEVELOPMENT					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Component Development	Contract	EB-2112 Groton, CT	445.686	25.271	11/02	4.100	11/03	8.256	11/04	42.368	525.681	
Component Development	SS/CPFF	EB-4030 Groton, CT	234.056	1.420	11/02	2.400	11/03	1.600	11/04	1.600	241.076	
Component Development	SS/CPFF	LM-6226	10.202	7.813	11/02	0.000	11/03	0.000	11/04	0.000	18.015	
Component Development	WR	NSWC Carderock MD	396.015	43.128	11/02	13.246	11/03	18.820	11/04	78.061	549.270	
Component Development	WR	NSWC Crane, IA	4.029	0.000	11/02	0.000	11/03	0.000	11/04	0.000	4.029	
Component Development	WR	NUWC Newport, RI	74.710	4.611	11/02	1.734	11/03	3.690	11/04	21.479	106.224	
Component Development	WR	NFPC Phila, PA	3.523	2.273	11/02	0.110	11/03	0.000	11/04	0.000	5.906	
Component Development	Various	Misc	197.287	8.812	Various	2.452	Various	4.019	Various	59.098	271.668	
Technology Insertion	Various	Misc	18.192	0.460	Various	0.000	Various	0.000	Various	385.560	404.212	
											0.000	
Subtotal Product Development			1,383.700	93.788		24.042		36.385		588.166	2,126.081	
Remarks:												
Development Support											0.000	
Software Development											0.000	
Integrated Logistics Support	WR	NSWC Carderock MD	0.150	0.717	11/02	0.000	11/03	0.000	11/04	0.000	0.867	
Integrated Logistics Support	WR	NAWC Orlando, FL	22.212	3.499	11/02	2.773	11/03	1.420	11/04	0.000	29.904	
Integrated Logistics Support	WR	NUWC Newport, RI	2.269	0.245	11/02	1.446	11/03	1.657	11/04	0.769	6.386	
Technical Data											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Support			24.631	4.461		4.219		3.077		0.769	37.157	
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)										DATE: February 2004		
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RDT&E, N / BA-5			0604558N/VIRGINIA Class Design Development			1947/VIRGINIA Class HM&E DEVELOPMENT						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Evaluation	Contract	EB-2112 Groton, CT	2.059	1.892	11/02	1.223	11/03	12.725	11/04	33.111	51.010	
Test & Evaluation	WR	NSWC Carderock MD	14.099	10.395	11/02	20.196	11/03	21.867	11/04	63.080	129.637	
Test & Evaluation	WR	NUWC Newport, RI	11.138	5.159	11/02	8.129	11/03	8.272	11/04	38.463	71.161	
Test & Evaluation	C/CPAF	EG&G C6411 Rockville, MD	6.461	1.008	11/02	0.885	11/03	0.965	11/04	11.152	20.471	
Test & Evaluation	Various	Miscellaneous	10.056	2.233	11/02	12.736	11/03	13.530	11/04	62.330	100.885	
Test & Evaluation											0.000	
Test & Evaluation											0.000	
Subtotal T&E			43.813	20.687		43.169		57.359		208.136	373.164	
Remarks:												
Contractor Engineering Support	C/CPAF	SEAPORT D7019 Rockville MD	5.261	3.253	11/02	2.812	11/03	2.898	11/04	34.210	49.732	
Program Management Support	C/CPAF	EG&G C6411 Rockville, MD	21.537								21.537	
Program Management Support	Various	Miscellaneous	19.232								19.232	
Travel											0.000	
Award Fees		EG&G C6411 Rockville, MD	1.032								1.032	
SBIR Assessment											0.000	
Subtotal Management			47.062	3.253		2.812		2.898		34.210	91.533	
Remarks:												
Total Cost			1,499.206	122.189		74.242		99.719		831.281	2,626.637	
Remarks:												

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Exhibit R-3, Project Cost Analysis
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EXHIBIT R4, Schedule Profile																								DATE: February 2004												
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5												PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development								PROJECT NUMBER AND NAME 1947/VIRGINIA Class HM&E DEVELOPMENT																
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Acquisition Milestones				▲ Program Review																△ IOC																
Test & Evaluation Milestones								DT-IIB				DT-IIC												DT-IIIE				DT-IIF								
Development Test																	TSST																			
Operational Test																																				
				OT-IIB				OT-IIC																					OPEVAL OT-IID							
Construction Milestones																																				
Ship Authorizations		▲ SSN 777				▲ SSN 778				△ SSN 779		△ SSN 780				△ SSN 781				△ SSN 782				△ SSN 783				△ SSN 784								
Ship Deliveries											△ SSN 774				△ SSN 775						△ SSN 776				△ SSN 777											
Post Shakedown Availability															PSA SSN 774		PSA SSN 775		PSA SSN 776		PSA SSN 777															

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COST (\$ in Millions)		FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost		88.676	38.573	39.805	40.725	38.459	35.555	26.262
RDT&E Articles Qty								

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

A. (U) Mission Description and Budget Item Justification: (U) This project encompasses the top level systems development, test and 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 include requirements definition, software, hardware development, software/hardware test, prototype production, and electronic integration as well as physical integration into the platform.

