FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004
Exhibit R-2

BA: 03 PROGRAM ELEMENT: 0603114N
PROGRAM ELEMENT TITLE: Power Projection Advanced Technology

COST: (Dollars in Thousands)

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R2487 DP-2 Thrust Vectoring Program	4,763	4,945	0	0	0	0	0
R2721 Vectored Thrust Ducted Propeller (VTDP)	3,334	0	0	0	0	0	0
R2821 Integrated Hypersonic Aeromechanics Tool (IHAT)	3,574	3,461	0	0	0	0	0
R2823 Precision Strike Navigator (PSN)	961	989	0	0	0	0	0
R2911 Power Projection Advanced Technology/Integrated High Payoff Rocket Propulsion Technology Program (IHPRPT)	72,816	198,188	86,179	67,107	65,237	46,609	47,556
R3006 Affordable Weapons	20,431	0	0	0	0	0	0
R3022 Joint Non Lethal Weapons	0	0	6,180	2,394	1,397	10,790	10,806
R9008 High Energy Laser-Low Aspect Target Tracking (HEL-LATT)	4,451	2,076	0	0	0	0	0
R9010 Variable Engine Nozzle	1,436	1,483	0	0	0	0	0
R9012 Magdalena Ridge Observatory	20,129	10,383	0	0	0	0	0
R9013 Littoral Support Craft-Experimental (LSC(X))	8,702	0	0	0	0	0	0
R9133 Advance Camouflage Coating	6,976	0	0	0	0	0	0
R9134 High Speed Anti-Radiation Demonstration (HSAD)							

FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004
Exhibit R-2

BA: 03 PROGRAM ELEMENT: 0603114N
PROGRAM ELEMENT TITLE: Power Projection Advanced Technology

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
	7,352	5,044	0	0	0	0	0
R9135 High Speed Anti-Radiation Missile Demonstrator (AARGM)							
	6,062	0	0	0	0	0	0
R9136 Advanced Lifting Body Research Program/High Speed, Heavy-Lift, Shallow Draft-Capable Watercraft Demonstration							
	5,651	12,510	0	0	0	0	0
R9137 Littoral Support Craft LSC (X))-Lifting Body							
	9,698	0	0	0	0	0	0
R9292 Advanced Thin Film Coatings							
	0	4,945	0	0	0	0	0
R9295 Large Area Multi-Spectral Sapphire Windows For Airborne Reconnaissance							
	0	1,682	0	0	0	0	0
R9296 Laser Radar							
	0	2,967	0	0	0	0	0
R9297 Low Power Mega-Performance UAV Processing Engines							
	0	1,483	0	0	0	0	0
R9298 Low-Cost Guided Imaging Rocket (LOGIR)							
	0	2,967	0	0	0	0	0
R9299 Printed Wiring Boards (PWB)							
	0	4,203	0	0	0	0	0
R9302 Uncooled High Resolution Infrared Sensors							
	0	3,362	0	0	0	0	0
Totals	176,336	260,688	92,359	69,501	66,634	57,399	58,362

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops and demonstrates advanced technologies, including Directed Energy, for naval weapon systems, and Electric Warship. This Program Element (PE) includes elements of the following Future Naval Capabilities (FNCs): Time Critical Strike (TCS), Autonomous Operations (AO), and Total Ownership Cost (TOC). Within the Naval Transformation Roadmap, this investment will achieve one of four key transformational capabilities required by Sea Strike as well as

technically enable elements of both Sea Shield and Force Net.
Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

PROGRAM CHANGE SUMMARY:

	FY 2003	FY 2004	FY 2005
FY 2004-2005 President's Budget Submission	167,191	177,006	190,411
Cong. Rescissions/Adjustments/Undist.Reductions	0	-3,006	0
Congressional Actions	0	86,700	0
*Execution Adjustments	11,012	0	0
Inflation Savings	0	0	-627
Joint Non-Lethal Weapons Program	0	0	6,200
J-UCAS Transfer to DARPA	0	0	-107,000
Rate Adjustments	0	-12	155
SBIR Assessment	-1,867	0	0
Technical Adjustments	0	0	3,220
FY 2005 President's Budget Submission	176,336	260,688	92,359

*Includes $14.9M ATR for Affordable Weapons.

