CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **Feb 2004**	
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**				R-1 ITEM NOMENCLATURE **PE 0101221N Strategic Sub & Wpns Sys Spt**				
COST ($ in Millions)		FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost		**38.1**	**65.5**	**108.8**	**111.0**	**110.4**	**113.8**	**114.7**
0004 TRIDENT Submarine System Improvement		5.2	4.0	2.6	3.5	3.3	3.4	3.5
2228 Technology Applications Program		32.9	61.5	106.2	107.5	107.1	110.4	111.2

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon system with greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This Program Element supports investigations into new technologies which would help mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base. These efforts include Reentry System Applications and Guidance System Applications, Radiation Hardened Electronics Applications, and Strategic Propulsion Applications. The TRIDENT Submarine System Improvement Program develops and integrates command and control Improvements needed to maintain TRIDENT Submarine operational capability through the life cycle of this vital strategic asset. The program conducts efforts needed to maintain strategic connectivity, ensure platform invulnerability, and reduce lifecycle costs through Obsolete Equipment Replacement (OER) and commonality.

The TRIDENT operational systems development program results in improvements to the baseline TRIDENT Combat System. Current TRIDENT Combat Systems were first developed in the early 1970s and are becoming increasingly difficult to maintain and offer comparitively less performance than more recently designed systems. Previous efforts to upgrade portions of the TRIDENT Combat System include improvements via sonar and combat control hardware and software (e.g., QE2 programs), feasibility of increased countermeasure capability and a concept evaluation of an Submarine Fleet Mission Program Library (SFMPL) interface. Due to the sensitivity of TRIDENT programs it is assessed that international technology will not have a major impact or be a recipient of the benefits derived from this effort. Development strategies will significantly enhance the sustainability and operability of the sonar, communications and Combat Control Systems on TRIDENTs by evaluating both Obsolete Equipment Replacement (OER) possibilities and potential improvements.

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: **Feb 2004**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	R-1 ITEM NOMENCLATURE **PE 0101221N Strategic Sub & Wpns Sys Spt**

B. (U) Program Change Summary:

	FY 2003	FY 2004	FY2005
FY 2004 President's Budget:	39.2	104.8	139.6
FY 2005 President's Budget	38.1	65.5	108.8
Total Adjustments:	-1.1	-39.3	-30.8
Summary of Adjustments:			
SBIR transfer	-0.6		
Congressional Plus up		1.0	
Closed Account Billings	-0.5		
Congressional Reductions		-39.6	
Delete Effectiveness Enhancement (E2) Demonstration			-30.3
Inflation, NCWF Rates, Efficiency reductions		-0.7	-0.5

C. (U) Other Program Funding Summary: See enclosed R-2a for each individual project data.

D. (U) Acquisition Strategy: See enclosed R-2a for each individual project data.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **Feb 2004**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	PROJECT NUMBER AND NAME **Technology Applications 2228**	

COST ($ in Millions)		FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost 2228 Technology Applications		**32.9**	**61.5**	**106.2**	**107.5**	**107.1**	**110.4**	**111.2**
RDT&E Articles Qty								

A. (U) MISSION DESCRIPTION AND BUDGET PROJECT JUSTIFICATION:

This project supports implementation of a coordinated Navy/Air Force Reentry System Applications Program (RSAP), a coordinated Navy/Air Force Strategic Guidance Applications Program (GAP), a coordinated Navy/Air Force Strategic Propulsion Applications Program (SPAP), and a coordinated Department of Defense Radiation Hardened Applications Program (RHAP). Reentry vehicle and guidance technology had been rapidly eroding beyond the point of being capable to respond to increasing aging phenomena and future requirements. Beginning in FY 2004, SPAP demonstrates and validates technologies unique to strategic missile applications. Also beginning in FY 2004, the RHAP program addresses production, qualification and manufacturing issues associated with strategic and space radiation hardened electronics. The December 2001 DOD Nuclear Posture Review determined that infrastructure is a critical part of the new triad and these efforts form part of the infrastructure that supports the nuclear force structure.