(U) The 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.

(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.

(U) The FY04/05 budget submit expanded the original definition of the F1950 project mission to include an ongoing post VIRGINIA Class TECH/OPEVAL RDT&E effort to continue the development of VIRGINIA Unique Combat System Improvements. The VIRGINIA Class C3I will continue to leverage backfit communities efforts, but even with "common" systems that the Navy has developed there will continue to be VIRGINIA Unique capability improvements required. The FY08 and out funding identified is for those efforts.

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B. Accomplishments/Planned Program --- C3I Systems Engineering

	FY 03	FY 04	FY 05	FY 06
Accomplishments/Effort/Subtotal Cost	51.747	23.965	25.250	
RDT&E Articles Quantity				

1. (U) FY 2003 ACCOMPLISHMENTS:

- (U) (\$51.747M) Continued the development of high priority ship safety/self-protect deficiencies identified during integration efforts and formal DT/OT. Completed development of high priority technology refreshment changes to C3I System/subsystems.

2. (U) FY 2004 PLAN:

- (U) (\$23.965M) Continue development of high priority ship safety/self-protect deficiencies identified during integration and lead ship sea test efforts. Continue the information assurance implementation of NPES systems/subsystems. Develop a Network Centric Architecture for Non-Tactical Data Processing System as well as additional GCCS-M capabilities for the Sonar Subsystem

3. (U) FY 2005 PLAN:

- (U) (\$25.250M) Continue development of high priority ship safety/self-protect deficiencies identified during integration and lead ship sea test efforts. Begin the detailed planning for C3I System/subsystems testing as part of VIRGINIA Class TECH/OPEVAL. Continue the information assurance implementation for NPES system/subsystems.

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development	PROJECT NUMBER AND NAME 1950/VIRGINIA Class Combat System Development

B. Accomplishments/Planned Program (Cont.) --- Sonar Combat Control and Architecture Subsystems

	FY 03	FY 04	FY 05	FY 06
Accomplishments/Effort/Subtotal Cost	36.929	14.608	14.555	
RDT&E Articles Quantity				

1. (U) FY 2003 ACCOMPLISHMENTS:

- (U) (\$36.929M) Continued development of S/CC/A subsystem changes identified during integration efforts. Completed development of high priority technology refreshment changes to S/CC/A subsystems. Continued integration of Tactical Tomahawk capability into S/CC/A.

2. (U) FY 2004 PLAN:

- (U) (\$14.608M) Continue development of high priority S/CC/A ship safety/self-protect deficiencies identified during integration and lead ship sea test efforts. Complete integration of Tactical Tomahawk capability into S/CC/A.

3. (U) FY 2005 PLAN:

- (U) (\$14.555M) Continue development of high priority S/CC/A ship safety/self-protect deficiencies identified during integration and lead ship sea test efforts. Begin the detailed planning for S/CC/A subsystems testing as part of VIRGINIA Class TECH/OPEVAL.

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EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2004
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development	PROJECT NUMBER AND NAME 1950/VIRGINIA Class Combat System Development
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C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY 04 Pres Controls)	90.852	30.445	27.362
Current BES/President's Budget: (FY05 Pres Controls)	88.676	38.573	39.805
Total Adjustments	-2.176	8.128	12.443

Summary of Adjustments

Miscellaneous adjustments			13.000
FY02 Inflation Savings			
FY03 SBIR and Manpower Adjustments	-2.167		-0.363
NWCF Rate Adjustment			-0.038
FY04 Virginia Class Adjustment		-3.300	
FY03 Inflation and Various	-0.009	-0.472	-0.156
Submarine Combat Control System Architecture		2.100	
Virginia Class - Network Centric Architecture		4.000	
Virginia Class - Information Assurance		5.800	
Subtotal	-2.176	8.128	12.443

Schedule:

"Not Applicable"

Technical:

"Not Applicable"

