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

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603640M
PROGRAM ELEMENT TITLE: MARINE CORPS ADVANCED TECHNOLOGY DEMONSTRATIONS (ATD)

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
Total PE	128,818	88,108	59,170	62,853	59,205	59,898	61,104
2223 MARINE CORPS ATD	48,140	20,449	24,088	25,249	25,766	25,724	26,152
2297 CMC WARFIGHTING LAB CORE	50,520	35,059	35,082	37,604	33,439	34,174	34,952
9999 CONGRESSIONAL PLUS-UPS	30,158	32,600	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: As the land warfare component of Naval Expeditionary Forces, the Marine Corps has unique and technologically stressing requirements resulting from its amphibious mission, Marine Air-Ground Task Force (MAGTF) organizational structure, reliance on maneuver, logistic sustainability, and intensive tempo of operations in diverse environments. Critical Marine Corps requirements addressed in this program element (PE) are Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR); Maneuver; Logistics; Human Performance, Training and Education; and Firepower. These are ongoing efforts to develop and demonstrate advanced technologies and system concepts in an operational environment. Multiple transitions into the Sub-system/Component Advanced Development phase are planned, as well as fieldable prototyping to reduce risk in System Concept Development and Demonstration. Joint service efforts are in line with Defense Technology Objectives (DTOs) and Joint Warfighting Objectives (JWOs). In addition, Marine Corps operational experimentation, warfighting concept experimentation, and conceptual operational assessment of emerging technologies are funded. Specifically, this PE supports the following capabilities: promptly engaging regional forces in decisive combat on a global basis; responding to all other contingencies and missions in the full spectrum of combat operations (high, mid, and low intensity), in Urban Operations in the Global War on Terrorism (GWOT), and warfighting experimentation. This PE supports all of the Marine Corps mission areas. Within the Naval Transformation Roadmap, this investment will achieve one of three key transformational capabilities required by Sea Shield as well as technically enable the Ship

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to Objective Maneuver (STOM) and persistent Intelligence, Surveillance and Reconnaissance (ISR) key transformational capabilities within Sea Strike and the enhanced Sea-borne Positioning of Joint Assets within Sea Basing.

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:

	FY 2005	FY 2006	FY 2007
FY 2006 President's Budget Submission	88,239	56,434	58,833
Congressional Action	0	32,600	0
Congressional Undistributed Reductions/Rescissions	-69	-926	0
Execution Adjustments	9,467	0	0
FY 2005 SBIR	-2,037	0	0
GWOT Counter IED Efforts	33,208	0	0
Program Adjustments	10	0	0
Rate Adjustments	0	0	337
FY 2007 President's Budget Submission	128,818	88,108	59,170

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not applicable.

Schedule: Project 2297, Marine Corps Warfighting Laboratory (MCWL): Worldwide contingency operations (i.e. Operation Iraqi Freedom (OIF) campaigns, humanitarian efforts, and others) have increased the operations tempo of United States Operating Forces to the extent that their support of and participation in the MCWL Advanced Warfighting Experiments (AWEs) Sea Viking 2004 and 2006 was substantially reduced. Events have been rescheduled and adjusted so that operational assessments may be conducted by operational units preparing to deploy to Iraq and subsequently in Iraq in order to accommodate troop availability.

C. OTHER PROGRAM FUNDING SUMMARY:
Not applicable.

D. ACQUISITION STRATEGY:
Not applicable.

E. PERFORMANCE METRICS:
The primary objective of this PE is the development of technologies to meet unique Marine Corps needs in

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conducting Expeditionary Maneuver Warfare. The program consists of a collection of projects categorized by critical warfighting function. Individual project metrics reflect the technical goals of each specific project. Typical metrics include the advancement of related Technology Readiness Levels, the degree to which project investments are leveraged with other performers, reduction in life cycle cost upon application of the technology, and the identification of opportunities to transition technology to higher categories of development.

