Exhibit R-3, Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

Cost ($ in Millions)		FY 2001	FY 2002	FY 2003	FY2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost		50.1	45.5	40.3	41.4	41.8	43.1	43.0	CONT.	CONT.
J0951 TRIDENT II		9.2	8.7	0	0	0	0	0	0	9594.5
S0004 TRIDENT Submarine System Improvement		0.6	0.6	5.4	4.4	4.3	5.4	4.7	CONT	CONT
J2228 Technology Applications Program		40.3	36.2	34.9	37.0	37.5	37.7	38.3	CONT	CONT
RDT&E Articles Qty										
Defense Emergency Response Fund (DERF)/Cost of War (COW): J0951			0	30.0	30.0	30.0	0	0	0	90.0
Defense Emergency Response Fund (DERF)/Cost of War (COW): J2228			0	39.9	54.7	71.5	72.5	71.5	CONT.	CONT.

Exhibit R-3, Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

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 PE supports investigations into new technologies which would help mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base. Efforts also include Reentry System and Guidance System Applications efforts. 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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY:
This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for operational systems.

B. (U) Program Change Summary:

	FY 2001	FY 2002	FY 2003
FY 2002 President's Budget:	53.2	43.4	71.8
Adjustments to:	-3.1	+2.1	-31.5
FY 2003 President's Budget Submit:	50.1	45.5	40.3

Explanation: Changes from FY 2002 President's Budget to FY 2003 President's Budget submission: The decrease in FY 2001 represents a transfer out for closed account

Exhibit R-3, Cost Analysis		Date: Jan 2002
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billings (-$1.5M), FY 2001 Navy reprogramming adjustment (-$1.5M), and a government wide recission (-$.01M). The increase in FY 2002 is a combination of a Congressional plus up for RADHARD Electronics in project J2228 (+$2.5M) and a Congressional adjustment (section 8123: Management Reform) of -$0.4M. The decrease in FY 2003 is a result of the combination of the transfer out of -$35.0M for D5 Life Extension (project J2228) to Trident II BA 1 WPN, a +$4.0M plus up (reprogrammed from NAVSEA OPN Subhead 81HM) to project S0004 for VLRA batteries, adjustment for carryover at R&D activities (-$0.3M), and inflation adjustment (-$0.2M).

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.

E. (U) Schedule Profile: Not Applicable.

Cost ($ in Millions)		FY 2001	FY 2002	FY 2003	FY2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost J0951 TRIDENT II		9.2	8.7	0	0	0	0	0	0	9595.9
RDT&E Articles Qty										
Defense Emergency Response Fund (DERF)/Cost of War (COW)			0	30.0	30.0	30.0	0	0	0	90.0

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Exhibit R-3, Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

. (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 by providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This project supports investigations into new technologies which would help mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base.

NOTE: (U) Defense Emergency Response Fund (DERF)/Cost of War (COW): FY03funding in the amount of $30M to begin an Effective Enhancement (E2) Demonstration intended to demonstrate a near term capability to steer a SLBM warhead to GPS-like accuracy.

Exhibit R-3, Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

(U)PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2001 PLAN:
   - (U) ($9.2) SRS: Effort continued in support of phase three development and Fleet alterations for the SLBM Retargeting System. Full obligation is complete.

2. (U) FY 2002 PLAN:
   - (U) ($8.7) SRS: Efforts continue to complete phase three development required for deployment and final implementation of the SLBM Retargeting System Program in October 2003. Full obligation is projected by 3rd quarter of the 1st year.

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APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

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

	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Program
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(U) Related RDT&E: N/A

C. (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.

D. (U) Schedule Profile: Not Applicable.

Exhibit R-3, Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

Cost Categories Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost			FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Ancillary Hardware Development	SS / CPFF	GDDS/MA.	31.2			0	N/A	0	N/A			Cont	Cont	TBD
Ancillary Hardware Development	WR	NSWC/VA.	51.4			9.2	10/00	8.7	10/01			Cont	Cont	TBD
Subtotal Product Development			82.6			9.2		8.7						
Remarks:														
Total Cost			82.6			9.2		8.7				CONT.	CONT	CONT.
Remarks:														

Exhibit R-3 Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 0101221N	PROJECT NAME AND NUMBER Technology Applications J2228

Cost ($ in Millions)		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Project Cost J2228 Technology Applications Program		40.3	36.2	34.9	37.0	37.5	37.7	38.3	CONT.	CONT.
RDT&E Articles Qty										
Defense Emergency Response Fund (DERF)/Cost of War (COW)			0	39.9	54.7	71.5	72.5	71.5	CONT.	CONT.