• The RSAP program, through sustainment of the reentry vehicle technology base, will maintain confidence in the dependability and reliability of strategic SLBM and ICBM weapon systems over the long term when no new systems will be in development. Critical and unique attributes necessary for the design, development and in-service support of current and modernized SLBM reentry systems have been defined and will be maintained to insure a functioning readiness application technical capability in reentry is preserved. Working closely with the Air Force, Navy and Air Force requirements have been integrated into a comprehensive program. The program maintains close coordination with the DOD Science and Technology (S&T) community in order to: leverage S&T programs, ensure system driven technology base requirements are considered in contract awards, eliminate duplication of effort and provide an opportunity to demonstrate appropriate emerging technologies through a reentry flight test evaluation process.

• The GAP program provides a minimum strategic guidance core technology development capability consistent with the Strategic Advisory Group (SAG) recommendations to COMSTRATCOM. The SAG recommended that SSP establish a program which preserves this critical design and development core. It is a basic bridge program which develops critical guidance technology applicable to any of the existing Air Force/Navy strategic missiles. The objective is to transition from current capability to a long term readiness status required to support deployed systems. Air Force and Navy guidance technology requirements are integrated and needs prioritized. Efforts are focused on alternatives to technologies identified as system "weak links." Current system accuracy and functionality depends upon key technologies which provide radiation hardened velocity, attitude and stellar sensing capabilities. As the underlying technologies that currently provide these capabilities age and are no longer technically supportable, modern alternatives must be made available in order to allow for orderly replacement. There is no commercial market for these technologies and their viability depends on the strategic community.

• The SPAP program, commencing in FY 2004, is a coordinated Navy/Air Force effort and addresses infrastructure needs by exercising critical developmental skills to allow for future large-scale rocket motor test firings. A sound base of demonstrated technologies suitable for Strategic Missile applications will be maintained and will provide the nation a talent base and source of technologies suitable for a follow-on development program. Boost propulsion (missile stages), post boost propulsion (missile payload delivery vehicle) and Ordnance (separation events and flight termination events) are all integral parts of missile propulsion application efforts.

• The RHAP program, commencing in FY 2004, sustains critical skills in radiation hardened electronics by advancing radiation hardened simulation technologies to reflect the processes in future systems. These efforts become of greater importance because of the shrinking industrial base for radiation hardened electronics, the unavailability of underground testing resources, and the loss of radiation hardened expertise. These efforts are coordinated by the Radiation Hardened Oversight Council (RHOC) chaired by the Director, Defense Research & Engineering (DDR&E). The RHAP program focuses on a coordinated Productization & Qualification Program which provides a transition between Science and Technology (S&T) and production by efficient utilization of limited resources, sharing of information to eliminate redundancy, increased use of common part/technologies, coordination into the RHOC technology road map and implementation of the USD (AT&L) investment strategy. The RHAP will compliment the GAP electronic part activities by specifically focusing on those tasks required to ensure producability of radiation hardened parts. □

EXHIBIT R-2a, RDT&E Project Justification	DATE: Feb 2004
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	PROJECT NUMBER AND NAME **Technology Applications 2228**

B. (U) Accomplishments/Planned Program

		FY 03	FY 04	FY 05
Reentry Systems Application Program (RSAP)		19.0	22.3	26.1
RDT&E Articles Quantity				

(U) FY 2003 PLAN
- (U) ($19.0) Continue Reentry System Applications Program. Full obligation is complete.
  FY 2003 efforts included:
  - (U) Continued development and ground testing of reentry vehicle candidate heatshield, nosetip and aft closure materials including those available from Science & Technology (S&T).
  - (U) Identified and evaluate next generation low-cost heatshield material candidates.
  - (U) Conducted an updated ground and flight test program to assess performance of reentry components exposed to operational environments beyond their design life; evaluate risk mitigation concepts for known aging mechanisms.
  - (U) Downselected low-cost design approach and components for Arming and Fuzing applications.
  - (U) Downselected a low-cost inertial sensor technology for Reentry Body (RB) flight test instrumentation.
  - (U) Maintained RSAP technical program plan, conducted system assessments and continued Vulnerability & Hardening certification process in absence of Nuclear Under Ground Testing (UGT) facilities.