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not Applicable.

Schedule: Not Applicable.

FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004
Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603114N PROGRAM ELEMENT TITLE: Power Projection Advanced Technology
PROJECT NUMBER: R2911 PROJECT TITLE: Power Proj Adv Tech / IHPRPT

COST: (Dollars in Thousands)

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R2911 Power Proj Adv Tech / IHPRPT	72,816	198,188	86,179	67,107	65,237	46,609	47,556

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Project includes elements of the following Future Naval Capabilities (FNCs): Time Critical Strike (TCS); Autonomous Operations (AO); and Total Ownership Cost (TOC).

Note: Integrated High Payoff Rocket Propulsion Technology Program (IHPRPT) (FY 2004 $988) is discussed in the Congressional Plus-Up section.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Joint Unmanned Combat Air System	21,000	117,865	0

ONR supports the DARPA (Defense Advanced Research Project Agency)-led Joint Unmanned Combat Air Systems (J-UCAS) effort (formerly UCAV-N), in conjunction with Air Force, to develop and demonstrate technical feasibility, military utility and operational value for a networked system of high performance, weaponized unmanned air vehicles to effectively and affordably prosecute 21st century combat missions – including Suppression of Enemy Air Defenses (SEAD), collaborative electronic attack, penetrating surveillance, and deep strike – within the emerging global command and control architecture. Multi-year funding in this project will provide for two robust flight demonstrations to encourage innovation, fully explore the potential, and develop options for reduced risk transition to acquisition.

The technical challenges of J-UCAS include: (1) suitability of an advanced low observable air vehicle for carrier based launch and recovery, (2) integrated manned/unmanned air and deck operations, and (3) associated mission control system (MCS) carrier integration. Two full flight demonstrations are planned to include simulation and surrogate buildups, carrier air operations, catapult launch and arrested landing, deck and mission operations.

FY 2003 Accomplishments:

- Initiated Phase IIB Flight demonstration phase with two contractors under the J-UCAS effort. Continued system design and planning for mission and deck operations simulations. Simulated carrier air traffic area operations demonstrations. Conducted flight test of X-47A Pegasus.

FY 2004 Plans:

- Continue FY03 design and planning tasks. Initiate detailed air vehicle, surrogate, and MCS software design and air vehicle fabrication. Perform mission control at sea demonstration and preliminary, midterm and critical design reviews. This effort transitions to DARPA in FY05.

	FY 2003	FY 2004	FY 2005
TIME CRITICAL STRIKE	37,566	65,432	72,153

The specific mission of Time Critical Strike (TCS) integrates surveillance, indications and warnings, target identification, targeting, fire order generation and dissemination, engagement and kill mechanisms, and damage assessment processes to address critical mobile targets, urban targets, short dwell targets and deeply buried targets. TCS technologies reduce the time to conduct strike in all functional areas of the kill chain. Technologies in this functional area also include those associated with High Speed Strike Weapons.

FY 2003 Accomplishments:

- Mission Responsive Ordnance (MRO) technology: Developed targetable submunition warhead variant for Tomahawk focusing on kill vehicle definition and operation and support structure. This task was terminated at the end of FY03 due to lack of transition support.
- Image Video Analysis (IVA): Conducted an algorithm survey and developed algorithms for target exploitation in image and video streams. Task terminated at the end of FY03 due to loss of transition support.
- Affordable Weapons System (AWS): Conducted solid rocket motor and turbojet qualification, multiple flight tests, launcher development and test, and shipboard integration. This program transitions to 6.4 in FY04.
- Advanced Gun-Barrel Technology (AGT): Initiated design concepts and scaled material testing for advanced gun projectile propulsion technology and associated gun-barrel technology.
- Real Time Execution Decision Support System (REDS): Continued design and development of software for collaborative planning, options generation, and mission target folder generation.
- Cruise Missile Real Time Retargeting (CMRTR): Completed test and evaluation of V.2 sensor, continued development of V.3 sensor, spec V.4 low cost terminal seeker.

