

UNCLASSIFIED

FY 2008/2009 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: February 2007

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603114N
PROGRAM ELEMENT TITLE: POWER PROJECTION ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
Total PE	127,732	114,221	49,684	59,984	77,948	50,924	53,759	54,408
2911 POWER PROJECTION ADVANCED TECHNOLOGY	81,595	71,535	49,684	59,984	77,948	50,924	53,759	54,408
9999 CONGRESSIONAL PLUS-UPS	46,137	42,686	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops and demonstrates advanced technologies, including Directed Energy, for naval weapon systems, and the Electric Warship. This Program Element (PE) includes elements of the following Future Naval Capabilities (FNCs); Time Critical Strike, and Force Net. 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.

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B. PROGRAM CHANGE SUMMARY:

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
FY 2007 President's Budget Submission	127,049	76,806	40,926	64,151
Congressional Action	0	42,850	0	0
Congressional Realignment	2,200	0	0	0
Congressional Reduction	0	-5,000	0	0
Congressional Undistributed Reductions/Rescissions	-622	-435	0	0
Execution Adjustments	1,744	0	0	0
Non-Pay Inflation Adjustments	0	0	-171	199
Program Adjustments	0	0	5,394	4,756
Program Realignment	0	0	3,519	-9,257
Rate Adjustments	0	0	16	135
SBIR Assessment	-2,639	0	0	0
FY 2008/FY 2009 President's Budget Submission	127,732	114,221	49,684	59,984

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.

E. PERFORMANCE METRICS:

The metrics used are programmatic milestones and technical milestones such as flight test and testing of projectile concepts for technical demonstration programs; Technology Transition Agreements (TTAs) which are

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agreements between the Office of Naval Research and an acquisition program office to transition FNC 6.3 technologies into an acquisition program.

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COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
2911 POWER PROJECTION ADVANCED TECHNOLOGY	81,595	71,535	49,684	59,984	77,948	50,924	53,759	54,408

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the Time Critical Strike (TCS) and ForceNet FNC components which address technological issues associated with the development of strike weapons to significantly decrease the launch to engagement timeline; provide the Navy of the future the ability to quickly locate, target, and strike critical targets; and enhance mission capabilities and operational utility of Naval forces by dramatically increasing the autonomy, performance, and affordability of Naval organic Unmanned Vehicle systems.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2006	FY 2007	FY 2008	FY 2009
PRECISION STRIKE TECHNOLOGY	51,472	41,976	23,029	31,147

This project focuses on the development of high speed (Mach 3 to Mach 4+) propulsion technologies supporting the development of strike weapons which significantly decrease the launch to engagement timeline. Investments under this activity were previously reported under the Time Critical Strike FNC. This new activity breakout provides improved clarification of the overall investment scope.

Decrease in funding between FY 2006 and FY 2007 is due to the reduction in National Aerospace Initiative Revolutionary Approach to Time-critical Long Range Strike (NAI RATTLRS) program. Decrease in funding between FY 2007 and FY 2008 is due to the completion of the Hypersonic Flight Demonstration Program (HyFly). The increase in funding between FY 2008 and FY 2009 is due to the significant increase in the 6.3 demonstration portion of the Electromagnetic (EM) Railgun program.

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FY 2006 Accomplishments:

- NAI RATTLRS: Completed a preliminary design review of the proposed concept. Completed system critical design review. Fabricated safe separation flight test vehicles and flight test hardware. Accelerated technical development of individual components. Began engine component fabrication assembly and testing, fabrication assembly and system check-out of the airframe and components, and fabrication of safe separation flight test vehicles and flight test hardware.
- HyFly: Completed two fully powered HyFly flights to demonstrate flight worthiness.

FY 2007 Plans:

- NAI RATTLRS: Complete final component demonstration and validation along with a critical design review. Conduct system checkouts and fabrication of flight demonstration vehicles.
- HyFly: Complete three fully powered HyFly flights to demonstrate Hypersonic and long rangeflight performance.
- EM Gun: Initiate procurement for the first set of new capacitor banks to support the 32 mega-joule (MJ) muzzle energy demonstration. Additional sets will be purchased in FY 2008 and FY 2009 to provide a total of 100MJ of energy to the system. Conduct testing of initial barrel design components from the three vendors currently under contract to design and build the tactical barrel. Conduct system level testing of the energy storage and power delivery system through the rails of the railgun to ensure the initial design will support the full scale power and current requirements in FY 2009 and FY 2010. Support testing of initial projectile concepts from two vendors currently under contract for projectile development.

