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CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification		DATE: February 2003									
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE									
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7		PE 0101221N Strategic Sub & Wpns Sys Spt									
	COST (\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009		
Total PE Cost		43.0	39.3	104.8	139.6	141.9	111.0	114.1	114.9		
J0951 TRIDENT II		9.1		29.6	30.3	30.4					
S0004 TRIDENT Submarine System Improvement		0.5	5.3	3.0	2.6	3.5	3.4	3.4	3.5		
J2228 Technology Applications Program		33.4	34.0	72.2	106.7	108.0	107.6	110.7	111.4		

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. Also included in this program element are efforts associated with the three year Enhanced Effectiveness (E2) Demonstration which is intended to demonstrate a near-term capability to steer a SLBM warhead to Global Positioning Satellite (GPS)-like accuracy. Finally, 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.

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Exhibit R-2, RD TEN Budget Item Justification
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APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7		PE 0101221N Strategic Sub & Wpns Sys Spt	

B. (U) Program Change Summary:

	EY 2002	EY 2003	EY 2004	EY 2005
Previous President's Budget: FY 2003 President's Controls):	45.5	40.3	41.4	41.8
Current President's Budget (FY 2004 President's Controls):	43.0	39.3	104.8	139.6
Total Adjustments:	-2.5	-0.7	63.4	97.8
Summary of Adjustments:				
Congressional Undistributed Reductions	-1.2		-0.8	-0.5
Reprogrammings	-0.9		-0.5	-1.2
SBIR Transfer				
Management Reform				
Economic Assumptions/various	-0.3	-0.1		
Nuclear Posture Review Program Add	-0.1	-0.6	-3.0	-3.0
			67.7	102.5

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.

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EXHIBIT R-2a, RDT&E Project Justification

APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7	PROJECT NUMBER AND NAME TRIDENT II J0951	DATE: February 2003
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COST (\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost J0951 TRIDENT II	9.1	0.0	29.6	30.3	30.4	0.0	0.0	0.0
RDT&E Articles Qty								

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

This project supports an Effectiveness Enhancement (E2) Demonstration, starting in FY 2004, which is intended to demonstrate a near-term capability to steer a SLBM warhead to Global Positioning Satellite (GPS)-like accuracy. There will be no redesign of internal navigation components, optimization of packaging, or warhead development. Existing electronics and instrumentation will be packaged in the aft-extension portion of the reentry body (RB). This minimizes demonstration costs, and provides a point of departure for a potential follow-on SDD (System Design and Development) that would optimize for production of similar but smaller components develop appropriate payloads. In addition, modifications to the Missile, Guidance & Fire Control sections would be required to provide the necessary inertial measurement unit (IMU) alignment required for this application. Although the technology being developed applies to ballistic missiles in general, this demonstration is targeted to use TRIDENT II (D5). The demonstration is structured to use the existing D5 design to the maximum extent, and also use instrumentation already developed for reentry bodies (integrating it with control flaps for this new purpose). The demonstration will culminate in flight tests and will provide a final demonstration assessment report and recommended transition plan to the NAVY and STRATCOM in early FY 2007.

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EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2003
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7	PROJECT NUMBER AND NAME TRIDENT II J0951

B. (U) Accomplishments/Planned Program

	FY 02	FY 03	FY 04	FY 05
SLBM Retargeting System(SRS)	9.1			
RDT&E Articles Quantity				

(U) FY 2002 PLAN
 (U) (\$9.1) SRS: Efforts continued to complete phase three development required for deployment and final implementation of the SLBM Retargeting System Program in October 2003. Full obligation is complete.

	FY 02	FY 03	FY 04	FY 05
Enhanced Effectiveness (E2) Demonstration			29.6	30.3
RDT&E Articles Quantity				

(U) FY 2004 PLAN
 (U) (\$29.6) E2 Demonstration: Efforts begin in support of the three year program. Full obligation is projected by the 3rd quarter of the 1st year.