- Precision Strike Navigator (PSN): Continued development of chemical and mechanical processes, accuracy and stability testing for low cost Fiber Optic Gyroscope (FOG) inertial measurement unit (IMU).
- High-Speed Anti-Radiation Missile (HSARM): Continued integrated studies and initiated development of an advanced dual mode anti-radiation missile seeker for a ramjet-powered missile airframe.
- Hyper-spectral Imaging System (HSI): Completed rugged, high through-put near and far Infra-Red Spectrometers, and enhanced detect algorithms for real time processor.
- TCS Exploitation and Deployment efforts: HyFly program began fabrication of prototype components (i.e. formed inlet cowl, inlet housing, gas generator housing, and combustor nozzle).

FY 2004 Plans:

- AGT: Continue development and scaled testing of propulsion.
- REDS: Complete software implementation and system and unit level test.
- CMRTR: Continue development of V.3 and V.4 sensors for low cost terminal seeker, and test subcomponents of V.3 sensor.
- PSN: Continue development of chemical and mechanical processes for low cost precision FOG IMU, and provide low accuracy unit for evaluation.
- HSARM: Continue development and subsystem test of an advanced dual mode anti-radiation missile seeker incorporating advanced seeker, aperture, guidance and control technologies for a ramjet-powered missile airframe.
- HSI: Integrate visible sub-system with near and far Infra-Red Spectrometers, optical train, select position/pointing system reference, and enhance detect algorithms for real time processor. Program completes in 2004.
- TCS Exploitation and Deployment efforts: HyFly program completes fabrication of prototype components, flight tests of separation test vehicle (STV), wind tunnel tests of freejet engine and assembly of first HyFly flight test vehicle and associated live energetic systems.
- National Aerospace Initiative Revolutionary Approach To Time-critical Long Range Strike (NAI RATTLRS): Begin studies to identify potential concepts that address performance of the first flight demonstration vehicle, and depict the evolution into weaponized configurations. Initiate engine preliminary design of the RATTLRS candidates under cooperative effort with the Air Force Research Laboratory Propulsion Research Technology (AFRL PRT) as part of the Joint Expendable Turbine Engine Concepts (JETEC) program. Complete preliminary flight demo vehicle design.

FY 2005 Plans:

- AGT: Continue FY03 and FY04 efforts and begin large scale gun prototyping with materials selected.

- CMRTR: Perform full system test of V.3 sensor, continue development of V.4 sensor for low cost terminal seeker, integrate V.2, V.3 sensors with V.4, and perform V.4 subsystem tests.
- PSN: Continue development of low cost precision FOG IMU and deliver updated high accuracy unit ready for evaluation.
- HSARM: Complete development, subsystem, and system level flight test demonstration of an advanced dual mode anti-radiation missile seeker for a ramjet-powered missile airframe.
- TCS Exploitation and Deployment efforts: HyFly efforts assemble and deliver 2nd and 3rd flight test vehicles to test site. Conduct free flight tests of all three flight test vehicles and submit a report for each flight test.
- NAI RATTLRS: Initiate inlet/engine/nozzle integration and component testing. Initiate fabrication of long lead flowpath hardware and ground testing of airframe configurations and fabrication of flight vehicle sub-systems.
- Landing Support Craft-Experimental (LSC(X)): Initiate development of a lifting body design for X-Craft. The lifting body will be used to provide low speed stability for the craft, allowing an increase in the operational envelope for helicopter operations and potentially for small craft deployment and retrieval. Develop a fluid drag reduction system leading to the improvement of ship speed, improved fuel economy, and reduced air pollution.