(U) FY 2004 PLAN
- (U) ($22.3) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the 1st year..
  FY 2004 efforts include:
  - (U) Continue to maintain the current capability and implement planned service life extension of Navy reentry systems.
  - (U) Assess data relating to aging trends to establish the impact on system performance and address any effects on the extended service of the deployed systems. Plan and execute test programs for the evaluation of aging effects and the development of predictive methodologies to mitigate the risks associated with aging mechanisms and the planned extended service of the deployed Navy reentry systems.
  - (U) Continue with the development, test, and assessment of replacement heatshield, nosetip, and aft closure materials for use on reentry systems, including those available from Science and Technology (S&T). Make recommendations for improved material thermal protection concepts and test techniques.
  - (U) Continue development of low-cost design approach and components for Arming and Fuzing applications.
  - (U) Assess, integrate, and test reentry system instrumentation, including software and hardware development for avionics computer, GPS, and inertial sensor technology.
  - (U) Maintain the RSAP technical program plan, and conduct system assessments as required.
  - (U) Continue development and improvement of analytical models and techniques for predicting reentry body and components response to stressing environments.
  - (U) Improve methods of assessing the vulnerability and hardness of reentry systems in the absence of underground testing (UGT).

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: **Feb 2004**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	PROJECT NUMBER AND NAME **Technology Applications 2228**

B. (U) Accomplishments/Planned Program (Continued)

(U) FY 2005 PLAN

•(U) ($26.1) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the first year.
FY 2005 efforts include:

(U) Continue development and ground testing of reentry vehicle candidate heatshield and nosetip materials including those available from Science & Technology (S&T).
(U) Characterize and flight test alternate low-cost heatshield and replacement nosetip material.
(U) Conduct a ground and flight test program to assess performance of reentry components exposed to operational environments beyond their design life; complete evaluation of ground test results; flight test repackaged components for risk mitigation.
(U) Initiate fabrication of RB inertial sensor flight test instrumentation for FY 2006 flight test.
(U) Maintain RSAP technical program plan, conduct system assessments and continue Vulnerability & Hardening certification process development in absence of Nuclear Under Ground Testing (UGT) facilities.
(U) Continue Reentry Body material development and advanced flight test instrumentation activities
(U) Continue development of GPS simulator for twelve channel receiver
(U) Initiate feasibility study of the use of Terminal Fix Sensors (TFS) for target area trajectory correction
(U) Ground test advanced reentry material systems
(U) Initiate development of low cost replacement In Flight Disconnect (IFD) connector for the MK4A Reentry system
(U) Initiate development of optimized Reentry Body separation system

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: **Feb 2004**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	PROJECT NUMBER AND NAME **Technology Applications 2228**

	FY 2003	FY 2004	FY 2005
Guidance Application Program (GAP)	13.9	18.4	20.6
RDT&E Articles Quantity			

(U) FY 2003 PLAN
- (U) ($13.9) Continue Strategic Guidance Applications Programs (GAP). Full obligation is complete.
  FY 2003 efforts included:
  - (U) Continued to develop advance sensor models for incorporation in Integrated Engineering Environment (IEE). Integrate Interferometic Fiber Optic Gyro (IFOG), the Hemospherical Resonator Gyro (HRG), and the Alternate PIGA into Strategic Inertial Guidance Hardware Technology Synthesizer (SIGHTS). Utilize IEE/SIGHTS capability to perform system architecture/design tradeoffs in support of technology downselect in FY 2006 for D5 Life Extension.
  - (U) Continued to evaluate high risk/high payoff sensor technology, (accelerometer, gyro, stellar) for application in the D5 Life Extension Guidance system. Begin prototype radiation-hard sensor build and test.