- FY 2004 efforts include:
- (U) Initiate and complete system design concepts and trades.
 - (U) Finalize system level requirements and demonstration test objectives
 - (U) Initiate and complete program plans and acquisition documentation
 - (U) Initiate and complete design trade studies and system specifications and initiate detail design of:
 - o Fire Control software modifications
 - o Missile electronics modifications
 - o GPS preset data transfer *→ forward GPS in RWS?*
 - o Reentry body extension, heat shield, flaps, and cabling.
 - (U) Finalize all hardware and software detail designs.
 - (U) Identify GFE/GFI and long lead item procurement required.

(U) FY 2005 PLAN
 (U) (\$30.3) E2 Demonstration: Efforts continue in support of the three year program. Full obligation is projected by the 3rd quarter of the 1st year.

FY 2004 efforts include:

- (U) Procure, fabricate, and assemble hardware.
- (U) Complete Fire Control software build, test, and validation
- (U) Integrate guidance and reentry body components
- (U) Complete hardware component ground testing
- (U) Conduct interface testing
- (U) Conduct Flight Test Readiness Review

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EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2003
APPROPRIATION/BUDGET ACTIVITY	
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7	
PROJECT NUMBER AND NAME TRIDENT II J0951	

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

EY 2002	EY 2003	EY 2004	EY 2005	EY 2006	EY 2007	EY 2008	EY 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 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 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:

- Naval Surface Weapons Center, Dahlgren, VA. Efforts in support of Phase three development of SRS.
- Naval Surface Weapons Center, Dahlgren, VA. Efforts in support of E2 Demonstration
- General Dynamics Defense Systems, Pittsfield, Ma. Efforts in support of E2 Demonstration
- Lockheed Martin Missile & Space, Sunnyvale, Ca. Efforts in support of E2 Demonstration
- Charles Stark Draper Lab, Cambridge Ma. Efforts in support of E2 Demonstration

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Exhibit R-3 Cost Analysis APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-7	PROGRAM ELEMENT PE 0101221N Strategic Sub & Wpns Sys Spt	PROJECT NUMBER AND NAME TRIDENT II J0951	DATE:	February 2003		

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
Ancillary Hardware Development	SS / CPFF	GDDS / MA	31.2							Cont.		TBD
Ancillary Hardware Development	WR	NSWC / VA	69.3							Cont.		TBD
SSBN SWS MOD & Test Support	WR	NSWC / VA				2.0	10/03		3.3	10/04		TBD
SSBN SWS MOD & Test Support	SS / CPFF	GDDS / MA				2.3	10/03		3.1	10/04		TBD
SSBN SWS MOD & Test Support	SS / CPFF	LNMESSVA				2.0	10/03		2.0	10/04		TBD
Test Missile Mods	SS / CPFF	LMMS/CA				5.3	10/03		2.4	10/04		TBD
E2 Development System	WR	NSWC / VA				1.0	10/03		1.5	10/04		TBD
E2 Development System	SS/CPFF	LMMS/CA				16.0	10/03		16.5	10/04		TBD
E2 Development System	SS / CPFF	CSDL/MA				1.0	10/03		1.5	10/04		TBD
Subtotal Product Development			100.5	0.0		29.6			30.3			

Remarks: All Contract types and individual costs per activity have not been determined yet.

Total Cost			100.5	0.0		29.6			30.3			TBD

Remarks:

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EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2003
APPROPRIATION/BUDGET ACTIVITY		PROJECT NUMBER AND NAME
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7		Technology Applications J2228

COST (\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Cost J2228 Technology Applications	33.4	34.0	72.2	106.7	108.0	107.6	110.7	111.4
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 is rapidly eroding beyond the point of being capable to respond to increasing aging phenomena and future requirements. Beginning in FY 2004, SPAP will demonstrate and validate technologies unique to strategic missile applications. Also beginning in FY 2004, the RHAP program will address 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, 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.

- 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 currently utilize 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, will be a coordinated Navy/Air Force effort and addresses infrastructure needs by exercising critical developmental skills culminating in annual 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, will sustain 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 would focus on a coordinated Production & 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, coordinating 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 producibility of radiation hardened parts.