	FY 2003	FY 2004	FY 2005
Autonomous Operations (AO)	14,250	13,903	14,026

The Autonomous Operations (AO) Future Naval Capability (FNC) activity aims to enhance the mission capability and operational utility of Naval forces by developing technologies that will dramatically increase the autonomy, performance, and affordability of Naval organic unmanned vehicle (UV) systems. By defining and focusing risk reduction overarching Intelligent Autonomy (IA) Science and Technology (S&T) principles, transitional products will be developed in four areas: Unmanned Air Vehicles (UAV) Technology, which includes intelligent autonomy reasoning, technologies to enhance “see and avoid” capabilities, object identification, vehicle awareness, and vehicle and mission management; Unmanned Undersea Vehicles (UUV), which will demonstrate the technical feasibility for a UUV system to effectively search, detect, track and trail undersea threats while maintaining a robust communications link to enable appropriate command, control and transmission of collected data; Unmanned Ground Vehicles (UGV), which focuses on the increasing utility of UGV systems in urban and littoral terrain to Marine Corps units; and UAV Propulsion, which will develop innovative propulsion and power technologies unique to Naval UAVs operating from surface combatants.

FY 2003 Accomplishments:

- IA Task: Developed and tested technologies for UV dynamic replanning, autonomous vehicle control, alert management, maritime situation awareness, and multi-vehicle distributed cooperation for unmanned air, ground, surface, and undersea vehicles. Completed simulation testing of tightly coupled path replanning and mapping.
- UAV Technology: Continued the development of self-awareness sensor software and decision development of sub-system self-awareness sensors to enable adaptation and independent action for detection (threats, terrain), and display for Situational Awareness (SA). Continued the development of multi-modal interface for humans to control autonomous vehicles using combination of control inputs for communications and network, as well as the ability for a single human to control multiple vehicles using a mixed-initiative model.
- UUV: Continued development and demonstration of undersea, autonomous operations for Maritime Reconnaissance (MR) utilizing a submarine launched capable vehicle and Undersea Search and Survey and Communications/Navigation Aid (USS/CNA) utilizing a network of multiple, mobile nodes.
- UGV: Continued design and development of mobility UGV test bed for platform, sensor, and command & control sub-systems.
- UAV Propulsion: Continued the development of naval-unique propulsion and power technologies for future UAV systems and integrated these technologies into an enhanced next-generation commercial core for test.

FY 2004 Plans:

- IA Task: Continue testing and demonstrating intelligent vehicle technologies. Complete in-water demonstration of tightly integrated path replanning and on-board mapping with AO UUV development effort.
- UAV Technology: Continue developing and performing simulation testing of sensors and sensor software and the development of multi-modal interface control. Demonstrate UAV networking and communication with loaned Joint Tactical Radio System (JTRS) prototype radios for demonstration in the FIRESCOUT.
- UUV: Continue work developing and demonstrating undersea operations for MR.
- UGV: Complete work on mobility UGV test bed. Transitioning to Marine Corps for System Development Design (SDD).
- UAV Propulsion: Continue development of naval-unique future UAV propulsion systems. Conduct ground test of the enhanced next-generation commercial gas generator core.

FY 2005 Plans:

- IA Task: Continue development of single operator/multi-vehicle control technologies. Complete design of real time autonomous vehicle replanning capability.
- UAV Technology: Continue work developing and performing simulation testing of sensors and sensor software and the development of multi-modal interface control. Develop and conduct testing of self-awareness sensor software and sub-system self-awareness sensors.

- UUV: Continue work developing and demonstrating undersea operations for MR.
- UAV Propulsion: Conduct ground test of the XTE-67/A1 UAV demonstrator engine with naval-unique technologies and integrate with the enhanced next-generation commercial core and a Mach 3.5 capable expendable turbine engine for missile applications. This meets Integrated High Performance Turbine Engine Technology (IHPTET) phase III Joint Expendable Turbine Engine Concept (JETEC) goals and is a foundation for the Versatile Affordable Advanced Turbine Engine (VAATE) program.

C. OTHER PROGRAM FUNDING SUMMARY:

Navy RELATED RDT&E:

PE 0601153N Defense Research Sciences
PE 0602114N Power Projection Applied Research
PE 0602236N Warfighter Sustainment Applied Research
PE 0603123N Force Protection Advanced Technology
PE 0603782N Mine and Expeditionary Warfare Advanced Technology
PE 0603236N Warfighter Sustainment Advanced Technology
PE 0603790N NATO Research and Development
PE 0305204N Tactical Unmanned Aerial Vehicles
PE 0603502N Surface and Shallow Water Mine Countermeasures
PE 0603654N Joint Service Explosive Ordnance Development
PE 0602131M Marine Corps Landing Force Technology

NON-NAVY RELATED RDT&E: These PEs adhere to Defense S&T Reliance agreements with oversight provided by the JDL.