(U) FY 2004 PLAN
- (U) ($18.4) Continue Strategic Guidance Applications Programs (GAP). Full obligation is projected by the 3rd quarter of the 1st year.
  FY 2004 efforts include:
  - (U) Continue to develop alternate models for incorporation in IEE and Hardware in the Loop (HWIL). Incorporate alternate sensor technologies into virtual system and HWIL. Utilize IEE/HWIL capability to perform system architecture/design tradeoffs in support of technology down select in FY 2006 for D5 Life Extension.
  - (U) Continue to evaluate high risk/high payoff sensor technologies (accelerometer, gyro, and stellar) and proximity electronics for application in the D5 Life Extension Guidance system and/or replacement of system weak links. Continue prototype radiation-hard sensor build and test.
  - (U) Invest in non-volatile non-destructive memory development to meet MK6 Life Extension memory goals
  - (U) (Sensors) Design, build, and evaluate Silicon Oscillator Accelerometer (SOA) support electronics and improved build processes. Prove SOA capability to meet Rad-hard strategic goals
  - (U) (GYRO) Build 6-10 gyros focused on improved dynamic and radiation margin in support of Life Extension.
  - (U) (GYRO) Develop IFOG hardenable electronic circuits.

(U) FY 2005 PLAN
- (U) ($20.6) Continue Strategic Guidance Applications Programs (GAP). Full obligation is projected by the 3rd quarter of the 1st year.
  FY 2005 efforts include:
  - (U) Utilize alternate models for incorporation in IEE and HWIL. Exercise alternate sensor technologies in the virtual system and the HWIL experiments. Finalize IEE/HWIL capability to an increased fidelity for system architecture/design tradeoffs in support of technology downselect by FY 2006 for D5 Life Extension.
  - (U) Continue to evaluate alternate sensor technologies, (accelerometer, gyro, and stellar) and proximity electronics for application in the D5 Life Extension Guidance system and/or replacement of system weak links. Evaluate prototype radiation-hard sensor build and test results for appropriate applications.
  - (U) Invest in non-volatile non-destructive memory development to meet MK6LE memory goals.
  - (U) (Sensors) Design, build, and evaluate SOA support electronics and improved build processes. Prove SOA capability to meet Rad-hard strategic goals
  - (U) (GYRO) Build 6-10 gyros focused on improved dynamic and radiation margin in support of Life Extension.
  - (U) (GYRO) Develop IFOG hardenable electronic circuits.
  - (U) (Stellar) Invest in Electron Bombarded (intensified) CCD and Active Pixel sensors for advanced system concepts.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: **Feb 2004**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	PROJECT NUMBER AND NAME **Technology Applications 2228**

B. (U) Accomplishments/Planned Program

		FY 03	FY 04	FY 05
Strategic Propulsion Applications Program (SPAP)		0.0	7.9	39.5
RDT&E Articles Quantity				

(U) FY 2003 PLAN N/A
•

(U) FY 2004 PLAN
- (U) ($7.9) Initiate SPAP program. Full obligation is projected by the 3rd quarter of the first year.
  FY 2004 efforts include:
  - (U) Initiate and complete Industrial Base Assessment.
  - (U) Identify, evaluate and down select suitable technologies for boost motor test.
  - (U) Identify and evaluate suitable technologies for post boost propulsion technologies test.
  - (U) Identify and evaluate suitable technologies for ordnance technologies test.
  - (U) Identify boost motor test fabrication hardware.

(U) FY 2005 PLAN
- (U) ($39.5) Continue SPAP program. Full obligation is projected by the 3rd quarter of the first year.
  FY 2005 efforts include:
  - (U) Continue down select process of boost motor components by testing and prepare for a boost rocket motor test demonstration.
  - (U) Initiate component tests for identified post boost control technologies.
  - (U) Initiate component tests for identified missile ordnance technologies.
  - (U) Complete fabrication of boost motor test hardware
  - (U) Identify post boost motor test fabrication hardware.
  - (U) Identify ordnance test fabrication hardware.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: Feb 2004
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	PROJECT NUMBER AND NAME **Technology Applications 2228**

B. (U) Accomplishments/Planned Program

		FY 03	FY 04	FY 05
Radiation Hardened Applications Program (RHAP)		0.0	12.9	20.0
RDT&E Articles Quantity				