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BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603640M PROGRAM ELEMENT TITLE: MARINE CORPS ADVANCED TECHNOLOGY DEMONSTRATIONS (ATD)
PROJECT NUMBER: 2223 PROJECT TITLE: MARINE CORPS ATD

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
2223 MARINE CORPS ATD	48,140	20,449	24,088	25,249	25,766	25,724	26,152

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Critical Marine Corps requirements/imperatives addressed in this Project are: Maneuver; Firepower; Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR); Logistics; Human Performance, Training and Education. These are ongoing efforts to develop and demonstrate advanced technologies and system concepts in an operational environment. Multiple transitions into the Sub-system/Component Advanced Development Phase are planned, as well as fieldable prototyping to reduce risk in System Concept Development and Demonstration. A tactically effective Mine Countermeasures (MCM) capability is necessary if Maneuver on land is to become a functional component of Naval Expeditionary Maneuver Warfare (EMW). Maneuver, supported by MCM provides synchronization and speed of detection, breaching, clearance, proofing, and marking operations. This project supports: 1) engaging regional forces in decisive combat on a global basis; 2) responding to all other contingencies and missions in the full spectrum of combat operations (high, middle, and low intensity), in Military Operations in Urban Terrain (MOUT), and in Operations other than War (OOTW); 3) and warfighting experimentation. By providing the technologies to enable these capabilities, this project supports the goals and objectives of the Strike, Littoral Warfare and Surveillance Joint Mission Areas. These are ongoing efforts to develop and demonstrate advanced technologies and system concepts in an operational environment.

In addition, this project supports the goals and objectives of the Littoral Combat/Power Projection Future Naval Capability (FNC). Through 2005 the focus of the FNC efforts has been on satisfying technology gaps related to Power Projection and Littoral Combat. As the products of these efforts are transitioned to acquisition programs of record, the focus of the FNC within this PE in FY 2006 and beyond will be on technology related to Urban, Asymmetric, and Expeditionary Operations (UAEO). The UAEO Capability Gap is a science and technology developmental area that is of the highest importance to Marine Corps operations in Iraq and Afghanistan. The UAEO Capability Gap is one of 25 prioritized Capability Gaps (prioritized by OPNAV N-6/7 and the Marine Corps Combat Development Command (MCCDC)) that are made up of Enabling Capabilities (ECs) and supporting products. The UAEO technology gap is being pursued as part of an overall effort that addresses the Sea Strike Capability Gap.

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PROJECT NUMBER: 2223 PROJECT TITLE: MARINE CORPS ATD

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2005	FY 2006	FY 2007
NIRF PROGRAM	17,092	0	0

The program details are at a higher level of classification.

	FY 2005	FY 2006	FY 2007
MANEUVER	13,857	7,015	6,874

The Maneuver Thrust Technology Area focuses on the development, demonstration, and transition of technologies that will increase the warfighting capabilities and effectiveness of current and future Marine Corps maneuver systems. This Thrust aims at capturing emerging and “leap ahead” technologies in the areas of mobility, materials, propulsion, survivability, durability, signature reduction, modularity, and unmanned systems. Beginning in FY 2008, Mine Countermeasures (MCM) will become a separate activity. Presently, MCM supports and enhances the maneuver and force protection Marine landing forces with the development of technologies to enable detection, neutralization, breaching, and clearing of mines, Improvised Explosive Devices (IEDs), and unexploded ordnance (UXO) from the beach exit to inland objectives. MAGTF MCM is a functional component of Naval Expeditionary Maneuver Warfare and includes STOM, Expeditionary Operations from a Sea Base, sustained Operations Ashore, Urban and Asymmetric Operations, and Operations other than War (OOTW).

FY 2005 reflects funding provided for efforts associated with the GWOT, specifically, Counter IED efforts such as Neutralization of IED's with RF (NIRF).

FY 2005 Accomplishments:

- Continued exploration of methods to compensate for the inhomogeneous Radio Frequency (RF) field of surface coils, for optimizing Signal to Noise Ratio (SNR) for varying inspection depths.
- Continued to improve Radio Frequency Interference (RFI) mitigation techniques and hardware, by considering coil designs, alternate RFI reference antenna designs, correlation between channels, and mitigation algorithms.
- Continued extension of characterization to a broader range of TNT sources, and to tetryl.

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- Initiated and completed comparative testing of the effectiveness of the DEMETER II magnetic signature duplication system to previously evaluated systems. The comparative analysis and technological readiness report of magnetic signature duplication systems were transitioned to Program Manager Engineers, Marine Corps Systems Command.
- Continued integration of Nuclear Quadrapole Resonance (NQR) technology with Ground Penetrating Radar (GPR) and Electromagnetic Induction (EMI) technologies for an orthogonal detector as part of a transition from PE 0602131M.
- Initiated and completed testing of the effectiveness of the DEMETER II magnetic signature duplication system.
- Initiated Advanced Electronically Controlled Active Suspension System (ECASS) development efforts for High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) and future USMC vehicles.