PE 0603285E ASP-01 Advanced Aerospace Systems
PE 0603709D Joint Robotics Program
PE 0604709D Joint Robotics Program - EMD
PE 0602203F Aerospace Propulsion
PE 0603202F Aerospace Propulsion Subsystems Integration
PE 0603216F Aerospace Propulsion and Power Technology
PE 0603205F Flight Vehicle Technology
PE 0603245F Flight Technology Integration

D. ACQUISITION STRATEGY:

Not Applicable.

FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004

Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603114N PROGRAM ELEMENT TITLE: Power Projection Advanced Technology

PROJECT NUMBER: R2911 PROJECT TITLE: Power Proj Adv Tech / IHPRPT

FY 2005 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2004
Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603114N PROGRAM ELEMENT TITLE: Power Projection Advanced Technology
PROJECT NUMBER: R3022 PROJECT TITLE: Joint Non Lethal Weapons

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R3022 Joint Non Lethal Weapons	0	0	6,180	2,394	1,397	10,790	10,806

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFCATION:
This effort establishes a program for Joint Non-Lethal Weapons (NLW) research in which the Marine Corps is the Executive Agent. The programs are a result of the lessons learned in Operation Iraqi Freedom.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Joint Non-Lethal Weapons (NLW) Program	0	0	6,180

This project covers the development of next-generation Non-Lethal Weapons (NLWs) and includes efforts to ensure optimum weaponization and use of these NLWs. Next-generation NLW systems focus on long-range localized NL effects to identified threat individuals (or groups of individuals) and/or their threat weapons systems operating in complicated environments such as urban areas, crowds, buildings, vehicles, boats and also in close proximity to high-value civilian establishments.

FY 2005 Plans:

- Initiate program to conduct feasibility assessments and demonstrations of promising non-lethal technologies and system concepts. Initial efforts will assess the general utility, effect, and effectiveness of technologies for incapacitating personnel, clearing facilities, stopping vehicles and vessels, and denying enemy access to protected areas.

C. OTHER PROGRAM FUNDING SUMMARY:
Related RDT&E:
PE 0602131M Marine Corps Landing Force Technology
PE 0603640M USMC Advanced Technology Demonstration

D. ACQUISITION STRATEGY:
Not Applicable.

CONGRESSIONAL PLUS-UPS:

R2487	FY 2003	FY 2004
DP-2 THRUST VECTORING PROGRAM	4,763	4,818

FY 03 - This effort involved the development and evaluation of the half scale DP2 vertical takeoff aircraft. Completed demonstration of tethered hover test.
FY 04 - Current plans are to demonstrate vertical lift with sustained control via tethered and untethered hover.

R2721	FY 2003	FY 2004
VECTORED THRUST DUCTED PROPELLER (VTDP)	3,334	0

This effort was a multi-functional component that replaced a conventional tail rotor system in a helicopter. The VTDP provided anti-torque/yaw control capability with propulsion and effort vectoring control. Continued design, analysis and engineering support of the aircraft systems. Continued aircraft modifications and drive system testing at the Helicopter Transmission Testing Facility (HTTF).

R2821	FY 2003	FY 2004
INTEGRATED HYPERSONIC AEROMECHANICS TOOL PROGRAM (IHAT)	3,574	3,461

FY 03 - This effort developed a multi-disciplinary optimization analysis tool for Navy use in design and evaluation of a hypersonic weapon system. Completed design and validation of Build One.
FY 04 - This effort will defined requirements of next incremental Build.

R2823	FY 2003	FY 2004
PRECISION STRIKE NAVIGATOR (PSN)	961	989

This effort fabricated a pre-production transceiver device using the PSN prototype facility at Army Missile Command. Current effort will continue process developement for low cost manufacture of the unique PSN devices and their applications.