(U) FY 2003 PLAN N/A
•

(U) FY 2004 PLAN
- (U) ($12.9) Initiate RHAP program. Full obligation is projected by the 3rd quarter of the first year.
  FY 2004 efforts include:
  - (U) Initiate and complete a Radiation Hardened Industrial Base Assessment.
  - (U) Start productization of .35 micron digital Silicon-On-Insulator (SOI) technology
  - (U) Start productization of .7 micron mixed signal SOI technology.
  - (U) Start technology/product development of alternate non-volatile memories, including Chalcogenide (CRAM), Magnetic (MRAM), and Silicon-On-Nitride (SONOS) technologies.
  - (U) Identify, evaluate and down-select a physics based model for nuclear radiation effects (Electromagnetic Pulse ((EMP)) and X-ray) on missile and missile components.
  - (U) Identify, evaluate, and down-select a physics based modeling method for nuclear radiation effects (System Generated EMP ((SGEMP)) on missile cables and connectors.
  - (U) Identify and evaluate potential built in self test system circuit models and develop a strategy for modeling nuclear radiation effects.
  - (U) Start evaluation of post radiation SPICE models for dose rate, total ionizing dose events

U) FY 2005 PLAN
- (U) ($20.0) Continue RHAP program. Full obligation is projected by the 3rd quarter of the first year.
  FY 2005 efforts include:
  - (U) Continue productization and qualification of .35 micron digital SOI technology.
  - (U) Continue productization and qualification of .7 micron mixed signal SOI technology.
  - (U) Continue physics based modeling method for nuclear radiation effects (EMP and X-ray) on missile and missile components.
  - (U) Continue physics based modeling method for nuclear radiation effects (SGEMP) on missile cables and connectors.
  - (U) Begin physics based modeling for nuclear radiation effects on modern built in self test circuits.
  - (U) Continue evaluation and validation of post radiation SPICE models for dose rate, total ionizing dose, and single event effects.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification	DATE: **Feb 2004**
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7**	PROJECT NUMBER AND NAME **Technology Applications 2228**

C. (U) Other Program Funding Summary: (Dollars in Thousands)

FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Total Complete	Total Cost
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

D. (U) Acquisition Strategy:

Contracts will continue to be awarded to those sources who were engaged in the TRIDENT II (D5) development program and are currently engaged in the production and/or operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (1) and (3) implemented by FAR 6.302.-1, 3 4.

E. (U) Major Performers:

- LMMS / CA - Reentry Body Systems integration (RSAP)
- NSWC / VA - Heatshield Nosetip materials development (RSAP)
- ITT / CO - Vulnerability and hardness technologies (RSAP)
- CSDL / MA - Reentry Systems flight test instrumentation (RSAP)
- CSDL / MA - Guidance Application program support (GAP)
- DOE / NM - Advanced fuzing technology (RSAP)
- LMMS/CA- Missile radiation hardened electronics integration (RHAP)
- CSDL/MA- Guidance radiation hardened electronics integration(RHAP)
- DOE/NM - Evaluation of candidate commercially avalable radiation hardened Field Programmable Gate Arrays (FPGAs) (RHAP)
- NAWC/CA - Rocket motor testing & integration(SPAP)
- LMMS/CA - Missile systems integration (SPAP)

CLASSIFICATION:

Exhibit R-3 Cost Analysis		DATE: **Feb 2004**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NUMBER AND NAME
RDT&E, N / BA-7	**PE 0101221N Strategic Sub & Wpns Sys Spt**	**Technology Applications 2228**