FY 2006 Plans:

- Continue all efforts of FY 2005.
- Continue Advanced ECASS development in support of HMMWV, MAGTF Expeditionary Family of Fighting Vehicles and other Light Armored Vehicles.
- Complete NQR technology integration efforts with GPR and EMI sensors.
- Initiate S&T programs to address MAGTF Land MCM Master Plan capability gaps.
- Initiate development of data and video transmission technology for unmanned ground vehicles.
- Initiate Electromagnetic Non-Explosive Reactive Armor (E-NERA) and Advanced Electromagnetic Armor (A-EMA) technology development efforts.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Initiate advanced armor concept development for current and future Marine Corps platforms from the 6.2 program, PE 0602131M.
- Initiate development of a Combat S&T vehicle prototype to enhance crew survivability and vehicle fuel efficiency.

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	FY 2005	FY 2006	FY 2007
LITTORAL COMBAT/POWER PROJECTION (LC/PP)	5,298	2,838	3,623

The goal of the LC/PP FNC is to support the development of Naval Expeditionary Maneuver Warfare via the application of technologies which enhance the ability of the Navy-Marine Corps team to achieve assured access and sustained operations in the littorals as the naval portion of a Joint campaign. By being assigned S&T responsibility for littoral combat, the LC/PP FNC has been given an expansive warfighting problem set. The littoral region is where the future fight will take place and requires a broad naval perspective in identifying and solving capability gaps. In identifying capability gaps, the LC/PP FNC considers all the critical warfighting functions: Command, Control, Intelligence, ISR, Fires, Maneuver, Sustainment, and Force Protection. As the products of these efforts are transitioned to acquisition programs of record, the focus of the FNC within this PE in FY 2006 and beyond will be on technology related to Urban, Asymmetric, and Expeditionary Operations (UAEO). The UAEO Capability Gap is a science and technology developmental area that is of the highest importance to Navy and Marine Corps operations in Iraq and Afghanistan. The UAEO Capability Gap is one of 25 prioritized Capability Gaps (prioritized by OPNAV N-6/7 and the Marine Corps Combat Development Command) that are made up of Enabling Capabilities (ECs) and supporting products. The UAEO technology gap is being pursued as part of an overall effort that addresses the Sea Strike Capability Gap. This activity includes support to the Urban, Asymmetric Operations-related to Future Naval Capabilities (FNC) Enabling Capabilities for Improvised Explosive Devices, Modular Scalable Effects Weapons, Advanced Naval Fires Technology, Dynamic Target Engagement, Position Location Information and Hostile Fire Detection and Response.

FY 2005 Accomplishments:

- Continued development of tools and technologies to support Marine Corps ISR efforts Measurement and Signature Intelligence Tactical Remote Sensor System (MASINT/TRSS) in remote sensor integration within the Distributed Common Ground/Surface System (DCGS).
- Continued efforts to provide urban direction finding for Radio Frequency (RF) emitters from moving platforms.
- Continued development of improved fire control systems technologies to Expeditionary Fire Support System (EFSS) artillery and mortar systems.
- Continued design and development of advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability.
- Continued efforts to provide an obstacle detection system on the Expeditionary Fighting Vehicle (EFV) by conducting testing of a brassboard design.

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- Continued design, integration and demonstration of hostile fire detection and counter-fire system (GUNSLINGER).
- Continued development of innovative relay Beyond Line of Sight (BLOS) technology through integration and demonstration of secure mobile network/wireless local area network (LAN) communication technologies. Transition EFV high data rate secure wireless communication connection to acquisition program of record.
- Completed development and began transition of expeditionary maneuver warfare Ship to Objective Maneuver (STOM) planning and decision-making tools for Marine ground forces; provided prototype capability of Expeditionary Decision Support System (EDSS) to MARCORSYSCOM.
- Completed the development of multi-source Intelligence (INTEL) visualization algorithms to increase the efficiency and effectiveness of raw sensor data to actionable intelligence and commence testing/demonstration; provided six workstations to 3rd Radio Battalion for demonstration evaluation in Iraq Operation Iraqi Freedom (OIF). (FY 06 effort funded by PE 0603782N).
- Initiated development of improved lightweight computational fire control interface technology.

