FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2005
Exhibit R-2

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603123N
PROGRAM ELEMENT TITLE: FORCE PROTECTION ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
Total PE	128,088	180,641	71,488	56,070	45,859	40,924	62,513	76,976
R2706 PROJECT M	4,805	1,882	0	0	0	0	0	0
R2711 SUPERCONDUCTING DC HOMOPOLAR MOTOR	5,391	3,666	0	0	0	0	0	0
R2828 ADVANCED WATERJET-21	1,944	0	0	0	0	0	0	0
R2831 AC SYNCHRONOUS HIGH TEMP SUPERCONDUCTOR (HTS) ELECTRIC MOTOR	5,783	3,467	0	0	0	0	0	0
R2912 FORCE PROTECTION ADVANCED TECHNOLOGY	60,027	72,751	65,715	49,715	39,272	34,194	55,416	69,588
R3049 FORCE PROTECTION	5,068	8,523	5,773	6,355	6,587	6,730	7,097	7,388
R9013 LITTORAL SUPPORT CRAFT - EXPERIMENTAL	13,452	9,906	0	0	0	0	0	0
R9014 PRECISION FABRICATION OF LARGE CURVED STEEL SHIP STRUCTURES	2,411	0	0	0	0	0	0	0
R9017 WIRELESS SENSOR NETWORK	961	0	0	0	0	0	0	0
R9019 WAVE POWER DEMONSTRATION PROJECT	3,278	3,368	0	0	0	0	0	0
R9023 AFFORDABLE, INTERMEDIATE MODULUS COTS CARBON FIBER QUALIFICATION PROGRAM FOR AIRCRAFT AND MISSILES								

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	0	991	0	0	0	0	0	0
R9139	SANDWICH PANEL CONSTRUCTION							
	0	3,963	0	0	0	0	0	0
R9140	HIGH SPEED PERMANENT MAGNET GENERATOR							
	3,460	6,438	0	0	0	0	0	0
R9143	SMART SENSOR WEB ADVANCED TECHNOLOGY							
	0	1,784	0	0	0	0	0	0
R9293	VARICRAFT							
	0	6,241	0	0	0	0	0	0
R9303	AGILE PORT & HI SPEED SHIP/MOBILITY-21 DEPL TECH							
	4,826	9,212	0	0	0	0	0	0
R9304	AVIATION GROUND NAVIGATION SYSTEM (AGNAS)							
	1,636	991	0	0	0	0	0	0
R9305	COMPOSITE SPECIAL OPERATIONS CRAFT							
	964	0	0	0	0	0	0	0
R9306	DOCK SHOCK							
	964	4,260	0	0	0	0	0	0
R9307	E-2C INFRARED SEARCH AND TRACK (IRST) TECHNOLOGY EXPERIMENTATION							
	1,325	0	0	0	0	0	0	0
R9308	GLOBAL PERSONAL LOCATOR BEACON (PLB)							
	1,686	0	0	0	0	0	0	0
R9309	LARGE UNMANNED UNDERSEA VEHICLE (LUUV) TEST BED							
	1,154	1,684	0	0	0	0	0	0
R9310	LASER WELDING AND CUTTING							
	3,364	0	0	0	0	0	0	0
R9311	QUAD HULL SECURITY CAISSON TECHNICAL DEMONSTRATION							
	2,411	0	0	0	0	0	0	0
R9312	REMOTE CONTINUOUS ENERGETIC MATERIAL MANUFACTURING PYROTECHNIC IR DECOYS							
	1,154	0	0	0	0	0	0	0

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R9313	TECHNOLOGIES FOR FUTURE NAVAL CAPABILITIES							
	1,060	1,288	0	0	0	0	0	0
R9314	WIRELESS PROGRAMMABLE LOGIC CONTROLLERS							
	964	0	0	0	0	0	0	0
R9344	EXTREME TERRAIN MEDICAL EVACUATION VEHICLE PILOT							
	0	1,684	0	0	0	0	0	0
R9454	ADVANCED DEVELOPMENT AND DEMONSTRATION OF ELECTRIC ACTUATOR TECHNOLOGY							
	0	991	0	0	0	0	0	0
R9455	AT-SEA DECONTAMINATION PLATFORM DEVELOPMENT AND CONCEPTUAL DESIGN							
	0	991	0	0	0	0	0	0
R9456	BRAIDED REDUCED RECOIL ROPE FOR HAND AND MOORING LINES							
	0	991	0	0	0	0	0	0
R9457	COMPOSITE TWISTED RUDDER							
	0	991	0	0	0	0	0	0
R9458	DEPLOYABLE FIBER OPTIC FORCE PROTECTION SYSTEM							
	0	1,784	0	0	0	0	0	0
R9459	DEVELOPMENT OF WIDE BANDGAP SEMICONDUCTOR MATERIALS							
	0	4,457	0	0	0	0	0	0
R9461	ELECTROMAGNETIC PROPULSION COST REDUCTION							
	0	1,388	0	0	0	0	0	0
R9462	FUTURE NAVAL CAPABILITIES - CREW MODELING AND SIMULATION (FNC-CMS)							
	0	2,576	0	0	0	0	0	0
R9463	HIGH-SPEED POWER NODE SWITCHING CENTER							
	0	1,388	0	0	0	0	0	0
R9464	INTEGRATED ADVANCED COMMUNICATIONS TERMINAL (ACT)							
	0	991	0	0	0	0	0	0
R9465	MISSILE WARNING SENSOR							
	0	2,477	0	0	0	0	0	0
R9466	MULTI-MISSION WARHEAD FOR ULTRA-LIGHT TORPEDO							