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
Support & Management												
Technology Applications	SS - CPFF	LMMS / CA	49.0	8.7	10-02	12.4	10-03	16.0	10-04	Cont.	Cont.	TBD
Technology Applications	WR	NSWC / CA	35.8	4.7	10-02	5.9	10-03	6.4	10-04	Cont.	Cont.	TBD
Technology Applications	MIPR	DOE / NM	12.6	4.5	10-02	0.8	10-03	0.0	10-04	Cont.	Cont.	TBD
Technology Applications	SS - CPFF	CSDL / MA	5.5	0.1	10-02	1.0	10-03	2.1	10-04	Cont.	Cont.	TBD
Technology Applications	SS - CPFF	KAMAN / CO	4.5	0.0	10-02	0.0	10-03	0.0	10-04	Cont.	Cont.	TBD
Technology Applications	SS - CPFF	ITT / CO	N/A	1.0	10-02	1.5	10-03	1.6	10-04	Cont.	Cont.	TBD
Technology Applications	SS - CPFF	CSDL / MA	106.1	13.9	10-02	18.4	10-03	20.6	10-04	Cont.	Cont.	TBD
Technology Applications	SS - CPFF	CSDL / MA	N/A			11.0	10-03	16.0	10-04	Cont.	Cont.	TBD
Technology Applications	SS - CPFF	LMMS/CA	N/A			6.8	10-03	33.5	10-04	Cont.	Cont.	TBD
Technology Applications	SS - CPFF	LMMS/CA	N/A			1.7	10-03	3.0	10-04	Cont.	Cont.	TBD
Technology Applications	MIPR	DOE / NM	N/A			0.7	10-03	1.0	10-04	Cont.	Cont.	TBD
Technology Applications	MIPR	DOE / NM	N/A					1.0	10-04	Cont.	Cont.	TBD
Technology Applications	WR	NSWC / CA	N/A					0.8	10-04	Cont.	Cont.	TBD
Technology Applications	WR	NAWC/CA	N/A			0.8	10-03	3.8	10-04	Cont.	Cont.	TBD
	VARIOUS	VARIOUS	N/A			0.5	10-03	0.4	10-04	Cont.	Cont.	TBD
Subtotal Product Development			213.5	32.9		61.5		106.2		Cont.	Cont.	TBD
Remarks:												
Total Cost			213.5	32.9		61.5		106.2		Cont.	Cont.	
Remarks:												

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2004**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-7	**PE 0101221N Strategic Sub & Wpns Sys Spt**	**0004**

B. Accomplishments/Planned Program

	FY 02	FY 03	FY 04	FY 05
Valve Regulated Lead Acid (VRLA) Batteries		4.000	2.500	
RDT&E Articles Quantity				

Valve Regulated Lead Acid (VRLA) Batteries are sealed state-of-the-art technology that significantly reduces the maintenance involved with traditional flooded lead acic submarine batteries. VRLA eliminates the need for air agitation systems, battery make-up water additions, flash arrestors and charcoal filters. VRLA enables convenience charging, requires no special ventilation lineups, requires fewer environmental concerns and offers increased life up to 8 years. Most importantly, VRLA batteries also have many workload (quality of life) and cost reduction benefits. FY03-FY04 funds will be used to perform the initial VRLA cell design, battery well assessment studies, install and operate prototype battery cells, and develop ship alteration packages for all classes.

	FY 02	FY 03	FY 04	FY 05
Ship Control Station Obsolete Equipment Upgrade			0.094	2.020
RDT&E Articles Quantity				

In order to support the expected 42-year operational cycle for a TRIDENT submarine a Ship Control Station (SCS) and Obsolete Equipment Replacement programs needs to be instituted. The OER program will attempt to utilize the design changes that are being developed for the VIRGINIA Class SCS Hull, Mechanical and Electrical (HM&E) interfaces. The replacement SCS will utilize commercial off the shelf components and will replace existing hardware wired displays and indications with flat panel displays and indications

	FY 02	FY 03	FY 04	FY 05
Architecture Model Maintenance & COTS	0.547	0.322	0.372	0.540
RDT&E Articles Quantity				

Conduct COTS/emergent technology and CCS performance requirements evaluations supporting Trident modernization program/plans. Research and evaluate effectiveness of proposed new technology over the ships' life cycle. Analyze impacts on platform performance with proposed new technology changes using architecture models and tests. Study and identify options in selecting and installing new technology improvements. Evaluate Navigation data interface requirements to meet ECDIS-N compliance on Trident hulls. Complete CCC CONOPS study to accommodate Revision 7.3 (MK2 ECP4) installation. Provide arrangement layouts GFI to Electric Boat (EB) Ship Design Agent (SDA).