FY 2006 Plans:

- Continue efforts to provide urban direction finding of RF emitters from moving platforms.
- Continue development of tools and technologies to support Marine Corps ISR efforts (MASINT/TRSS) in remote sensor integration within the DCGS.
- Continue design and development of advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability.
- Continue development of improved lightweight computational fire control interface technology.
- Continue development of improved fire control systems technologies to EFSS artillery and mortar systems.
- Continue effort to incorporate advanced target acquisition target hand-off technologies to reduce sensor to shooter loop and improve target location. (Previous and concurrent effort funded by PE 0602131M)
- Continue investigation of ammunition packaging techniques to lower weight and have the packaging provide additional use on the battlefield. (Previous and concurrent funding provided by PE 0602131M)
- Continue integration of hostile fire detection and counter-fire system (GUNSLINGER).
- Continue development of innovative relay BLOS technology through integration and demonstration of secure wireless networks/secure wireless LAN communication technologies.
- Continue development and conduct open ocean testing of an obstacle detection system on the EFV.

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FY 2007 Plans:

- Continue development of tools and technologies to support Marine Corps ISR efforts (MASINT/TRSS) in remote sensor integration within the DCGS. Demonstrate a layered unattended sensor system.
- Continue development and demonstrate hostile fire detection and counter-fire system (GUNSLINGER). (Transitions to PE 0603114N.)
- Continue development of landmine countermeasure insensitive munitions technology. (Previously funded by PE 0602131M)
- Continue development of innovative relay BLOS technology through integration and demonstration of secure wireless networks/secure wireless LAN communication technologies. (Transitions to PE 0603235N.)
- Complete efforts to provide urban direction finding of RF emitters from moving platforms; provide algorithms to MARCORSYSCOM PM INTEL.
- Complete development and begin transition of an obstacle detection system on the EFV.
- Complete effort to incorporate advanced target acquisition target hand-off technologies to reduce sensor to shooter loop and improve target location; provide multiple software injectors to MARCORSYSCOM PM GC2. (Transitions to PE 0603114N.)
- Complete investigation of ammunition packaging techniques to lower weight and have the packaging provide additional use on the battlefield; provide prototype packaging to MARCORSYSCOM PM AMMO. (Transitions to PE 0603114N.)
- Complete development and transition improved lightweight computational fire control interface (EFSS) technology; provide prototype to MARCORSYSCOM PM EFSS. (Transitions to PE 0603114N.)
- Complete development and transition advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability provide prototype mortar tube, bipod and baseplate to MARCORSYSCOM PM EFSS. (Transitions to PE 0603114N.)

	FY 2005	FY 2006	FY 2007
HUMAN PERFORMANCE, TRAINING & EDUCATION	3,178	2,681	3,642

This activity develops and demonstrates advanced training technology and technologies that enhance neural and cognitive aspects of human performance including tactical decision-making, modeling, simulation, range instrumentation, synthetic environment generation and training effectiveness evaluation. This activity's name will change in FY 2008 to "Human Performance, Training and Survivability" to better describe its program/projects and some projects will migrate from the Firepower activity during FY 2008.

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FY 2005 Accomplishments:

- Continued development and evaluation of low-cost, dynamic cognitive skills training tools (tactical decision simulations) that cut across every echelon for individual, groups, and groups of groups.
- Continued demonstration and evaluation of technologies available for prototype of a Rapid Portable Synthetic Environment Generation capability.
- Completed the development of RF tracking and video tracking fusion for enhanced situational awareness in a MOUT training environment.
- Completed demonstration and transition of a prototype of Video Flashlights capability for enhanced situational awareness in a MOUT training environment for the Marine Security Forces.
- Initiated integrating cognitive performance improvement (augmented cognition) technology using operationally relevant systems and scenarios, and demonstrate improved human cognition via multiple sensory modalities.
- Initiated the integration and evaluation of cognitive state detection technologies with instructor-based training scenario applications and demonstrate improved individual task performance.

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Initiate the development of tools to capture metrics and lessons learned from a variety of simulation and training sources.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete development and transition of low-cost, dynamic cognitive skills training tools (tactical decision simulations) that cut across every echelon for individual, groups, and groups of groups.
- Initiate development of scenarios and prototype applications demonstrating improved team performance in stressful urban environments.
- Initiate development of Physical Performance Enhancement (PPE) and survivability technology prototypes.

	FY 2005	FY 2006	FY 2007
LOGISTICS	3,060	3,005	3,585

This activity supports Marine Corps Expeditionary Logistics which is the practical discipline and real world

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application of the deployment, sustainment, reconstitution, and re-deployment of forces engaged in expeditionary operations. Expeditionary Logistics replaces mass with assured knowledge and speed, is equally capable ashore or afloat in austere environments, and is fully scalable to meet uncertain requirements. Expeditionary Logistics logically divides into five pillars: deployment support, force closure, sustainment, reconstitution/redeployment, and command and control. These pillars are thoroughly integrated and perpetually related in execution.