A. (U) Mission Description and Budget Item Justification:

This supports implementation of a coordinated Air Force/Navy Reentry System Applications Program as well as the implementation of a Strategic Guidance Applications Program. Reentry Vehicle and Guidance Technology is rapidly eroding beyond the point of being capable to respond to increasing aging phenomena and future requirements. The Nuclear Posture Review examined the infrastructure which supports the nuclear force structure. It concluded that special actions were required to correct the rapidly eroding capability to maintain confidence in the existing weapon systems, and recommended that the reentry vehicle and guidance technology bases should be preserved. That recommendation resulted in the Presidential Decision Directive-30, which directed that programs be established for the reentry vehicle and guidance technology application.

- Through sustainment of the reentry vehicle technology base, confidence in the dependability and reliability of strategic SLBM and ICBM weapon systems will be maintained 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 requirements have been integrated with the Air Force requirements into a comprehensive program. The Program maintains close coordination with the DOD Science and Technology (S&T) community through the Reliance process 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.

- This program provides a minimum strategic guidance core technology development capability consistent with the Strategic Advisory Group (SAG) recommendations to CINCSTRAT. 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 currently utilized 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

Exhibit R-3 Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 0101221N	PROJECT NAME AND NUMBER Technology Applications J2228

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.

NOTE: (U) Defense Emergency Response Fund (DERF)/Cost of War (COW): FY03funding in the amount of $39.9M includes additional funding for RSAP/GAP initiative ($14.4M), solid motor test firing ($7.5M) and RADHARD Application Program ($18.0M)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2001 PLAN

- (U) ($18.5) Continued Reentry System Applications Program (RSAP). Full obligation is complete.
  FY 2001 efforts include:
  - (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) Conducted replacement heatshield flight test demonstration.
  - (U) Downselected Poly Acrylo Nitrile (PAN) fiber alternate heatshield material candidate for the FY 2005 flight test demonstration.
  - (U) Evaluated aged hardware flight data and observed ground test anomalies; developed risk mitigation concepts for known aging mechanisms.
  - (U) Identified and evaluated low-cost design approaches and components for arming and fuzing applications.
  - (U) Identified and evaluated low-cost inertial sensor technology for reentry body flight test instrumentation.
  - (U) Maintained RSAP technical program plan, conduct system assessments and continue vulnerability & hardening certification process in absence of nuclear under ground testing (UGT) facilities.

- (U) ($21.8) Continued Strategic Guidance Applications Programs (GAP). Full obligation is complete.
  FY 2001 efforts include:

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APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 0101221N	PROJECT NAME AND NUMBER Technology Applications J2228

(U) Continued initial Integrated Engineering Environment (IEE)/Strategic Inertial Guidance Hardware Technology Synthesizer (SIGHTS) integration to provide a "real time" hardware-in-the-loop simulation capability for FY 2002. Initiated development of alternative models for incorporation in IEE.

(U) Completed the prototype accelerometer fabrication and initiate testing. Continued Interferometic Fiber Optic Gyro (IFOG) fabrication and testing. Continued the stellar subsystem prototype technology task initiated in FY 2000. Evaluate alternate steller sensor technology. Evaluated circumvention methodology using SIGHTS hardware.

(U) Pursued alternate strategies in order to attain strategic performance from the Hemispherical Resonator Gyro (HRG). Assess producibility for various Alternate PIGA technologies.

(U) Provided Chemical Mechanical Planarization (CMP) capability to the SPAWAR micro-electronic fabrication facility. This metal interconnect technology enhancement allows SPAWAR to manufacture electronic devices using methods compatible with the latest commercial practices. This equipment is required for the development and validation of Radiation Hardened Technology Computer Aided Design (RHTCAD) dose rate response modeling.

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APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 0101221N	PROJECT NAME AND NUMBER Technology Applications J2228

2. (U) FY 2002 PLAN

- (U) ($18.9) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the first year. FY 2002 efforts include:
  - (U) Continue development and ground testing of reentry vehicle candidate heatshield, nosetip, and aft closure materials including those available from Science & Technology (S&T).
  - (U) Evaluate low-cost replacement heatshield flight test demonstration.
  - (U) Establish flight confidence in PAN fiber alternate heatshield material candidate for the FY 2005 flight test demonstration.
  - (U) Develop an updated ground and flight test program to assess performance of reentry components exposed to operational environments beyond their design life; develop and test risk mitigation concepts for known aging mechanisms.
  - (U) Continue evaluation of low-cost design approaches and components for arming and fuzing applications.
  - (U) Continue evaluation of low-cost inertial sensor technology for reentry body flight test instrumentation.
  - (U) Maintain RSAP technical program plan, conduct system assessments and continue vulnerability & hardening certification process in absence of nuclear under ground testing (UGT) facilities.