FY 2008 Plans:

- NAI RATTLRS: Conduct RATTLRS flight testing. Conduct data reduction of flight demonstration and prepare final program report.
- EM Gun: Complete procurement of capacitor banks. Continue testing components and designs up to 16 MJ muzzle velocity. Continue testing of initial barrel design components and system level testing of the energy storage and power delivery system. Continue Ship integration efforts and support to testing of initial projectile component concepts. Initiate detailed design electromagnetic demonstration launcher with industry partners. Initiate firing of EM lab launcher to test components and designs up to 16 MJ.

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FY 2009 Plans:

- EM Gun: Continue testing of initial barrel design components. Continue ship integration efforts. Continue the conduct of system level testing of the energy storage and power delivery system. Continue to support testing of initial projectile concepts. Continue electromagnetic demonstration launcher detailed design. Continue firing of EM lab launcher to continue test components and designs up to 32 MJ muzzle velocity. Initiate equipment and system integration into Electromagnetic Launch Facility (EMLF) at NSWC Dahlgren, VA. Initiate Integrated Launch Packages (ILP) flight demonstrations at 20 Kgs. Initiate preliminary designs for mid-range testing.

	FY 2006	FY 2007	FY 2008	FY 2009
STRIKE AND LITTORAL COMBAT TECHNOLOGIES	8,761	21,051	26,655	28,837

The focus of this effort is on those technologies that will support the Naval Precision Strike Operations and provide the Navy of the future the ability to quickly locate, target, and strike critical targets. This activity includes support to the following FNC ECs: Advanced Naval Fires Technology, Hostile Fire Detection and Response, Dynamic Target Engagement & Enhanced Sensor Capabilities, and Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets.

The funding profile from FY 2006 to FY 2007 reflects the reorganization of FNC Program investments into ECs. As a result of this reorganization, the funding for each EC has been aligned to a Budget Activity 2 and Budget Activity 3 PE as appropriate. The increase from FY 2006 to FY 2008 funding is due to funding additional FNC projects. This Activity reflects the alignment of investments for the following ECs: Advanced Naval Fires Technology Spiral 1, Hostile Fire Detection and Response Spiral 1, Dynamic Target Engagement & Enhanced Sensor Capabilities, and Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets.

FY 2006 Accomplishments:

- Advanced Gun Barrel & Targeting Technology (AGTT): Completed analytical modeling and scaled prototypes of advanced liner coatings and aluminum composite metal matrix material designs and completed fabrication of a full scale composite barrel test section.
- High-Speed Anti Radiation Missile (HSARM): Completed classified effort to develop seeker technology for time critical targeting.
- Ground Moving Target Indicator (GMTI) Capability: Continued effort to provide a low-cost, single board

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radar system suitable for use on a long endurance Unmanned Air Vehicle (UAV) (reflected under Dynamic Target Engagement & Enhanced Sensor Capabilities in FY 2007).

- Ultra Endurance UAV: Initiated effort to provide affordable, high endurance platform/propulsion with Commercial Off the Shelf (COTS) and modified COTS components for persistent Intelligence, Surveillance and Reconnaissance (ISR), targeting, Bomb Damage Assessment/Bomb Damage Indication (BDA/BDI), and weapon delivery. Initiated development of Electro Optic/Infrared (EO/IR) sensors and foliage penetration radars suitable for high resolution imaging of ground threats through rain, fog, and camouflage from small UAVs (reflected under Dynamic Target Engagement & Enhanced Sensor Capabilities in FY 2007).