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2004**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-7	**PE 0101221N Strategic Sub & Wpns Sys Spt**	**0004**

B. Accomplishments/Planned Program (Cont.)

	FY 02	FY 03	FY 04	FY 05
Data Processing System Development		0.881		
RDT&E Articles Quantity				

To evaulate potential areas of renovation and to identify a phased approach that facilitiates the replacement of the TRIDENT CCS/DPS legacy subsystems:

Continue analysis of the physical requirements and characteristics of OER items, including the satisfaction of redundancy, survivability and maintainability requirements. Analyze and recommend applicable COTS hardware and software items, and the identification of any developmental items required for the development of the final product. Identify design options for centralized CCS anomaly, fault and failure data gathering and analysis. Identify DPS Workstation to meet high availability requirements levied by the processing of mission critical data as well as total CCS statusing and alarming in a networked environment, including the provision for a remote workstation display capability in critical spaces to provide complete CCS status monitoring and fault isolation capabilities. Prototype development is also included. Analyze networked architectures embraced by non-TRIDENT platforms for applicability. Analyze design component capture potential from the Submarine Warfare System Design and maximize commonality with proposed SSGN architecture.

Conduct system engineering working group meetings to facilitate a plan to migrate away from the DPS AN/UYK-43 computer. Analyze existing legacy AN/UYK-43 subsystem requirements and determine applicability to future CCS design with Revision 9.0 as the target revision. Identify CCS legacy functionality that may be accommodated by the DPS Workstatioin design. Analyze signals processing currently performed by the DPS (TSDC) for the Ship Control Subsystem (SCS) and for reassignment to the SCS

DPS Rev 7.3 Modifications In Support of MK2 ECP-004 NAV Interface:

In lieu of TIDS availability, modifications are necessary to the DPS to provide RLGN-like services for SSBN platforms by implementing a Network Data Processor/Server/Client capability at the DPS Mission Critical Workstation (MCW) to satisfy MK2 and ARCI needs for CCS Revision 7.3. DPS modifications in support of this capability include the serving of Nav Data to TIDS or directly to MK2/ARCI via VA Class IDL using CORBA interfaces and NTP data received from the UYK-43 to MK2/ARCI, also via VA Class IDL. Processing will also be implemented for the DPS MCW to receive health status information from MK2/ARCI for both internal DPS MCW interface statusing as well as to satisfy UYK-43 legacy subsystem user requirements. DPS AOBT processing will also be modified to accept data from ARCI via a TBD CORBA structure.

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2004**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-7	**PE 0101221N Strategic Sub & Wpns Sys Spt**	**0004**

B. Accomplishments/Planned Program

	FY 02	FY 03	FY 04	FY 05
Thin Plate Lead Acid Battery			1.000	
RDT&E Articles Quantity				

Thin Plate Pure Lead Batteries - Submarine main storage batteries are the primary back-up source of power for nuclear submarines. Thin Plate Pure Lead technology (TPPL) is designed to improve the efficiency of the chemical reaction that occurs on the plates of batteries. Hence, incorporating TPPL technology into submarine batteries could significantly increase the achievable energy, power density and life of future submarine batteries. This effort would attempt to scale up the current TPPL product to a size suitable for use in submarine main storage batteries. It is possible that by coupling TPPL plates with VRLA battery technology, the Navy could further increase the energy, power density and life of VRLA submarine main storage batteries. The increase in battery life could result in a commensurate reduction in life cycle cost.

	FY 02	FY 03	FY 04	FY 05
RDT&E Articles Quantity				

	FY 02	FY 03	FY 04	FY 05
RDT&E Articles Quantity				

R-1 SHOPPING LIST - Item No. 161

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2004**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-7	**PE 0101221N Strategic Sub & Wpns Sys Spt**	**0004**

C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY 03 Pres Controls)	0.561	5.399	4.412	4.312
Current BES/President's Budget (FY04 Presidents Controls)	0.547	5.203	3.966	2.569
Total Adjustments	-0.014	-0.196	-0.446	-1.743
Summary of Adjustments				
Congressional undistributed reductions	-0.003	-0.062	-0.827	-0.450
Reprogrammings			-0.500	-1.200
FY03 Update		0.001		
FY02 Actuals	-0.011			
PBD430				0.008
PBD426				0.012
PBD203			-0.052	-0.052
PBD604			-0.068	-0.066
Inflation Savings		-0.068		
FY03 SBIR		-0.053		
BSO Adjustments		-0.014		
Thin Plate Pure Lead Batteries			1.000	
NWCF Rates Adjustments			0.001	0.005
Subtotal	-0.014	-0.196	-0.446	-1.743