BA: 03 PROGRAM ELEMENT: 0603114N PROGRAM ELEMENT TITLE: Power Projection Advanced Technology
PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

R2911	FY 2003	FY 2004
INTEGRATED HIGH PAYOFF ROCKET PROPULSION TECHNOLOGY PROGRAM (IHPRPT)	0	988

This effort will develop and demonstrate advanced propulsion technologies that will increase the kinematic performance of weapons systems while meeting the goals of the Integrated High Payoff Rocket Propulsion Technology (IHPRPT) program.

R3006	FY 2003	FY 2004
AFFORDABLE WEAPON	20,431	0

This effort flight-tested the Affordable Weapon from a short rail launcher using a new more powerful engine. Conducted flight duration tests of up to 6 hours. Tested the GPS targeting system and demonstrated it on a target range.

R9008	FY 2003	FY 2004
HEL-LOW ASPECT TARGET TRACKING (HEL-LATT)	4,451	2,076

FY 03 - This effort investigated tracking techniques for target acquisition, background discrimination, and aim-point maintenance using the laser and beam director at the High Energy Laser Systems Test Facility (HELSTF) in New Mexico. In FY03 several small missiles were tracked by SeaLite Beam Director (SLBD) and Tactical High Energy Laser (THEL) and engaged with THEL. In addition, upgrades to the SLBD and the development of a new tracking processing unit was begun.
FY04 - This effort upgrades to SLBD tracking system will be completed. New cameras, optical systems will be installed. Multiple High Power Laser tests against targets will be conducted.

R9010	FY 2003	FY 2004
VARIABLE ENGINE NOZZLE	1,436	1,483

FY 03 - This effort completed Phase I design and began fabrication of a Variable Displacement Van Pump (VDVP).
FY 04- This effort will conduct a lab demonstration of a VDVP and initiate Phase II integration of the VDVP with a demonstration engine.

BA: 03 PROGRAM ELEMENT: 0603114N PROGRAM ELEMENT TITLE: Power Projection Advanced Technology
PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

R9012	FY 2003	FY 2004
MAGDALENA RIDGE OBSERVATORY	20,129	10,383

This effort will build a testbed to explore how optical interferometry sensitivity can be improved, with techniques to include combining adaptive optics with medium size telescopes; provide next generation design technology for Navy optical interferometry; and develop significant academic resources to draw on for the Navy's future needs.

R9013	FY 2003	FY 2004
LITTORAL SUPPORT CRAFT-EXPERIMENTAL (LSC (X))	8,702	0

This effort designed and built a high speed vessel for full scale testing of high speed hydrodynamics, lifting body, drag reduction and low speed stability technologies for a multi-hulled catamaran (estimated start date FEB 03, estimated deliver date AUG 04)
*Previous year funding and planning discussed under PE 0603123N Project R9013.

R9133	FY 2003	FY 2004
ADVANCED CAMOUFLAGE COATING DEMONSTRATION	6,976	0

This effort manufactured camouflage materials and applied them to unmanned aerial vehicles for expanded flight test evaluation, assessment and qualification. Developed palettes of these materials requiring different schemes due to various operational environments. These materials have the potential of reducing costs due to repair and replacement of the coatings.

R9134	FY 2003	FY 2004
HIGH SPEED ANTI-RADIATION MISSILE DEMONSTRATION (HSAD)	7,382	5,044

FY03 - This effort developed a producible Digital Control Actuator System (CAS) for the missile aft steering system of the High Speed Anti-Radiation Demonstration (HSAD) airframe. Military value derives from the increase in performance of next generation Anti-Radiation Missiles (ARM). Completed project development plan and performed initial requirements analysis and drafted specification documents.
FY04 - This effort will develop design concepts and build multiple proof of concept subcomponent prototypes.

R9135	FY 2003	FY 2004

R9135	FY 2003	FY 2004
HIGH SPEED ANTI-RADIATION MISSILE DEMONSTRATION- AARGM	6,032	0

This effort funded the seeker modifications and additional seekers to support the High Speed Anti-radiation Demonstration (HSAD) at higher operational speeds and longer ranges than the existing AARGM. Military value derives from the increased speed, accuracy, lethality and flexibility of the next generation Anti-Radiation Missile (ARM). The next generation ARM will be used for both suppression of enemy air defenses (SEAD) and Destruction of Enemy Air Defenses (DEAD) missions.