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	0	2,279	0	0	0	0	0	0
R9467	NON-LINE OF SIGHT (NLOS) FOR UNMANNED SYSTEMS						
	0	4,260	0	0	0	0	0	0
R9468	DEVELOPMENT OF SULFER TOLERANT COPPER-BASED SOLID OXIDE FUEL CELL (SOFC)						
	0	991	0	0	0	0	0	0
R9469	TADIRCM ANTIMISSILE TECHNOLOGY						
	0	6,736	0	0	0	0	0	0
R9470	UNMANNED FORCE AUGMENTATION SYSTEM						
	0	991	0	0	0	0	0	0
R9471	UNMANNED SYSTEMS TECHNOLOGIES FOR EXPLOSIVE ORDNANCE DISPOSAL						
	0	4,260	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program addresses applied research associated with providing the capability of Platform and Force Protection for the U.S. Navy. This program supports the development of technologies associated with all naval platforms (surface, subsurface, terrestrial and air) and the protection of those platforms. This PE supports the Future Naval Capabilities (FNC) in the areas of Fleet/Force Protection, Advanced Capability Electric Systems (ACES), Total Ownership Cost, and Missile Defense. The goal of this program is to provide the ability to win or avoid engagements with other platforms or weapons and, in the event of engagement, to resist and control damage while preserving operational capability. Surface Ship & Submarine, Hull, Mechanical & Electrical (HM&E), Missile Defense, Fleet Force Protection and Defense against Undersea Threats, and Emerging Threats activities all support FNC efforts.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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PROGRAM CHANGE SUMMARY:

	FY 2004	FY 2005	FY 2006	FY 2007
FY 2005 President's Budget Submission	119,838	82,130	55,844	57,302
Cong Rescissions/Adjustments/Undist. Reductions	0	-1,751	0	0
Congressional Action	0	100,300	0	0
Execution Adjustments	10,001	0	0	0
FNC Realignment	0	0	-4,816	-9,751
Non-Pay Inflation Adjustments	-106	0	0	0
Program Adjustments	0	-38	-68	-46
Program Realignment	0	0	20,562	8,177
Rate Adjustments	0	0	-34	388
SBIR Assessment	-1,645	0	0	0
FY 2006/2007 President's Budget Submission	128,088	180,641	71,488	56,070

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not Applicable

Schedule: Not applicable

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603123N PROGRAM ELEMENT TITLE: FORCE PROTECTION ADVANCED TECHNOLOGY
PROJECT NUMBER: R2912 PROJECT TITLE: FORCE PROTECTION ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
R2912 FORCE PROTECTION ADVANCED TECHNOLOGY	60,027	72,751	65,715	49,715	39,272	34,194	55,416	69,588

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses applied research associated with providing the capability of Platform and Force Protection for the U.S. Navy. This project supports the development of technologies associated with all naval platforms (surface, subsurface, terrestrial, and air) and the protection of those platforms. It supports the Fleet/Force Protection, ACES, Total Ownership Cost, and Missile Defense Future Naval Capabilities (FNCs). The goal of this project is to provide the ability to win or avoid engagements with other platforms or weapons and, in the event of engagement, to resist and control damage while preserving operational capability.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2004	FY 2005	FY 2006	FY 2007
SURFACE SHIP & SUBMARINE HULL MECHANICAL & ELECTRICAL (HM&E)	31,521	42,939	23,838	18,300

Activity includes: Signature Reduction, Hull Life Assurance, Distributed Intelligence for Automated Survivability, and Advanced Capability Electric Systems. Signature Reduction addresses Electromagnetic (EM), infrared (IR), and acoustic signature tailoring, both topside and underwater. Hull Life Assurance addresses development of new structural system approaches for surface ships and submarines, including the management of weapon effects to control structural damage and the improvement of structural materials. Distributed Intelligence for Automated Survivability addresses both the basic technology of automating damage control systems, as well as, distributed auxiliary control with self-healing capability. Advanced Capability Electric Systems area addresses electrical and auxiliary system and component technology to provide improvement in system energy and power density, system operating efficiency, and recoverability from casualties. This activity includes support to two FNC Enabling Capabilities: Battlefield Power; and Quiet Drives and Ship Fuel Cell Systems. Additional funding added in FY 2005 by OSD Program Decision Memorandum II (PDM II). This

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funding will be invested in development of electromagnetic gun technology.

FY 2004 Accomplishments:

- Continued development of advanced main propulsion superconducting motor.
- Continued development of advanced power electronics for Electromagnetic Aircraft Launch System (EMALS) and ship main propulsion systems.
- Continued development of diesel fuel reforming technology for molten carbonate and fuel cells.
- Continued development of Quiet Electric Drive (QED)/secondary propulsion unit (SPU).
- Continued development of superconducting DC homopolar motor.
- Continued technology efforts for reduced total ownership cost.
- Completed fabrication and test of Proton Exchange Membrane (PEM) diesel fuel cell reformer.
- Completed proving ground testing of Reconnaissance, Surveillance, Targeting Vehicle (RSTV).
- Initiated development of electromagnetic gun technology, including focus on rail wear issues, energy storage, and pulsed power switching.
- Initiated development of technologies for future Marine Corps Battlefield Power System.
- Initiated design and construction of 36.5 MW prototype motor.

FY 2005 Plans:

- Continue all efforts of FY 2004 less those noted as completed above.
- Complete development of advanced power electronics for Electromagnetic Aircraft Launch System (EMALS) and ship main propulsion systems.
- Complete Quiet Electric Drive/submarine secondary propulsion unit (SPU).
- Funding from PDM II will be applied to further develop electromagnetic gun technology, including focus on rail wear issues, energy storage, and pulsed power switching (transitions to PE 0602114N in FY 2006).

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Initiate advanced technology portion of on-board vehicle power system by fabricating and beginning component tests (transitioned from FY 2005 efforts under PE 0602123N).

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FY 2007 Plans:

- Continue all efforts of FY 2006.
- Complete testing of advanced main propulsion superconducting motor.

	FY 2004	FY 2005	FY 2006	FY 2007
ADVANCED ENERGETICS	2,820	0	0	0

Advanced Energetics efforts addressed technology development to provide substantial improvements in energetic material systems and subsystems primarily in terms of performance, but also addressing safety, reliability, and affordability concerns, and ultimately to transition advanced technology to the Fleet. Goals included: advanced energetic materials for thermobarics, agent defeat, and reactive material based warhead subsystems for both defensive and offensive applications. Efforts included development of new fuels, oxidizers, explosive formulations, reliable simulation tools, and diagnostics to develop and design superior performance reduced vulnerability systems tailored to specific warfighter missions.

FY 2004 Accomplishments:

- This activity concludes with the payload development of the Thermobaric Weapon Advanced Concept Technology Demonstration (ACTD) with explosive fill optimization, scale up, full-scale performance validation, and qualification.