FY 2007 Plans:

- Advanced Naval Fires Technology (ANF): Initiate and complete effort to reduce time delay from target acquisition to engagement through information sharing interfaces; accurate mobile, lightweight fire control systems and improved forward digital target acquisition and hand off. Specific tasks include: adaptive expeditionary maneuver warfare system, advanced gun barrel technology, advanced weapons material technology, indirect weapon aiming/pointing system size/weight reduction, Marine Air/Ground Task Force (MAGTF)/Joint fires information exchange connectivity and interoperability, Vertical Assault force lightweight computational interface capability, and universal fire control software for indirect weapon systems.
- Hostile Fire Detection and Response (HFDR): Develop technologies for hostile fire detection and active response capabilities to increase individual Marine and tactical level unit survivability and mobility. Specific efforts include: advanced ammo packaging, Electronic Warfare (EW) Integrated System for Small Platforms (EWISSP) and GUNSLINGER hostile fire detection and counter fire system.
- Dynamic Target Engagement & Enhanced Sensor Capabilities (includes GMTI and Ultra Endurance UAV formerly listed as separate products in FY 2006 accomplishments): Develop the capability to improve the processing of dynamic targets from 100 to 400 per day. Develop UAVs with increased endurance and support for more autonomous operations. Specific tasks include development of: decision support algorithms for dynamic target engagement, remote sensor fusion hardware for ground sensors, an ultra endurance UAV, and a GMTI radar system for use on UAVs.
- Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets: Provide products to discriminate targets from non-combatants and provide terminal guidance to engage targets that are operating in close proximity to noncombatants. The effort will develop advanced sensors, communications, and planning systems. Specific tasks include: the development of a Low-Cost Imaging Terminal Seeker (LCITS).

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FY 2008 Plans:

- Hostile Fire Detection and Response: Complete Reconfigurable Surveillance UAV for Warfighters which developed EO/IR sensors and foliage penetration radars suitable for high resolution imaging of ground threats through rain, fog, and camouflage from small UAVs.
- Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets: Continue Low Cost Imaging Terminal Seeker projects. Initiate Weapons Data Link (WDL) project to develop a weapons data link terminal that will allow robust in-flight control of strike weapons at greater standoff ranges with reduced power/space/weight requirements, and improved protection against ECM.
- Dynamic Target Engagement & Enhanced Sensor Capabilities: Continue Ultra Endurance UAV project. Complete GMTI Scout, and Remote Sensor Fusion Card efforts. Initiate Decision Support for Dynamic Target Engagement.
- Increased Capability Against Moving and Stationary Targets: Initiate Direct Attack Seeker Head (DASH) project to use active millimeter wave (mmW) radar and Imaging Infrared (IIR) seekers to develop and demonstrate a low cost multi-passive array technology to engage moving targets in adverse weather battlefield conditions. The DASH common aperture architecture is applicable to a variety of weapon airframes such as Hellfire, High Speed Anti-Radiation Missile (HARM), Joint Direct Attack Munition (JDAM), and Harpoon. Initiate Multi-Mode Sensor/Seeker (MMSS) project to develop a tri-mode sensor/seeker for use on surveillance platforms such as Fire Scout. MMSS will develop and demonstrate the capability to provide increased range target search, acquisition, identification, and tracking in both clear and adverse battlefield weather.

FY 2009 Plans:

- Discriminate and Provide Terminal Guidance for Weapons Targeted at Moving Targets: Complete Low Cost Imaging Terminal Seeker project. Continue Weapons Data Link (WDL) project to develop a weapons data link terminal that will allow robust in-flight control of strike weapons at greater standoff ranges with reduced power/space/weight requirements, and improved protection against ECM.
- Dynamic Target Engagement & Enhanced Sensor Capabilities: Complete Decision Support for Dynamic Target Engagement, and Ultra Endurance UAV efforts.
- Increased Capability Against Moving and Stationary Targets: Continue DASH and MMSS projects.
- Continue development of advanced technologies that support delivery of Technology Oversight Group approved FNC enabling capabilities structured to close operational capability gaps in power projection. Package advanced power projection technologies into deliverable FNC products and ECs that can be integrated into acquisition programs within a five year period. Mature power projection technologies that support naval requirements identified within the Sea Strike and FORCENet naval capability pillars.

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	FY 2006	FY 2007	FY 2008	FY 2009
AUTONOMOUS OPERATIONS (AO)	21,362	8,508	0	0

The Autonomous Operations (AO) 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 systems. By defining and focusing risk reduction overarching Intelligent Autonomy (IA) S&T principles, transitional products will be developed in four areas: UAV Technology, which includes IA reasoning, technologies to enhance "see and avoid" capabilities, object identification, vehicle awareness, and vehicle and mission management; 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; UGV, which focus 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. This activity also contains a task from the Knowledge Superiority Assurance FNC.