Schedule:

VRLA BATTERY - FY03 (1st Qtr) – Program Inception; Cell Design and Development
FY04 (4th Qtr) - Cell Qualification Testing
FY05 (2nd QTR) - Certification / IOC

Technical:

Not Applicable □

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2004**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / BA-7	**PE 0101221N Strategic Sub & Wpns Sys Spt**	**0004**

D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
267600 / 267606 BA2 OPN (Electronics)	9233	17551	8496	5265	3419	4010	4082	4159	0	56215
095000 BA1 (HM&E)	21065	39434	27604	7308	5346	12736	17149	19373	0	150015
094500 / 094505 BA1 (Batteries)	10684	13564	11386	26077	24096	30829	14396	14561	0	145593

E. ACQUISITION STRATEGY: *

VRLA Battery - The Type Commanders (TYCOMs) establish battery replacement schedules based on battery performance and maintenance availability. Beginning in FY05, NAVSEA intends to shift procurement from flooded batteries to VRLA. In FY06, the only replacement batteries available will be VRLA; thus the SHIPALT must be accomplished to support installations beginning in FY06.

Ship Control Station - The proposed architecture will consist of the following hardware components. Ship Control Panel (SCP), Ballast Control Panel (BCP), Remote Interface Controller (RIC), Remote Interface Box (RIB). The SCP will be modified be removing the existing panels and replacing them with the flat panel display that provide the operator controls and indications needed to control all plane surfaces. The existing emergency hydraulic control will be maintained.

F. MAJOR PERFORMERS: **

VRLA Batteries - NSWC Crane, In: Development engineering and test support.
GNB, Fort Smith, Arkansas: Battery cell design/development.
General Dynamics Electric Boat, Groton, Connecticut: Ship alteration package design/development.
Northrop Grumman Newport News, Newport News, VA: Ship alteration package design/development.

Ship Control Station - NSWC Carderock

Thin Plate Pure Lead Battery - NSWC Crane

*** Not required for Budget Activities 1,2,3, and 6**
**** Required for DON and OSD submit only.**

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2004**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-7**			PROGRAM ELEMENT **PE 0101221N Strategic Sub & Wpns Sys Spt**			PROJECT NUMBER AND NAME **0004**						
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	
Design/Development Engineering	SS/CPFF	Electric Boat, Groton, CT		0.800	01/03	0.094	01/04	0.000	N/A	0.000	0.894	0.894
Design/Development Engineering	SS/CPFF	NG NNEWS, VA		1.270	01/03	0.000	01/04	0.000	N/A	0.000	1.270	1.270
Design/Development Engineering	SS/PD	SUPSHIP Groton, CT		0.500	03/04	1.054	03/04	0.000	N/A	0.000	1.554	1.554
Developmental Test & Evaluation	SS/WR	NSWC CRANE, IN		1.430	01/03	2.446	03/04	0.000	N/A	0.000	3.876	3.876
Design/Development Engineering	SS/WR	NSWC Carderock, MD		0.000		0.000	01/04	2.020	01/05	0.000	2.020	2.020
Design/Development Engineering	SS/WR	NUWC Newport, RI	0.547	0.480	01/03	0.372	01/04	0.549	01/05	0.000	1.948	1.948
Developmental Test & Evaluation	SS/WR	NUWC Newport, RI		0.723	01/03			0.000		0.000	0.723	0.723
											0.000	
Subtotal Product Development			0.547	5.203		3.966		2.569		0.000	12.285	

Remarks: NSWC Crane - Funds will be used to perform the initial VRLA cell design, battery well assessment studies and develop the prototype battery. □

											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:

R-1 SHOPPING LIST - Item No. 161

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: **February 2004**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-7**			PROGRAM ELEMENT **PE 0101221N Strategic Sub & Wpns Sys Spt**			PROJECT NUMBER AND NAME **0004**						
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	
											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Total Cost			0.547	5.203		3.966		2.569		0.000	12.285	

Remarks:

R-1 SHOPPING LIST - Item No. 161