	FY 2004	FY 2005	FY 2006	FY 2007
FLEET FORCE PROTECTION AND DEFENSE AGAINST UNDERSEA THREATS	8,182	13,354	23,677	17,815

This Activity is combined and renamed from "Sensors and Associated Processing Activity" and "Underwater Platform Self-Defense Activity" to more accurately describe its scope. Increase in funding in FY 2005 and FY 2006 is due to an increase in demonstration activity.

Fleet Force Protection and Defense against Undersea Threats efforts include applied research for complementary sensor and processing technologies for platform protection and shipboard technologies to increase the survivability of surface ship and submarine platforms against torpedo threats.

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The first major goal of this activity is to develop complementary sensor and processing technologies for 21st century warfighting success and platform protection. Current small platforms (both surface and airborne) have little or no situational awareness (SA) or self-protection against air, surface, and asymmetric threats. This activity will provide tactical aircraft (TACAIR) and other platforms with effective threat warning and self-protection. The technology areas specific to platform protection will develop individual or multi-spectral [Electro-Optic (EO), Infra-Red (IR), Radio Frequency (RF), Electromagnetic (EM), visual, and acoustic] sensors and associated processing. To defend platforms from current and advanced threats in at-sea littoral environments and in port, these technologies must improve multi-spectral detection and distribution of specific threat information.

The Fleet Force protection portion of this activity includes support to the FNC Enabling Capabilities for Aircraft Integrated Self-protection Suites, Intent Determination – EO/IR Enhancements, Proof-of-Concept for Non-lethal Approach, and Hostile Fire Detection and Response Spirals 1 and 2.

The second major goal of this activity is to develop enabling technologies that will increase the survivability of surface ship and submarine platforms against torpedo threats. Proposed technologies focus on defeating high priority threats including torpedoes (i.e. straight running, wake homing, acoustic homing, air dropped torpedoes, and salvoes of torpedoes). Technologies developed will minimize shipboard impact and require no organizational maintenance. Two major efforts are ongoing. The Next Generation Countermeasure (NGCM) is a mobile adaptive acoustic countermeasure with acoustic communication links to enable countermeasure connectivity and group behavior for defeat of threat torpedoes. The Anti-Torpedo Torpedo (ATT)/Tripwire provides technologies that improve passive shipboard detection, classification, and localization (DCL) of incoming torpedoes and an ATT to engage the threat torpedoes. The ultimate goal of this effort is to develop a torpedo defense capability to fill Sea Shield Warfighting Capability Gap/Enabling Capability: Platform Defense against Undersea Threats, including Ship Self-Defense Against Multi-Salvo Torpedo Attacks. This will be accomplished by providing a capability to prevent any of the torpedoes in up to four-torpedo salvos fired at high value units from hitting those units. Ultimately the efforts should deliver a netted set of decoys and a counter-torpedo-torpedo for use in detecting and defeating a 4-torpedo salvo attack against a surface or subsurface platform.

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FY 2004 Accomplishments:

Sensors & Associated Processing -
- Completed tests on a short sample of a new high temperature towline required to operate throughout the entire F/A-18 E/F flight envelope including maximum afterburner for the Integrated Defensive Electronic Countermeasures (IDECM) Pre-Planned Product Improvement (P3I).
- Completed laboratory and field characterization testing of prototype missile warning sensors with two-color stacked diode focal plane arrays and improved cryogenic coolers for the Missile Warning System (MWS).
- Initiated testing after receiving the first jam head optical dome for testing for the EO/IR Laser Jammer for TACAIR.
- Completed demonstration of the high power thulium fiber laser pump for the mid-wave infrared/visible countermeasure laser system for Shipboard EO/IR Closed Loop Self-protection.
- Completed successful demonstration of the Gun Fire Detection and Situation Awareness software at Ft. Meade, Maryland for the End User Terminal (EUT).
- Initiated Distributed Aperture System (DAS) efforts focusing on design, development, and testing of systems, subsystems, and components for integration of sensor modules and components into a DAS capability demonstration model. This is an international effort to develop new and improved algorithms for DAS Infrared Search and Track (IRST) to cope with at-sea environmental effects.

Underwater Platform Self-Defense –
- Continued open loop in-water data collection efforts to evaluate the ATT sonar technologies for improving operations in the wake.
- Continued in-water open loop data collection experiments to collect ATT sensor data of an emulated threat salvo during relevant engagement geometries.
- Continued requirements analysis for ATT warhead safe-and-arm inertial measurement unit.
- Continued tank tests evaluating the ability of ATT’s to transmit and receive acoustic communication bit sequences.
- Completed development of a Signal Generator Board for ADC MK2 countermeasure format.
- Completed and transitioned NGCM technology: Countermeasure Threat Emulator for Operational Test and Evaluation Force (OPTEVFOR), the Tethered Countermeasure for Tactical Development Exercise (TACDEVEX) evaluation of MK54 torpedo, and ADC MK3/MK4 Mod 1 countermeasures for the fleet.
- Completed and transitioned countermeasure threat emulator to DEVRON12.

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FY 2005 Plans:

Sensors & Associated Processing -
- Continue all efforts of FY 2004 less those noted as completed above.
- Initiate developments for the Laser Detection and Ranging (LADAR) piece of the DAS for target imagery and identification. The LADAR build will see a low power breadboard model.
- Initiate development of the conformal solid-state beam director for the EO/IR Laser Jammer for TACAIR.

Underwater Platform Self-Defense -
- Continue all efforts of FY 2004 less those noted as completed above.
- Complete evaluation of NGCM mobility capabilities in tank tests.
- Initiate closed loop data collections to evaluate ATT 2x2 salvo technologies.