- (U) ($17.3) Continue Strategic Guidance Applications Programs (GAP). Full obligation is projected by the 3rd quarter of the 1st year. FY 2002 efforts include:
  - (U) Initiate IEE virtual implementation validation. Complete IEE/SIGHTS integration to evaluate alternate system architectures. Initiate incorporation of alternate sensor technologies, PIGA and system circumvention methodology into SIGHTS.
  - (U) Complete the prototype IFOG fabrication and initiate testing. Initiate alternate stellar subsystem design based on current sensor technology. Survey emergent technologies for alternate gyro and PIGA. Perform radiation testing of

Exhibit R-3 Cost Analysis		Date: Jan 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 0101221N	PROJECT NAME AND NUMBER Technology Applications J2228

current electronics technology.

(U) Continue test of Hemispherical Resinator Gyro (HRG) prototype hardware. Testing will assess the best approach to attain Strategic performance.

(U) Semiconductor process complexity has been increasing steadily and doubling in density every eighteen to twenty four months. Radiation hardened electronics have typically lagged commercial state-of-the art electronics by two to three generations. Every new generation of electronics has introduced a unique set of radiation response problems. A radiation hardened program is required to address these production, qualification and manufacturing issues. The tasks funded under the GAP program have established the framework for addressing Rad Hard electronics, but do not include the detailed tasking required to fully address all the Rad Hard issues. The Radiation Hardened Application efforts herein will compliment the Gap electronic part activities by specifically focusing on those tasks required to ensure producibility of Rad Hard parts.

Funding herein is requested for:

(a) A Productization and Qualification Program for Digital, Analog and Mixed Signal Radiation Hardened Electronics which will:

- o Evaluate commercial process improvements/enhancements and access for Rad Hard part products
- o Identify and eliminate yield inhibitors and manufacturing issues
- o Modify process and design rule to improve yield
- o Optimize models (process, device, library)
- o Demonstrate consistent yield
- o Establish statistical process control

(b) Radiation Hardened Technology computer aided design

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efforts which will:

- o Enhance existing commercial Technology Computer Aided design tools to include radiation and reliability mechanisms
- o Develop physical models for these mechanisms
- o Validate simulations against actual devices produced with a controlled process
- o Maintain commercial software licenses

3. (U) FY 2003 PLAN

- (U) ($19.8) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the first year.
  FY 2003 efforts include:
  - (U) Continue development and ground testing of reentry vehicle candidate heatshield, nosetip and aft closure materials including those available from Science & Technology (S&T).
  - (U) Identify and evaluate next generation low-cost heatshield material candidates.
  - (U) Conduct 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) Downselect low-cost design approach and components for Arming and Fuzing applications.
  - (U) Downselect a low-cost inertial sensor technology for Reentry Body (RB) flight test instrumentation.
  - (U) Maintain RSAP technical program plan, conduct system assessments and continue Vulnerability & Hardening certification process in absence of Nuclear Under Ground Testing (UGT) facilities.

- (U) ($15.1) Continue Strategic Guidance Applications Programs (GAP). Full obligation is projected by the 3rd quarter of the 1st year. FY 2003 efforts include:

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(U) Continue to develop alternate models for incorporation in IEE. Incorporate IFOG, the HRG, and the Alternate PIGA into SIGHTS. Utilize IEE/SIGHTS capability to perform system architecture/design tradeoffs in support of technology downselect in FY 2006 for D5 Life Extension.

(U) Continue to evaluate alternate sensor technology, accelerometer, gyro, stellar and electronics for application in the D5 Life Extension Guidance system and/or replacement of system weak links. Begin prototype radiation-hard sensor build and test.

B.(U) Other Program Funding Summary:

FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	To COMPLETE	PROGRAM
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(U) Related RDT&E: N/A

C. (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.

D (U) Schedule Profile: Not Applicable

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Cost Categories <u>SUPPORT AND MANAGEMENT</u>	Contract Method & Type	Performing Activity & Location	Total PYs Cost			FY01 Cost	FY01 Award Date	FY02 Cost	FY02 Award Date	FY03 Cost	FY03 Award Date	Cost To Complete	Total Cost	Target Value of Contrac
TECHNOLOGY APPLICATIONS	SS – CPFF	LMMS/CAL	34.1			4.9	10/00	6.0	10/01	6.0	10/02	CONT.	CONT	CONT.
TECHNOLOGY APPLICATIONS	WR	NSWC/VA	26.1			5.4	10/00	4.8	10/01	5.1	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	MIPR	DOE/NM	5.3			4.4	10/00	2.9	10/01	3.1	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	CSDL/MA	2.6			2.7	10/00	4.2	10/01	3.9	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	KAMAN/CO	2.8			0.7	10/00	0.8	10/01	1.0	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS-CPFF	ARL/TX								0.2	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS-CPFF	SAIC/FLA								0.3	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS-CPFF	MARK/CA								0.1	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	CSDL/MA	73.8			15.5	10/00	17.5	10/01	15.2	10/02	CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS - CPFF	CNSW/IN				6.7	11/00							
Subtotal Support			144.7			40.3		36.2		34.9				

Remarks