The funding profile from FY 2006 to FY 2007 reflects the reorganization of FNC Program investments into ECs. As a result of this reorganization, the funding for each EC has been aligned to a Budget Activity 2 and Budget Activity 3 PE as appropriate. This Activity reflects the alignment of investments for the following ECs: Marine and UxV Tactical Intelligence, and Surveillance and Reconnaissance (ISR). The elimination of FY 2008 funding in this activity is a result of the completion in FY 2007 of all of the Autonomous Operations tasks including multi-vehicle cooperation technologies, multi-modal interface control, and the UAV propulsion tasks.

FY 2006 Accomplishments:

- IA Task: Completed testing and demonstration of dynamic replanning technologies including high-fidelity simulation of multiple classes of Naval unmanned vehicles in a simulated warfare environment, hardware, and in-water demonstrations. Continued testing and demonstration of multi-vehicle cooperation technologies.
- UAV Technology: Continued testing and demonstration of multi-modal interface control. Completed performing simulation testing of sensors and sensor software. Demonstrated the Sonochute Launched UAV from P-3 and continue system development. Integrated the Landing Period Designator into Eagle Eye and Firescout ship recovery systems and conduct demonstrations.

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- UUV: Transitioned Undersea Search and Survey (USS) and Communication Navigation Aid products to Program Management Office-Explosive Ordnance Disposal and Office of Naval Intelligence (ONI-34); stood up STT efforts in the areas of advanced undersea sensors, communications, and autonomy. The STT-B effort transferred to PE 0603747N in FY 2007 due to EC realignments.
- UAV Propulsion: Continued ground test of the XTE-67/A1 UAV demonstrator engine with naval-unique technologies and integrated with an enhanced next-generation commercial core and a Mach 3.5 capable expendable turbine engine for missile applications.
- Reconfigurable Surveillance UAVs (RSU): This effort developed surveillance UAVs that can be reconfigured to support different packages in order to better provide protection to the warfighters. This activity transitioned to PE 0602131M in FY 2007 due to the EC alignments.

FY 2007 Plans:

- IA Task: Complete testing and demonstration of multi-vehicle cooperation technologies including high-fidelity simulation of multiple heterogeneous Naval unmanned vehicles in a simulated warfare environment, hardware, and in-water demonstrations.
- UAV Technology: Complete testing and demonstration of multi-modal interface control.
- UAV Propulsion: Complete integration of power generation, distribution, prognostic and engine diagnostic and thermal management technologies on the WLE-67/A1 demonstrator engine and ground test. The propulsion system and associated technologies developed and demonstrated are applicable towards Joint-Unmanned Combat Air System (J-UCAS), and Broad Area Maritime Surveillance (BAMS) UAV.

C. OTHER PROGRAM FUNDING SUMMARY:

Navy RELATED RDT&E:

- PE 0601153N Defense Research Sciences
- PE 0602114N Power Projection Applied Research
- PE 0602131M Marine Corps Landing Force Technology
- 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

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PE 0603502N Surface and Shallow Water Mine Countermeasures

PE 0603654N Joint Service Explosive Ordnance Development

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

PE 0603709D8Z Joint Robotics Program

PE 0604709D8Z Joint Robotics Program

PE 0602203F Aerospace Propulsion

PE 0603216F Aerospace Propulsion and Power Technology

D. ACQUISITION STRATEGY:

Not applicable.

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PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

	FY 2006	FY 2007
AUTONOMOUS UNMANNED SURFACE VESSEL	0	1,793

This effort supports the autonomous unmanned surface vessel.

	FY 2006	FY 2007
COMPUTATIONAL ANALYSIS OF CYBER-TERRORISM AGAINST THE UNITED STATES	0	996

This effort supports computational analysis of cyber-terrorism against the United States.

	FY 2006	FY 2007
EXPEDITIONARY CRAFT	0	9,364

This effort supports the expeditionary craft.

	FY 2006	FY 2007
HIGH ENERGY LASER SYSTEMS TEST FACILITY	0	2,590

This effort supports the high energy laser system test facility.

	FY 2006	FY 2007
LASER RADAR (LADAR) - NAVAL AIR WARFARE CENTER CHINA LAKE	0	996

This effort supports the laser radar at the Naval Air Warfare Center China Lake.

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	FY 2006	FY 2007
TIME CRITICAL STRIKE RAMJET	0	996

This effort supports the time critical strike ramjet.