FY 2006 Plans:

Sensors & Associated Processing -
- Continue all efforts of FY 2005.
- Complete land based testing of optical design and data processing systems for DAS.
- Complete international effort to develop new and improved algorithms for DAS IRSTs to cope with at-sea environmental effects.
- Initiate demonstration of the multi-spectral uncooled MWS sensor for the Integrated EO/IR Self Protection Suite for Rotary Wing Aircraft.
- Initiate the integration of the Gallium Arsenide (GaAs) transmitter with an ALE-55 sized Fiber-Optic Towed Decoy (FOTD) and onboard power supply for Integrated Defensive Electronic Countermeasures (IDECM) Pre-planned Product Improvement (P3I).
- Initiate the field demonstration of the full capabilities of the integrated personal communications, situational awareness, and gunfire detection system for EUT.
- Initiate integration and testing of the Shipboard Electro-optic Integrated Defense System's (SHIELD) hardware at NRL's infrared countermeasure techniques development laboratory for Shipboard EO/IR Closed Loop Self-protection.
- Initiate building and testing of LADAR effort to a High Power Pulsed LADAR Brass board model. Integrate Optical design, data processing, and LADAR components and test in simulated at-sea environment. Complete LADAR project and transition to PMS500 for DDX platform.
- Initiate development work on improving imaging technologies (EO/IR/Laser) support IROSS Shipboard

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Protection System (SPS) Spiral for Integrated Radar Optical Sighting & Surveillance (IROSS).

Underwater Platform Self-Defense -
- Continue all efforts of FY 2005 less those noted as completed above.
- Initiate open loop in-water experiments to evaluate ATT 4x4 engagement technologies.
- Initiate tank experiments to evaluate NGCM Group behavior technology.
- Initiate NGCM controlled mobility at-sea demonstration.

FY 2007 Plans:

Sensors & Associated Processing -
- Continue all efforts of FY 2006 less those noted as completed above.
- Complete laboratory demonstration of both the conformal solid-state beam director and effective countermeasure jamming capability against an imaging missile seeker for the EO/IR Laser Jammer for TACAIR.
- Complete the final at-sea demonstration of the SHIELDs hardware for Shipboard EO/IR Closed Loop Self-protection.
- Initiate in flight tests against single and multiple, simultaneous threats employing the complete IDECM P3I system capabilities, including new towline, decoy, and Electronic Countermeasure (ECM) techniques for IDECM Pre-Planned Product Improvement (P3I).

Underwater Platform Self-Defense -
- Continue all efforts of FY 2006.
- Complete demonstration of one-one ATT operations in the wake and transition technology to PMS415.
- Complete demonstration of ATT 2x2 salvo engagement technology for clear water engagements and transition technology to PMS415.
- Initiate demonstration of a set of NGCM group behaviors and transition technologies to PMS415.

	FY 2004	FY 2005	FY 2006	FY 2007
MISSILE DEFENSE (MD)	2,802	7,149	9,300	10,600

This activity describes Science and Technology (S&T) projects of the Missile Defense Future Naval Capability (FNC) program including: Advanced Area Defense Interceptor (AADI) S&T planning and data analysis effort for Navy-Marine Corps Air-Directed Surface-to-Air Missile (ADSAM) live firing demonstration at White Sands Missile Range in FY 2008; Affordable Ground Based Radar (AGBR) High Mobility Medium Weight Vehicle (HMMWV)-mounted

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advanced development model (ADM) radar for defense of Marine Corps mobile forces against air and missile attacks; Distributed Weapons Coordination (DWC) (including sensor coordination) open architecture combat system algorithms for automated battle management aids (ABMA), including common threat evaluation (CTE) and preferred shooter recommendation (PSR) functions that will enable fleet units to defend against air and missile attacks with increased effectiveness and efficiency; Littoral Affordability (classified program); and Affordable Ground Based Radar (AGBR) project to reduce risk for an X-band alternative for the Marine Corps Ground/Air Task-Oriented Radar (GATOR) TAMD system (FY 2004 only). Funding increase in FY 2005 is due to an acceleration in DWC efforts.

FY 2004 Accomplishments:

- Continued AADI ADSAM demonstration planning and coordination efforts.
- Continued Littoral Affordability effort (classified program).
- Initiated and completed AGBR project radar group mechanical integration with High Mobility Medium Weight Vehicle (HMMWV) (efforts also included in PE 0603235N). Project completes in FY 2005 under PE 0603271N.
- Initiated testing and demonstration of DWC combat system algorithms developed under PE 0602123N.

FY 2005 Plans:

- Continue all efforts of FY 2004 less AGBR.

FY 2006 Plans:

- Continue AADI and DWC efforts of FY 2005.
- Complete Littoral Affordability effort (classified program).

FY 2007 Plans:

- Continue AADI planning and coordination for FY 2008 Navy ADSAM live-fire demonstration.
- Complete DWC testing and demonstration of CTE and PSR algorithms; continue development and testing of sensor coordination algorithms.

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	FY 2004	FY 2005	FY 2006	FY 2007
HIGH SPEED CRAFT TECHNOLOGY	14,702	9,309	8,900	3,000

This activity was renamed from “Littoral Surface Craft – Experimental (LSC(X))” to more accurately describe the scope of the activity. X-Craft is envisioned as an S&T platform designed for LCS risk reduction and mission module demonstration. A high-speed, all-aluminum catamaran, it displaces 1400 tons at full load. Performance requirements are 50 knots at combat load (about 1200 tons), 40 knots in sea state 4, and a 4000 nautical miles range without replenishment. It will be capable of landing two helicopters up to the size of SH-60R, transporting and operating autonomous vehicles, and carrying several reconfigurable mission modules in standard Twenty-foot Equivalent Unit (TEU) boxes. The crew will be minimal and the vessel will be built to commercial American Bureau of Shipping (ABS) standards. Decrease of funding in FY 2005 was due to the completion of the High Speed Craft.

FY 2004 Accomplishments:

- Completed detail design of the LSC(X) prototype craft.
- Discontinued plans to install lifting body and drag reduction systems on the X-Craft following vessel delivery. Demonstration on these systems will be continued on an alternate platform.
- Completed scheduling and funding of crew training.
- Continue construction of the high speed vessel.

FY 2005 Plans:

- Continue all efforts of FY 2004 less those noted as completed above.
- Continue development of drag reduction and lifting body technology an alternative platform.
- Complete construction and deliver to fleet.
- Initiate and complete certification testing of the X-craft.

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.

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FY 2007 Plans:

- Continue development of drag reduction and lifting body technology on an alternative platform.