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EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2003
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7	PROJECT NUMBER AND NAME Technology Applications J2228

B. (U) Accomplishments/Planned Program

Reentry Systems Application Program (RSAP) RDT&E Articles Quantity	FY 02 17.7	FY 03 19.3	FY 04 27.4	FY 05 27.2
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- (U) FY 2002 PLAN
 - (U) (\$17.7) Continue Reentry System Applications Program. Full obligation is complete. 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 Poly Acrylo Nitrile (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) FY 2003 PLAN
 - (U) (\$19.3) 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) FY 2004 PLAN
 - (U) (\$27.4) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the first year. FY 2004 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) Characterize next generation low-cost heatshield material candidates.
 - (U) Conduct a ground and flight test program to assess performance of reentry components exposed to operational environments beyond their design life; evaluate initial ground test results; evaluate risk mitigation techniques for known aging mechanisms.
 - (U) Document low-cost design approach and components for Arming and Fuzing applications.
 - (U) Define packaging and interface designs for Reentry Body (RB) flight test instrumentation inertial sensor technology.
 - (U) Maintain RSAP technical program plan, conduct system assessments and conduct Vulnerability & Hardening certification process development in absence of Nuclear Under Ground Testing (UGT) facilities.
 - (U) Expand Advanced Reentry Body Nosetip development activities
 - (U) Resume low cost Reentry Body heatshield replacement development activities.
 - (U) Initiate development of GPS simulator for twelve channel receiver.
 - (U) Ground test advanced reentry material systems.
 - (U) Develop sensors/test methods for studying accelerated aging of Reentry Bodies.
 - (U) Initiate development of advanced flight test instrumentation systems
 - (U) Develop plan for certification of vulnerability and hardness processes in the absence of underground nuclear testing

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RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7	Technology Applications J2228

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

- (U) FY 2005 PLAN
 - (U) (\$27.2) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the first year.
 - (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

Guidance Application Program (GAP)	FY 2002	FY 2003	FY 2004	FY 2005
RDT&E Articles Quantity	15.7	14.7	16.8	19.5

- (U) FY 2002 PLAN
 - (U) (\$15.7) Continue Strategic Guidance Applications Programs (GAP). Full obligation is complete.
 - FY 2002 efforts include:
 - (U) Initiate Integrated Engineering Environment (IEE) virtual implementation validation. Complete IEE/Strategic Inertial Guidance Hardware Technology Synthesizer (SIGHTS) integration to evaluate alternate system architectures. Initiate incorporation of alternate sensor technologies, Pendulous Integrated Gyro Accelerometer (PIGA) and system circumvention methodology into SIGHTS.
 - (U) Complete the prototype Interferometric Fiber Optic Gyro (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 current electronics technology.
 - (U) Continue test of Hemispherical Resonator 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 provides for:
- 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

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APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-7	PROJECT NUMBER AND NAME Technology Applications J2228

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

- (U) FY 2003 PLAN
 - (U) (\$14.7) Continue Strategic Guidance Applications Programs (GAP). Full obligation is projected by the 3rd quarter of the 1st year. FY 2003 efforts include:
 - (U) Continue to develop advance sensor models for incorporation in IEE. Integrate 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 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) (\$16.8) 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 (HWL). Incorporate alternate sensor technologies into virtual system and HWL. 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) (Rad-Hard electronics) Invest in Gigantic Magneto-Resistive Memory (GMR) system to meet MK6LE memory goals (presently feasibility funded). Continue radiation hard electronics technology development (processors, memory, timers, oscillators), and circuit design alternatives.
 - (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 IFOG dynamic and radiation margin.
 - (U) (GYRO) Develop IFOG hardenable electronic circuits.
 - (U) (Stellar) Invest in Electron Bombarded (intensified) Charge Couple Device (CCD) and Active Pixel sensors for advanced system concepts.
- (U) FY 2005 PLAN
 - (U) (\$19.5) 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) (Rad-Hard electronics) Invest in Gigantic Magneto-Resistive Memory (GMR) system to meet MK6LE memory goals (presently feasibility funded). Continue radiation hard electronics technology development (processors, memory, timers, oscillators), and circuit design alternatives.
 - (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 IFOG dynamic and radiation margin.
 - (U) (GYRO) Develop IFOG hardenable electronic circuits.
 - (U) (Stellar) Invest in Electron Bombarded (intensified) CCD and Active Pixel sensors for advanced system concepts.

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