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2004
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development	PROJECT NUMBER AND NAME 1950/VIRGINIA Class Combat System Development
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D. OTHER PROGRAM FUNDING SUMMARY:

<u>Line Item No. & Name</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>To Complete</u>	<u>Total Cost</u>
SCN Line 201300 PE: 0203281N	2479.2	2427.4	2670.1	2453	2339.8	2710.3	3053.3	5388.5	43353.9	74776.7
SCN Line 201310 PE: 0203281N	0	0	0	0	0	0	0	0	0	589.2
O&M/N BA-2 1B2B PE: 0204283N	0	0	15.66	18.636	24.663	40.236	57.371	57.8	cont.	cont.
OPN BA-1 Line Item 094200	0	0	0	56.1	189.1	187.3	192.7	218.7	cont.	cont.

- (U) Related RDT&E
- (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)

E. ACQUISITION STRATEGY:

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing, with Design expected to complete this year, and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing Electric Boat (EB) and Northrop Grumman Newport News (NGNN) to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, EB remained the design yard for the VIRGINIA Class Submarine and NGNN became a part of the IPPD process. The Program Office is expected to continue the EB/NGNN teaming arrangement and is considering a block buy for FY03 and is also considering other alternate strategies. Future focus will be to complete ship design, continuance of Logistics product development, Technology Insertion and testing for the VIRGINIA Class submarines. Technology insertion has been virtually eliminated between FY04 and FY09 due to budget cuts in the RDT&E,N and SCN appropriations.

F. MAJOR PERFORMERS:

- Lockheed Martin, Manassas, Virginia. C3I Prime Contractor, Development and Limited Production of the S/CC/A Subsystems, Contract Award Date 24 April 1996.
- Naval Undersea Warfare Center, Newport, Rhode, Island, Technical Direction Agent for all Virginia Class Electronics.

CLASSIFICATION:

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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2004		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT				PROJECT NUMBER AND NAME					
RDT&E, N / BA-5			0604558N/VIRGINIA Class Design Development				1950/VIRGINIA Class Combat System Development					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
C3I Prime Contract E&MD Total	C/CPAF	Lockheed Manassas, VA	233.173	18.822	Various	4.069	Various	3.204	Various	0.248	259.516	259.516
C3I Prime Contract E&MD Award Fee	C/CPAF	Lockheed Manassas, VA	6.899	0.944	Various	0.500	Various	0.500	Various	0.000	8.843	8.843
C3I Prime Contract Post Delivery	C/FFP	Lockheed Manassas, VA	16.500	3.135	Various	2.509	Various	2.509	Various	3.877	28.530	28.530
Unique Virginia Class Improvements	TBD	Various/TBD	0.000							95.806	95.806	95.806
Advanced Display Sys (AN/UYQ-70)	SS/CPFF		0.000								0.000	
	CPIF	Lockheed St. Paul, MN	24.191	2.730	11/02	1.432	11/03	0.906	11/04	9.688	38.947	38.947
Multi-Purpose Processor	SS/CPIF	Digital Sys Fairfax, VA	41.449								41.449	41.449
Multi-Purpose Processor	SS/CPIF	Lockheed Manassas, VA	1.755								1.755	1.755
Photonics	C/CPIF	Kollmorgen Northhampton, M	24.656	5.106	11/02	1.000	11/03	1.590	11/04	11.533	43.885	43.885
Non-Penetrating Periscope	C/CPIF	Kollmorgen Northhampton, M	4.060								4.060	4.060
Electronic Support Measures	C/FFP	Lockheed Syracuse, NY	37.858	0.209	11/02					6.410	44.477	44.477
Platform Integration	SS/CPFF	EB Corp Groton, CT	27.382	0.358	11/02	0.790	11/03	1.500	11/04	17.723	47.753	47.753
Platform Integration	SS/CPFF	NNews Shipbuilding NNews,	3.065								3.065	3.065
Integrated Electronic Mast	SS/CPIF	Goleta Portsmouth, RI	8.897								8.897	8.897
Tactical Simulator	SS/CPFF	Goleta Portsmouth, RI	2.750								2.750	2.750
High Frequency Sail Array	SS/CPFF	Applied Research Austin, TX	3.273								3.273	3.273
Navigation/Radar	SS/CPFF	Sperry Corp Charlottesville, VA	6.153								6.153	6.153
Technology Refreshment	Various	Various/TBD	9.757	1.008	Various	0.545	Various	0.769	Various	9.590	21.669	
Open System Module	SS/CPFF	UNISYS Corp St. Paul, MN	2.500								2.500	2.500
Technical Direction Agent	N/A	NUWC Newport, RI	188.083	17.609	Various	6.559	Various	8.500	Various	66.832	287.583	
Technology Refreshment/Info. Assur	C/CPFF	Progeny Systems, Manassas	9.828	2.992	11/02	5.527	11/03	1.164	11/04	0.896	20.407	
Systems Engineering	N/A	NSWC Cardock, MD	3.995	0.465	11/02						4.460	
Systems Engineering	N/A	NSWC Crane, IN	3.439	0.283	11/02						3.722	
Systems Engineering	N/A	SSC Charleston, SC	2.333								2.333	
Systems Engineering	N/A	SSC San Diego, CA	1.635	0.910	11/02						2.545	
Systems Engineering	N/A	NUWC Keyport, WA	4.876	2.982	11/02	1.350	11/03	1.450	11/04	4.600	15.258	
Miscellaneous	Various	Various	41.364	28.329	Various	11.510	Various	12.129	Various	101.406	194.738	
Subtotal Product Development			709.871	85.882		35.791		34.221		328.609	1,194.374	
Remarks:												
Development Support											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Support			0.000	0.000		0.000				0.000	0.000	
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)								DATE: February 2004				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N / BA-5			0604558N/VIRGINIA Class Design Development			1950/VIRGINIA Class Combat System Development						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												0.000
Operational Test & Evaluation												0.000
Test & Evaluation	Various	Various						2.805	Various	15.691	18.496	
Test Assets												0.000
Tooling												0.000
GFE												0.000
Award Fees												0.000
Subtotal T&E			0.000	0.000		0.000		2.805		15.691	18.496	
Remarks:												
Contractor Engineering Support			0.000									0.000
Contractor Support Services/ETS	C/CPAF	EG&G Rockville, MD	3.040	2.794	Various	2.782	Various	2.779	Various	24.813	36.208	
Contractor Support Services/ETS	C/CPAF	EG&G Rockville, MD	14.406								14.406	
CSS/ETS Award Fee	C/CPFF	EG&G Rockville, MD	1.195								1.195	
Contractor Support Services/ETS	C/CPFF	EG&G Rockville, MD	8.857								8.857	
Contractor Support Services/ETS	C/CPFF	SWL Inc. Vienna, VA	5.705								5.705	
Contractor Support Services/ETS	C/CPFF	American Sys Chantilly, VA	2.099								2.099	
Miscellaneous	Various	Various	4.676								4.676	
Program Management Support			0.000									0.000
Travel			0.000									0.000
Subtotal Management			39.978	2.794		2.782		2.779		24.813	73.146	
Remarks:												
Total Cost			749.849	88.676		38.573		39.805		369.113	1,286.016	
Remarks:												

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CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE: February 2004								
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5								PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development								PROJECT NUMBER AND NAME F1950/VIRGINIA Class Combat System Development																
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones				▲ Program Review																△ IOC								△ MS III				
Test & Evaluation Milestones							DT-IIB					DT-IIC												DT-IIIE				DT-IIF				
Development Test																				TSST												
Operational Test																																
				OT-IIB				OT-IIC																				OPEVAL OT-IID				
Construction Milestones																																
Ship Authorizations		▲ SSN 777				▲ SSN 778				△ SSN 779		△ SSN 780			△ SSN 781				△ SSN 782				△ SSN 783				△ SSN 784					
Ship Deliveries										△ SSN 774				△ SSN 775					△ SSN 776				△ SSN 777									
Post Shakedown Availability																																

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EXHIBIT R-2a, RDT&E Project Justification							DATE: FEBRUARY 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-5		PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development			PROJECT NUMBER AND NAME 3062/Submarine Multi-Mission Team Trainer			
COST (\$ in Millions)		FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost		16.207	6.000	3.746	2.665	2.723	2.779	2.861
RDT&E Articles Qty								

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

To achieve desired submarine force readiness levels, it is necessary to construct highly sophisticated shorebased Combat System Team Trainers capable of training personnel in all aspects of submarine approach, attack and surveillance operations in a controlled, simulated environment.

The Combat Control System (CCS) MK 1 and CCS MK 2 are installed on SSN and SSBN (TRIDENT) Class submarines, and there are currently plans to further upgrade these systems with the next H/W and S/W revisions which provide enhanced warfighter capabilities. The Tactical Acoustic Rapid COTS (commercial-off-the-shelf) Insertion (ARCI) Phased upgrades are also being installed with the next revision which provides enhanced warfighter capabilities. These CCS and ARCI upgrades directly impact shore based Team Trainers. In addition, the Advanced Processing Builds (APB), which feed technology insertion into the CCS/Acoustic development, also impact the trainers.