C. OTHER PROGRAM FUNDING SUMMARY:
RELATED RDT&E:

NAVY RELATED RDT&E:
PE 0204152N (E-2 Squadrons)
PE 0205601N (HARM Improvement)
PE 0206313M (Marine Corps Communications Systems)
PE 0601153N (Defense Research Sciences)
PE 0602123N (Force Protection Applied Research)
PE 0602131M (Marine Corps Landing Force Technology)
PE 0602235N (Common Picture Applied Research)
PE 0602271N (RF Systems Applied Research)
PE 0603235N (Common Picture Advanced Technology)
PE 0603271N (RF Systems Advanced Technology)
PE 0603502N (Surface and Shallow Water Mine Countermeasures)
PE 0603561N (Advanced Submarine System Development)
PE 0603563N (Ship Concept Advanced Design)
PE 0603564N (Ship Preliminary Design and Feasibility Studies)
PE 0604307N (Surface Combatant Combat System Engineering)
PE 0603609N (Conventional Munitions)
PE 0603640M (USMC Advanced Technology Demonstration (ATD))
PE 0604518N (Combat Information Center Conversion)
PE 0604558N (New Design SSN)

NON NAVY RELATED RDT&E: Not applicable.

D. ACQUISITION STRATEGY:
Not applicable.

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2005
Exhibit R-2a

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603123N PROGRAM ELEMENT TITLE: FORCE PROTECTION ADVANCED TECHNOLOGY
PROJECT NUMBER: R3049 PROJECT TITLE: FORCE PROTECTION

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
R3049 FORCE PROTECTION	5,068	8,523	5,773	6,355	6,587	6,730	7,097	7,388

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Includes funds to develop and demonstrate advanced technologies that support platform self-protection. The new capabilities include the areas of all-weather, day/night protection of naval platforms and forces against all weapon threats, counter-stealth, and countermeasures. Demonstrate capabilities that support the ability to prevent or control platform damage while preserving operational capability. Hull life assurance addresses development of new structural system approaches for surface ships and submarines, including the management of weapons effects to control structural damage and the improvement of structural materials. Distributed intelligence for automated survivability addressees both the basic technology of automating damage control systems, as well as, distributed auxiliary control with self-healing capability. This project supports the Fleet/Force Protection FNC.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2004	FY 2005	FY 2006	FY 2007
EMERGING THREATS	5,068	8,523	5,773	6,355

This activity includes: Efforts in hull life assurance and distributed intelligence for automated survivability. It addresses the management of weapon effects to control structural damage and the improvement of structural materials. Prior to the funds provided by a program realignment for Force Protection, all efforts of this activity were tasks that had been previously funded in the Hull Mechanical and Electrical Activity of Project R2912. The program realignment for Force Protection adds funding beginning in FY 2006 that will be applied to the development of advanced technologies critical to protecting Naval Installations against terrorist threats and activities. Technologies developed will provide seamless full spectrum protection against asymmetric attack by improving the ability to: sense developing and immediate threats; shape our responses through improved situational awareness and decision making; shield personnel, mission critical facilities, infrastructure, and operating fleet assets; maintain essential functions; and sustain and restore critical services in the aftermath of an incident. Technologies developed will also seek to reduce the required manpower and skill levels devoted to the force protection mission.

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FY 2004 Accomplishments:

- Continue development of lower cost/higher performance Force Protection sensors and automated detection algorithms, and decision support tools.
- Completed small-scale tests of prototype optical sensor for volume sensing (fire and smoke detection).
- Completed small-scale testing of high efficiency water-mist system.
- Initiated testing of hybrid water-mist at an intermediate scale.
- Initiated development to increase the capability of previous volume sensor by extending capabilities to allow real-time response.
- Initiated collection of field data on real-time volume sensor.

FY 2005 Plans:

- Continue all efforts of FY 2004 less those noted as completed above.
- Complete development of real-time volume sensor.
- Complete intermediate-scale testing of hybrid water-mist system.
- Complete data collection and field test of volume sensor.
- Initiate validation of full scale ship test performance of the real-time volume sensor on ex-USS Shadwell.
- Initiate validation of full-scale ship performance trials of hybrid water-mist system on ex-USS Shadwell.

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Initiate interim demonstration of prototype sensors.
- Initiate development of intrusion/incident response countermeasures.

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C. OTHER PROGRAM FUNDING SUMMARY:
NAVY RELATED RDT&E:
PE 0601153N (Defense Research Sciences)
PE 0602123N (Force Protection Applied Research)
PE 0602235N (Common Picture Applied Research)
PE 0603235N (Common Picture Advanced Technology)
PE 0603502N (Surface and Shallow Water Mine Countermeasures)
PE 0603561N (Advanced Submarine System Development)
PE 0603563N (Ship Concept Advanced Design)
PE 0603564N (Ship Preliminary Design and Feasibility Studies)
PE 0604558N (New Design SSN)
PE 0604561N (SSN-21 Developments)

NON NAVY RELATED RDT&E: Not applicable.

D. ACQUISITION STRATEGY:
Not applicable.

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CONGRESSIONAL PLUS-UPS:

R2706	FY 2004	FY 2005
PROJECT M	4,805	1,882

FY 2004: Completed testing at sea of the Advanced Development Model (ADM) with the Look Ahead Detection System (LADS).

FY 2005: Based on at-sea testing in FY04 there are issues of robustness and reliability with the Look-Ahead Detection Sensors (LADS). In this fiscal year, improvements will be made to the LADS and an Engineering Development Model (EDM) of the shock mitigating seat will be fabricated, tested and delivered to SOCOM. (An EDM differs from an ADM in that it is more robust and can be considered the prototype of a model that can be manufactured in large quantities.) The EDM will operate as a semi-active system, not a totally active system.

R2711	FY 2004	FY 2005
SUPERCONDUCTING DC HOMOPOLAR MOTOR	5,391	3,666

FY 2004: Completed construction and initiated testing of the 3.7MW sub-scale motor, performed brush risk reduction, and began preliminary design of full scale propulsion motor.

FY 2005: Continue pursuing brush technologies that will allow the full scale motor to meet fleet application requirements. Continue design of the 36.5MW motor and power system.