R9136	FY 2003	FY 2004
ADVANCED LIFTING BODY RESEARCH PROGRAM	5,651	4,945

FY03 - This effort designed, developed and demonstrated an advanced lifting body catamaran by converting the Surface Effect Ship 200 (SES-200) and incorporating an advanced lifting body to improve dynamic lift, payload capacity and small craft seakeeping.
FY04 - This effort will complete initial at-sea testing and data collection. Will also expand the at-sea testing of the advanced lifting body to more fully explore the seakeeping, stability and ride-control capabilities of the advanced lifting body through more extensive data collection and analysis.

R9136	FY 2003	FY 2004
HIGH SPEED, HEAVY-LIFT, SHALLOW DRAFT-CAPABLE WATERCRAFT DEMONSTRATION	0	7,565

This effort will develop a design for a dual-use, SWATH-like craft. Commercial use is as a ferry in regions of high tidal variations. Military use would be as a half-scale demonstrator of beachable, littoral transport.

R9137	FY 2003	FY 2004
LITTORAL SUPPORT CRAFT(LSC (X))-LIFTING BODY	9,698	0

This effort conducted underlying Science and Technology to support design and construction of a Lifting Body for the Littoral Support Craft-Experimental (a full scale vessel). *Previous year funding and planning discussed under PE 0603123N Project R2912.

R9292	FY 2003	FY 2004

R9292	FY 2003	FY 2004
ADVANCED THIN FILM COATINGS	0	4,945

This effort will develop and demonstrate Advanced Thin Film Coatings for Naval applications. These coatings include light-weight paint pigments for Naval Aviation paints, thin film paint replacement materials for reducing aircraft life cycle costs, and thin light-weight flexible Organic Light Emitting Diode (OLED) films for display and landing light applications. The planned program will develop and qualify these thin film based technologies for potential Naval Aviation applications on MV-22, Unmanned Air Vehicles (UAVs), and Joint Strike Fighter (JSF).

R9295	FY 2003	FY 2004
LARGE AREA MULTI-SPECTRAL SAPPHIRE WINDOWS FOR AIRBORNE RECONNAISSANCE	0	1,682

This effort will develop large area, high transmission, low cost, high durability entrance windows for integrated electro-optic and infrared sensors for Navy, Marine Corps and Army platforms.

R9296	FY 2003	FY 2004
LASER RADAR – "AUTONOMOUS TARGETING AND DESTRUCTION"	0	2,967

This effort will develop an improved missile seeker to search larger areas at faster speed to improve performance against occluded targets. Current funds will be used to develop improvements to the ladar electronics that will reduce system noise and improve performance of the seeker.

R9297	FY 2003	FY 2004
LOW POWER MEGA-PERFORMANCE UAV	0	1,483

This effort will develop microcode for 3D synthetic aperture radar on existing 64 node 23 GFLOP sequential instructions multiple data (SIMD) processing chip. Layout real-time 256 node chip to achieve 104 GFLOPS.

R9298	FY 2003	FY 2004
LOW-COST GUIDED IMAGING ROCKET (LOGIR)	0	2,967

This effort will develop a low cost rocket system that uses an imaging seeker and can be used against a wide

variety of targets. Funds provided will develop a simulation environment to support requirements analysis and preliminary design. Initial develop of a fully compliant Inertial Measurement Unit (IMU) will also be initiated.

R9299	FY 2003	FY 2004
PRINTED WIRING BOARDS (PWB)	0	4,203

This effort will develop vertical interconnect technology for silicon wafer scale circuitry onto printed wiring boards (PWBs). Advance multilayer PWB ultrasonic analysis by employing direct sequence spread spectrum technology.

R9302	FY 2003	FY 2004
UNCOOLED HIGH RESOLUTION INFRARED SENSORS	0	3,362

This effort will develop uncooled infrared sensors based on advanced metal doped, ion-implanted, organic polymer based materials. This effort will produce high resolution 640x480 IR sensors. Experimental devices have demonstrated higher performance, ease in fabrication, higher uniformity, and substantially lower fabrication costs than current inorganic material sensors.