The Submarine Multi-Mission Team Trainer (SMMTT) supports operator, employment, strike, and Battle Group training for enlisted and officer pipelines. The SMMTT provides individual operators and combat teams the opportunity to train ashore, prior to, and between deployments. The shore based training provides a means of maintaining team proficiency in stand alone or in combined team mode prior to ship deployment.

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EXHIBIT R-2a, RDT&E Project Justification	DATE: FEBRUARY 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E, N /BA-5	PROJECT NUMBER AND NAME 3062/Submarine Multi-Mission Team Trainer

B. Accomplishments/Planned Program

	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	16.207	6.000	3.746
RDT&E Articles Quantity			

FY03 Develop/integrate new software capabilities and system interfaces. Initiate development of display software.
 FY04 Incorporate visualization/simulation (VIS/SIM) technology into appropriate displays. Develop Weapons Console emulations.
 FY05 Combine components and tailor interfaces to create immersive environment. Incorporate latest Advanced Processor Build (APB).

	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.000	0.000	0.000
RDT&E Articles Quantity			

	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.000	0.000	0.000
RDT&E Articles Quantity			

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EXHIBIT R-2a, RDT&E Project Justification	DATE: FEBRUARY 2004
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N /BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Developme	PROJECT NUMBER AND NAME 3062/Submarine Multi-Mission TeamTrainer
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C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY 04 Pres Controls)	16.239	6.068	3.823
Current President's Budget: (FY04/05 Pres Bud Controls)	16.207	6.000	3.746
Total Adjustments	-0.032	-0.068	-0.077

Summary of Adjustments

Cancel Account	-0.032		
Miscellaneous reductions		-0.068	-0.077
Subtotal	-0.032	-0.068	-0.077

Schedule:

"Not Applicable."

Technical:

"Not Applicable."

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EXHIBIT R-2a, RDT&E Project Justification	DATE: FEBRUARY 2004
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N /BA-5	PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development	PROJECT NUMBER AND NAME 3062/Submarine Multi-Mission Team Trainer
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D. OTHER PROGRAM FUNDING SUMMARY:

<u>Line Item No. & Name</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>To Complete</u>	<u>Total Cost</u>
566100, Submarine Training Device Modification	0	0	10.1	30.1	25.7	14.1	12.7	12.8	0	105.5

E. ACQUISITION STRATEGY:

The SMMTT program phase 3 software development is accounted for in this RDT&E line. All production kits and software procured in OPN BLI 566100 PE 0804731N.

F. MAJOR PERFORMERS:

NSWCCD

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Exhibit R-3 Cost Analysis (page 1)								DATE: FEBRUARY 2004				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDT&E, N /BA-5			0604558N/VIRGINIA Class Design Development			3062/Submarine Multi-Mission Team Trainer						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
											0.000	
											0.000	
Component Development	WX	NSWCCD, Bethesda, MD	0.000	15.749	various	5.332	various	3.046	various	8.230	32.357	N/A
Component Development	FR	UT ARL	0.000	0.458	02/03	0.668	est Feb04	0.700	various	2.800	4.626	4.626
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Product Development			0.000	16.207		6.000		3.746		11.030	36.983	
Remarks:												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

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CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: FEBRUARY 2004		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME						
RDTE, N /BA-5			0604558N/VIRGINIA Class Design Development			3062/Submarine Multi-Mission Team Trainer						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			0.000	16.207		6.000		3.746		11.030	36.983	
Remarks:												

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EXHIBIT R4, Schedule Profile																									DATE: FEBRUARY 2004							
APPROPRIATION/BUDGET ACTIVITY RDT&E, N /BA-5										PROGRAM ELEMENT NUMBER AND NAME 0604558N/VIRGINIA Class Design Development										PROJECT NUMBER AND NAME 3062/Submarine Multi-Mission Team Trainer												
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Simulation Plan Development					▲	—	—	▲																								
Prime Item Development Specification (PIDS)					▲	▲																										
System Requirements Specification (SRS)						▲	—	▲																								
Interface Requirements Specification (IRS)						▲	—	▲																								
Interface Design Development						▲	—	—			△																					
Software Development							▲	—			—	—			△																	
Software Testing											△	—			—	—				△												
EDM Delivery												△																				
APB Upgrades									▲	—	—	—			△	—				△			△	—			△	—			△	—

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