R2828	FY 2004	FY 2005
ADVANCED WATERJET-21	1,944	0

FY 2004: Continued development of large scale demonstrator platform for signature, propulsion efficiency, and mechanical design interface evaluation.

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R2831	FY 2004	FY 2005
AC SYNCHRONOUS HIGH TEMP SUPERCONDUCTOR (HTS) ELECTRIC MOTOR	5,783	3,467

FY 2004: Completed detailed design of 36.5 MW propulsion motor and motor drive, procured long lead material, and initiated manufacture.

FY 2005: Continue manufacture of 36.5MW motor. Complete fabrication of rotor, stator, and frame. Procure load device and begin test preparations.

R9013	FY 2004	FY 2005
LITTORAL SUPPORT CRAFT EXPERIMENTAL	13,452	9,906

FY 2004: Continued the construction of the X-Craft. Expected to be delivered in FY05, X-Craft will be built to evaluate the hydrodynamic performance, structural behavior, and propulsion system efficiency of high speed hull form technologies. The 79-meter all-aluminum craft will also be used to evaluate mission modularity through a large open mission bay and will eventually serve as a platform for LCS risk reduction.

FY 2005: Complete construction of LSC(X) (aka “X-Craft”) and deliver to fleet in May 2005. Install active rudder system to provide steering redundancy and increase directional stability. Install various “fleet ready” upgrades to allow use of vessel in fleet exercises in support of LCS risk reduction. Upgrades include damage control systems, C4I and shock-mitigating seats. Use any remaining funds to operate vessel through FY 2005 in support of LCS risk reduction.

R9014	FY 2004	FY 2005
PRECISION FABRICATION OF LARGE CURVED STEEL SHIP STRUCTURES	2,411	0

FY 2004: Developed curved plate technology in the construction of double hull vessels using steel and alloy metals with low magnetic, anti-corrosive properties. Demonstrating this application addressed welding technology for stainless steel that is different from conventional carbon steel approaches. The demonstration builds full-scale hull sections that may be used for air-blast and underwater explosion resistance testing. Performed air-blast and underwater explosion testing on precision welded sections and evaluated curved plate

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technology performance.

R9017	FY 2004	FY 2005
WIRELESS SENSOR NETWORK	961	0

FY 2004: Developed wireless sensor technology for monitoring all shipboard systems and provide situational awareness.

R9019	FY 2004	FY 2005
WAVE POWER DEMONSTRATION PROJECT	3,278	3,368

FY 2004: This effort provided for deployment of a second buoy to demonstrate methods of linking power produced by multiple buoys for transmission via one power cable.

FY 2005: This effort will explore more efficient methods of converting wave energy to electrical energy and develop an improved mooring system.

R9023	FY 2004	FY 2005
AFFORDABLE, INTERMEDIATE MODULUS COTS CARBON FIBER QUALIFICATION PROGRAM FOR AIRCRAFT AND MISSILES	0	991

FY 2005: Initiate the qualification of intermediate modulus carbon fibers for use in polymer reinforced composite components for applications in JSF and Global Hawk, JUCAV and the F18.

R9139	FY 2004	FY 2005
SANDWICH PANEL CONSTRUCTION	0	3,963

FY 2005: Initiate the execution of three primary project tasks 1) develop a prototype manufacturing system, incorporating breakthrough process control and quality assurance (PC/QA) technology that is capable of cost-effectively producing steel sandwich panels; 2) design a full manufacturing system capable of meeting the size, volume, quality and cost requirements of the US Navy; and 3) manufacture demonstration panels of the size and shape needed in order to qualify the product for the targeted platforms including the CVN 21 class

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aircraft carriers.

R9140	FY 2004	FY 2005
HIGH SPEED PERMANENT MAGNET GENERATOR	3,460	6,438

FY 2004: Initiated design and construction of an approximately 3MW prototype high speed permanent magnet generator.

FY 2005: Continue design and construction of an approximately 3MW prototype high speed permanent magnet generator.

R9143	FY 2004	FY 2005
SMART SENSOR WEB ADVANCED TECHNOLOGY	0	1,784

FY 2005: Initiate efforts to develop and demonstrate an all digital interferometric signal detection and direction finder system.

R9293	FY 2004	FY 2005
VARICRAFT	0	6,241

FY 2005: This congressional add is a follow-on to FY 2004 High Speed, Heavy Lift Shallow Watercraft. The FY 2004 ($7.65M) was to develop a militarized design and construct a small-scale demonstrator of a variable draft advanced littoral transport. FY 2005 will produce a contract design for the vessel, procure long lead items relating to the propulsion plant, produce the integrated propulsion plant, and the complete detail construction design.

R9303	FY 2004	FY 2005
AGILE PORT AND HIGH SPEED SHIP TECHNOLOGY	4,826	4,953

FY 2004: Developed and demonstrated advanced maritime technologies with commercial and military applications. Includes scale model and full-scale demonstration of advanced hull forms, and supporting technologies in the areas of hydromechanics and lightweight structures.

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FY 2005: This plus-up funds a number of projects that deal with the application of transportation technologies to complementary Navy and civilian uses. Agile port efforts take the basic logistic cost estimates and arrangements derived from the FY 2004 effort and examine an alternative magnetic levitation technology to break the log jam between the port and an inland distribution center, or for military use between the depot and the port of embarkation. The fluid dynamic optimization synthesis design models will be selectively applied to a number of dual use multi-hull vessel candidate designs. Complete the concept design development of a very high power axial water jet design, tested at model scale in FY 2004. Further technical development efforts on the large trimaran will involve computational evaluations of the critical areas of hull form optimization, selected propulsion arrangements, and structural design issues involving regulatory approval.

R9303	FY 2004	FY 2005
STRATEGIC MOBILITY-21 DEPLOYMENT TECHNOLOGY	0	4,259

FY 2005: The Strategic Mobility-21 program is separately called out for FY 2005 but is a continuation of some FY 2004 work in Agile Port Technology. It will address the development and utilization of a candidate inland port facility (Victorville) operating in conjunction with controlled military and commercial cargo movement operations. The program will further involve both military and commercial port and terminal systems in the Southern California region and develop the supporting architectures for the comprehensive plan developed as part of the FY 2004 effort. The Strategic Mobility 21 program for FY 2005 is presently being further defined and drafted for approval and operational contracting in early 2005 in conjunction with an Operational Concept Document that is in development with USMC and USA guidance and related FY 2004 Agile Port funding.