	FY 2006	FY 2007
ADVANCED LIFTING BODY SHIP RESEARCH	0	5,579

This effort supports issues arising from commercialization efforts coming from technology transfer.

	FY 2006	FY 2007
ADVANCED PANORAMIC SENSOR SYSTEMS FOR UAVs	1,198	0

Continued to investigate, integrate, and test panoramic imaging, mission payload computing, data processing, wireless communications, and display technologies in order to develop prototype panoramic surveillance systems for Unmanned Air Vehicles for protection of convoys and critical infrastructure.

	FY 2006	FY 2007
ADVANCED TECHNOLOGIES FOR HIGH VELOCITY PARTICLE CONSOLIDATION	986	0

This effort supported advanced technologies for high velocity particle consolidation research.

	FY 2006	FY 2007
ARTICULATED STABLE OCEAN PLATFORM	958	1,594

FY 2006: Develop predictive methods for the motions of multiple connected bodies in a seaway. These can be used for the design of linked platforms and to analyze connected ship/platform and ship/ship combinations.

FY 2007: This effort supports articulated stable ocean platform research.

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	FY 2006	FY 2007
BOW LIFTING BODY SHIP RESEARCH	5,746	0

This effort conducted expanding lifting body research to enable the design of a bow lifting body that could provide the benefits of lifting body technology, such as improved seakeeping, to monohull vessels.

	FY 2006	FY 2007
CENTER FOR COASTLINE SECURITY TECHNOLOGY	2,110	0

This effort developed and delivered visible and infrared sensors for harbor and coastal 24 hour all weather surveillance. Sensors were integrated on underwater, surface, and airborne unmanned vehicles as well as at the Naval Surface Warfare Center Carderock's South Florida Test Facility along with attendant signal processing.

	FY 2006	FY 2007
COUNTERMINE LIDAR UAV-BASED SYSTEM (CLUBS)	960	0

This effort developed the capability to produce high resolution shallow water seafloor characterizations, quantify the performance of the algorithms in different environmental conditions; and provide a design for the construction of a system that can be deployed operationally on UAV.

	FY 2006	FY 2007
DP-2 VECTORED THRUST AIRCRAFT	3,752	3,885

FY 2006: This effort continued work on test aircraft and simulator configuration upgrades and repairs. Testing resumed Jun 2006 to complete sustained controlled hover, in and out of ground effect.

FY 2007: Aircraft tests were conducted in FY06 both in- and out-of-ground effect. Significant data was gathered, but test objectives were not fully achieved. FY07 effort will upgrade the simulation to allow better prediction of performance and improved test design, and conduct of in-ground-effect hot gas ingestion aircraft and model testing.

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	FY 2006	FY 2007
EXCALIBUR UNMANNED COMBAT AERIAL VEHICLE	959	0

This effort completed the development and refinement of the Excalibur Proof-of-Principle (PoP) Concepts of Operation (CONOPS) and requirements for a Marine Corps high speed, tactical Vertical Takeoff and Landing/Short Takeoff and Landing (VTOL/STOL) unmanned aerial vehicle. Additionally, this effort developed launch and recovery requirements, associated storage requirements, and associated shipboard launch and recovery operations for a sea-based Marine tactical Vertical Unmanned Air Vehicle (VUAV).

	FY 2006	FY 2007
HIGH-SPEED ANTI-RADIATION DEMONSTRATION - AIRFRAME/PROPULSION SECTION	4,846	0

This effort supported HSAD-Airframe/Propulsion Section development with the maturing of key technology areas that were investigated in the previous year's activities. The areas of focus were the development of the producibility/manufacturability aspects of the ramjet fuels, insulation retention system, and the combustion chamber's unique features. In addition, the refinement of the simplified engine performance models validated through ground tests were developed into a robust engine model, validated through flight tests. This model will be used to provide detailed component level insights to define optimal engine components for development.

	FY 2006	FY 2007
INFORMATION SHARING FOR ISRTE OF MOBILE TARGETS	1,438	1,793

FY06: A preliminary design review was held to discuss the program objectives and the approach for achieving the objectives.