R9304	FY 2004	FY 2005
AVIATION GROUND NAVIGATION SYSTEM (AGNAS)	1,636	991

FY 2004: Initiated the development of an integrated approach to planning and monitoring airside assets through the Aviation Ground Navigation System (AGNAS). If successful, AGNAS will provide an extremely precise depiction of airside personnel and ground support equipment locations, their movements, and a prediction of their future position.

FY 2005: Continue development and demonstration of the Aviation Ground Navigation System (AGNAS).

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R9305	FY 2004	FY 2005
COMPOSITE SPECIAL OPERATIONS CRAFT	964	0

FY 2004: Continued development of a replacement design for special operations craft that will incorporate composite hull construction technology and reduce slamming loads. Assembled the design and development team, confirmed basic requirements for the Mk V.1 prototype, began preliminary hull design, and began evaluation of candidate composite materials.

R9306	FY 2004	FY 2005
DOCK SHOCK	964	4,260

FY 2004: Continued development and system design studies for an advanced ship/platform shock test technology utilizing DARPA developed electrochemical explosive devices.
FY 2005: Demonstrate a suitable shock generation device and complete system engineering for a full scale test capability.

R9307	FY 2004	FY 2005
E-2C INFRARED SEARCH AND TRACK (IRST) TECHNOLOGY EXPERIMENTATION	1,325	0

FY 2004: Initiated infrared (IR) sensors on the E-2C aircraft for detection and tracking of Theater Ballistic Missiles (TBMs), as well as for aircraft and anti-aircraft missiles.

R9308	FY 2004	FY 2005
GLOBAL PERSONAL LOCATOR BEACON (PLB)	1,686	0

FY 2004: Developed Global Personal Location Beacon (PLB) Smart Sensor Web. This effort enhanced the current Emergency Positions Indicating Radio Beacons (EPIRBs) international constellation of satellites to relay an alerting distress message to a regional rescue coordination center (RCC) with critical situational data such as the nature of the emergency, what type of rescue will be required, number of people in the party, location, and condition of victims, and who should be alerted.

R9309	FY 2004	FY 2005

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R9309	FY 2004	FY 2005
LARGE UNMANNED UNDERSEA VEHICLE (LUUV) TEST BED	1,154	1,684

FY 2004: This effort produced an integrated vehicle and guidance design for a Large Unmanned Undersea Vehicle (LUUV) Test Bed including the design of a water tunnel modification and test fixture for evaluating and validating distributed electrical propulsion concepts. Continued system concept development by conducting tradeoff designs of various vehicle sizes, shapes, architectures and propulsion options to best meet the program objectives. Continuing work will focus on the detailed design of the chosen system concept.

FY 2005: Initiate design modifications to the existing Large Unmanned Undersea Vehicle (UUV) Test Bed that will facilitate advanced UUV systems and scaled advanced submarine propulsion systems demonstrations. This will include development of a front end/controller interface architecture, modular section design concepts, vehicle handling equipment design, vehicle maneuvering and control design concepts, and land based testing of subsystems selected from the proposed design concepts.

R9310	FY 2004	FY 2005
LASER WELDING AND CUTTING	3,364	0

FY 2004: Continued to develop the automated laser process controls for T beam fabrication and develop a second generation or ‘beta’ prototype of an industrialized system design capable of producing beams for US Navy ships.

R9311	FY 2004	FY 2005
QUAD HULL SECURITY CAISSON TECHNICAL DEMONSTRATION	2,411	0

FY 2004: Constructed and evaluated a quad hull security caisson constructed from segmented curved plates (a proprietary structural design and manufacturing technology). The technology may offer a robust and economical means of protecting shore facilities and ships from sea based terrorist attack. Completed ballistic, air blast and underwater explosion testing on quad hull segments.

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R9312	FY 2004	FY 2005
REMOTE CONTINUOUS ENERGETIC MATERIAL MANUFACTURING PYROTECHNIC IR DECOYS	1,154	0

FY 2004: Initiated the development of a technology for safe, economical production of pyrotechnical material for use in DOD systems. The initial application will be in the manufacture of infrared decoy flares for use as countermeasures against heat-seeking missiles in order to protect US aircraft.

R9313	FY 2004	FY 2005
TECHNOLOGIES FOR FUTURE NAVAL CAPABILITIES	1,060	1,288

FY 2004: Developed a test-bed model of an unmanned surface vehicle to be employed in the development of control and monitoring algorithm. Systems integrations performed to ensure the viability of the models, simulations and signal processing.

FY 2005: Continue to develop realistic features to the test-bed model of the unmanned surface vehicle to be employed in the development of control and monitoring algorithm. Establish techniques to evaluate the performance and the viability of the models, simulations and signal processing.

R9314	FY 2004	FY 2005
WIRELESS PROGRAMMABLE LOGIC CONTROLLERS	964	0

FY 2004: Funds supported the incorporation of wireless technology into machinery monitoring and control devices for automated equipment and system operation.

R9344	FY 2004	FY 2005
EXTREME TERRAIN MEDICAL EVACUATION VEHICLE PILOT	0	1,684

FY 2005: Effort supports Extreme Terrain Medical Evacuation Vehicle Pilot.

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R9454	FY 2004	FY 2005
ADV DEV AND DEMO OF ELECTRIC ACTUATOR TECHNOLOGY	0	991

FY 2005: Efforts include testing, validating performance, and establishing the range of possible shipboard applications of a quarter-scale actuator.

R9455	FY 2004	FY 2005
AT-SEA DECONTAMINATION PLATFORM DEVELOPMENT AND CONCEPTUAL DESIGN	0	991

FY 2005: Initiate a feasibility assessment of potential advanced ship decontamination system designs that could be used while at-sea including the predicted decontamination success rates for various Chemical/Biological/Radiological Warfare constituents, anticipated costs for forward fit and backfit onto Navy ships, and development of an optimum system design for Navy ships.

R9456	FY 2004	FY 2005
BRAIDED REDUCED RECOIL ROPE FOR HAND AND MOORING LINES	0	991

FY 2005: Initiate testing to prove that a braided 12-strand Reduced Recoil Rope will meet or exceed performance requirements as specified by the Navy. Testing will include sequential break failure, coefficient of friction testing, torque and rotation testing and abrasion resistance testing.

R9457	FY 2004	FY 2005
COMPOSITE TWISTED RUDDER	0	991

FY 2005: Develop a composite twisted rudder and start initial qualification tests. This rudder will have a non-uniform cord shape optimized to minimize the angle of attack of the water flow, thereby minimizing cavitation. The composite rudder will not corrode, will be lighter and easier to fabricate, and may have lower lifecycle cost.

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R9458	FY 2004	FY 2005
DEPLOYABLE FIBER OPTIC FORCE PROTECTION SYSTEM	0	1,784

FY 2005: Initiate optimized 3D underwater hydrophone tracking algorithms and demonstrate deployable fiber optic force protection system.

R9459	FY 2004	FY 2005
DEVELOPMENT OF WIDE BANDGAP SEMICONDUCTOR MATERIALS	0	4,457

FY 2005: Initiate development of semiconductor materials capable of higher power levels and greater temperature ranges than currently employed silicon-based materials.

R9461	FY 2004	FY 2005
ELECTROMAGNETIC PROPULSION COST REDUCTION	0	1,388

FY 2005: Initiate efforts to identify dual use technologies to reduce the cost of military and civilian applications of linear motor systems.

R9462	FY 2004	FY 2005
FUTURE NAVAL CAPABILITIES - CREW MODELING AND SIMULATION (FNC-CMS)	0	2,576

FY 2005: Initiate efforts to develop, validate and verify crew modeling and simulation that can be used as part of the Navy ship system design. This provides for a robust capability to determine the tactical and maintenance workload changes associated with new systems and significant systems changes.

R9463	FY 2004	FY 2005
HIGH-SPEED POWER NODE SWITCHING CENTER	0	1,388

FY 2005: Initiate design and fabrication of a high-speed switching center based on state-of-the-art technology for shipboard applications.

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R9464	FY 2004	FY 2005
INTEGRATED ADVANCED COMMUNICATIONS TERMINAL (ACT)	0	991

FY 2005: Initiate efforts to develop the design and interface methodology to enable advanced integration of a variety of communications terminal architectures. This alleviates the necessity for duplicative common communication terminal components.

R9465	FY 2004	FY 2005
MISSILE WARNING SENSOR	0	2,477

FY 2005: Develop 2-color mid-wave infrared (MWIR) sensor technology for improved missile warning receiver (MWR) performance over current systems operating in the ultraviolet (UV). Specific efforts will address fabricating mercury-cadmium-telluride (MCT) focal plane arrays in a 2-color, stacked diode, 256-by-256 pixel architecture on 6-inch silicon wafer substrates for greatly improved affordability; and developing a common sensor design to include visible and near-infrared (Vis/NIR) pulsed laser guidance detection along with 2-color MWIR missile plume detection in a single threat warning receiver, greatly reducing the cost and logistics burden of separate receivers.

R9466	FY 2004	FY 2005
MULTI-MISSION WARHEAD FOR ULTRA-LIGHT TORPEDO	0	2,279

FY 2005: Initiate investigation, by analysis and full scale experiments. To determine the effects on performance of combining defensive (omnidirectional) and offensive (directed energy) warhead technologies into a single multimode warhead for the 6.75" torpedo.

R9467	FY 2004	FY 2005
NON-LINE OF SIGHT (NLOS) FOR UNMANNED SYSTEMS	0	4,260

FY 2005: Initiate modifications to hardware prototypes for the Omni-Directional Inspection System (ODIS), which provides an electronically transmitted view of the underside of a vehicle. Each ODIS is composed of a high-resolution camera mounted on a sophisticated, omni-directional mobile platform that transmits video back to an Operator. This system can potentially reduce the risk to Military Police in screening vehicular traffic

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into secure areas.

R9468	FY 2004	FY 2005
DEVELOPMENT OF SULFER TOLERANT COPPER-BASED SOLID OXIDE FUEL CELL (SOFC)	0	991

FY 2005: Conduct research to investigate sulfur tolerant copper-based anode catalyst materials for solid oxide fuel cells for future Navy applications. This includes test fixture fabrication, anode cell materials development, and associated testing.

R9469	FY 2004	FY 2005
TADIRCM ANTIMISSILE TECHNOLOGY	0	6,736

FY 2005: Develop advanced component technologies for the Tactical Aircraft Directed Infrared Countermeasures (TADIRCM) Early Operational Analysis (EOA) pod effort. These include: (a) high power, multi-band mid-wave infrared (MWIR) lasers with improved beam quality, beam stability, efficiency and output power that can operate at the elevated temperatures and high-G/high vibration environment of a tactical jet pod installation; (b) MWIR transmitting fiber optics to improve coupling of the multi-band laser to the jam head beam director, (c) low profile, light weight, shared-axis fine trackers and beam directors with reduced pointing jitter and advanced auto-bore-sight capability that are suitable for high-G/high vibration operation; and (d) advanced missile warning receivers with low-cost fully athermalized and achromatic optics and advanced processing algorithms for rapidly geo-locating surface-to-air missile launch sites.

R9470	FY 2004	FY 2005
UNMANNED FORCE AUGMENTATION SYSTEM	0	991

FY 2005: Initiate efforts to conduct research, development and testing of advanced unmanned aerial vehicle (UAV) technologies, including the design and integration of an avionics suite and flight demonstration of the system. If successful, this effort will provide the Navy with a much-improved shipboard landing capability for fixed wing unmanned aircraft.

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R9471	FY 2004	FY 2005
UNMANNED SYSTEMS TECHNOLOGIES FOR EXPLOSIVE ORDNANCE DISPOSAL	0	4,260

FY 2005: Initiate development of S&T tools and capabilities necessary for the military and law enforcement Explosive Ordnance Disposal (EOD) technicians to meet the various EOD, Improvised Explosive Device (IED), and Unexploded Ordnance (UXO) challenges and reduce the risk to the personnel by developing unmanned systems to perform these dangerous and critical missions.