FY 07: This effort supports the development of algorithms to detect, track, and engage a moving target using the in-flight weapon, evaluate the communication requirements of the weapon to receive the initial targeting information and to update targeting information in flight, and develop a simulation capability that will allow the new weapon algorithms to be test and verified against moving targets. Pattern recognition algorithms to aid in target reacquisition will be developed. The simulation software will support a simulation of the end game either over water or land with inserted targets.

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	FY 2006	FY 2007
INTERNAL ROTOR URBAN FLIGHT VEHICLE	480	0

This effort developed a detailed design concept of a vertical lift, low altitude, dual fan-driven hovercraft capable of carrying multiple fully loaded combat personnel without a main rotor or fixed-wing structure, which offers new options for storage and mobility.

	FY 2006	FY 2007
LASER RADAR (LADAR)	973	3,188

FY 2006: This effort demonstrated and analyzed the Block IV LADAR system performance during field tests.

FY 2007: This effort will demonstrate increase Laser power to provide increase sensor range and resolution. Eye-safe capabilities will be explored to enhance sensor regimes.

	FY 2006	FY 2007
LONG WAVELENGTH ARRAY	3,352	1,644

FY 2006: This effort developed a long wavelength array to image astronomical objects at high frequency wavelengths and perform high resolution studies of the ionosphere. Funds in 2006 were used to develop a program plan for the array including required antenna configurations, receiver requirements, site layout and science requirements.

FY 2007: This effort supports the long wave length array.

	FY 2006	FY 2007
LOW COST TERMINAL IMAGING SEEKER	1,943	0

This effort supported low cost terminal imaging seeker development. LCITS work was focused on autopilot development, guidance & control development, and navigation development. Improvements were tested through extensive simulation at both the model and embedded software level.

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	FY 2006	FY 2007
LOW-POWER POLYMER BASED INFRARED TECHNOLOGY	1,438	0

Continued a Novel EO polymer and detector development for low cost, un-cooled, mid-wave focal plane arrays.

	FY 2006	FY 2007
QUIET HIGH SPEED PROPULSION	4,625	4,383

FY 2006: This effort developed an advanced hub-driven podded propulsor design for surface ship and submarine applications. The system has the attributes of reduced low-speed acoustic and electromagnetic signatures, is power dense and provides high-speed platform performance. This program will leverage the advanced, super-conducting, dc homopolar motor technology and work completed under the Advanced Hull Form Inshore Demonstrator (AHFID) propulsor program.

FY 2007: This effort supports quiet high speed propulsion.

	FY 2006	FY 2007
SHORT PULSE LASER DEVELOPMENT FOR MICROMACHINING APPLICATIONS	1,819	0

This effort supported short pulse laser development for micromachining applications research. The performer was the Penn St. Univ Electro-optics Center/PSU-EOC. They investigated the applications of femto second laser machining and drilling techniques to DoD manufacturing, characterizing the use of femto second laser in chem-bio ID using spectroscopy and developed design criteria for the use of eye-safe LADAR for UAV see-and-avoid of manned aircraft. The deliverables are test reports and a design study.

	FY 2006	FY 2007
SMART INSTRUMENT DEVELOPMENT FOR THE MAGDALENA RIDGE OBSERVATORY	3,352	3,885

FY 2006: This effort supported specifications for the interferometer array of light collectors that were drafted and released for bid, and testing of the beam combining instrument.

FY 2007: This effort supports the smart instrument development for the Magdalena Ridge Observatory.

UNCLASSIFIED

FY 2008/2009 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

DATE: February 2007

BUDGET ACTIVITY: 03

PROGRAM ELEMENT: 0603114N

PROJECT NUMBER: 9999

PROGRAM ELEMENT TITLE: POWER PROJECTION ADVANCED TECHNOLOGY

PROJECT TITLE: Congressional Plus-Ups

	FY 2006	FY 2007
STRUCTURALLY INTEGRATED LOW OBSERVABLE COATING SYSTEM	4,046	0

This effort developed and demonstrated a lower cost durable, paint replacement film exhibiting sufficient adherence to production primers to perform in severe Naval environments and be reasonably removed for maintenance operations. The significant payoff for this effort is the reduction in cost for durable paint replacement film and the life cycle benefits that come with its use on Naval platforms.

	FY 2006	FY 2007
TERAHERTZ DETECTION SYSTEM FOR IEDS/LANDMINES	1,156	0

This effort developed a high power prototype TeraHertz (THz) source and a transportable system for explosive detection.