FY 2005 Accomplishments:

- Continued development of a computer simulation-based tool for evaluating power requirements and powering options for electronic equipment used by MEF's.
- Completed development of hybrid alternative power systems (metal oxide battery technology) to demonstrate performance improvement. Final report is under evaluation for incorporation into the Seabasing FNC.
- Initiated exploring the development of portable fuel cell technologies capable of providing power in the 100 Watt to 500 Watt power range.
- Initiated next phase of research into developing a lightweight expeditionary bridging capability through assessment of bridge design, manufacturing, construction, and material solutions to include composites, extrusion, and forming techniques.

FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Complete development of a computer simulation-based tool for evaluating power requirements and powering options for electronic equipment used by MEF's.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Initiate research into developing a replaceable electrode battery power source that consists of a metallic structure that is consumed during power generation and then easily replaced with a new metallic component that restores a full charge. (Realigned from PE 0602131M.)

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	FY 2005	FY 2006	FY 2007
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE (C4ISR)	2,956	2,575	3,079

This activity integrates and demonstrates enhanced communications and situational awareness in warfighting environments and communication and situational awareness technologies for near term USMC operations. Beginning FY 2008, Intelligence, Surveillance and Reconnaissance (ISR) will become a separate activity leaving the focus of this effort in Command, Control, Communications, Computers (C4).

FY 2005 Accomplishments:

- Completed and transitioned to the Marine Corps Tactical Systems Support Activity, the Command and Control Technology testbed culminating in the migration of functionality in the systems integration environment for user prototyping, and requirements generation on prospective commercial and developmental software products.
- Initiated development and demonstration of low-cost compact satellite communications on-the-move capability.
- Initiated integration and demonstration of naval tactical warfighting applications and network connectivity.
- Initiated development and demonstration of urban communications capability.

FY 2006 Plans:

- Complete development and demonstration of low-cost compact satellite communications on-the-move capability.
- Complete integration and demonstration of naval tactical warfighting applications and network connectivity.
- Complete development and demonstration of urban communications capability.
- Initiate demonstration of advanced network mobility and network security capabilities.
- Initiate and complete demonstration of urban navigation capability.

FY 2007 Plans:

- Complete demonstration of advanced network mobility and network security capabilities.
- Initiate integration and demonstration of broadband, conformal, ultra-high frequency/very high frequency (UHF/VHF) antennas to be completed in FY 2008.
- Initiate development and demonstration of measurement and signature intelligence data management and integration capability to be completed FY 2008.

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	FY 2005	FY 2006	FY 2007
FIREPOWER	2,699	2,335	3,285

This activity develops technology for application on current and future expeditionary weapons and elements of the kill chain. It includes, but is not limited to, the following technologies: fuze, fire control, launch/propulsion, lethality, and accuracy.

FY 2005 Accomplishments:

- Completed M1A1 Firepower Enhancement Program support from PE 0602131M. Technical results from this effort are under consideration for use on the M1A1 Main Battle Tank Product Improvement Program.
- Initiated and completed long range, non-lethal weapon, electronic projectile advanced development.
- Initiated variable effects conventional warhead concept development for experiments and tests to prove technological feasibility, assess operability, scalability and demonstrate general military utility and/or cost reduction potential.

FY 2006 Plans:

- Continue variable effects conventional munitions development.
- Initiate shipboard submunition Microelectromechanical System (MEMS) fuze safety and reliability enhancement effort from PE 0602131M. Prototype and demonstrate MEMS safe and arm device subsystems. Explore systems safety, shipboard storage, sensitivity, affordability and munitions effectiveness for expeditionary maneuver warfare and demonstrate general military utility and/or cost reduction potential.
- Initiate Marine Advanced Combat Headborne System Initiative (MACHSI) advanced technology development. Transitioned from FY 2005 PE 0602131M. The goal is to increase warfighter head and neck protection while enhancing warfighter comfort and minimizing warfighter encumbrance.

FY 2007 Plans:

- Continue all efforts of FY 2006.

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C. OTHER PROGRAM FUNDING SUMMARY:

ALL: NAVY RELATED RDT&E:
PE 0601152N (In-House Laboratory Independent Research)
PE 0601153N (Defense Research Sciences)
PE 0602131M (Marine Corps Landing Force Technology)
PE 0602782N (Mine and Expeditionary Warfare Applied Research)
PE 0603782N (Mine and Expeditionary Warfare Advanced Technology)
PE 0603235N (Common Picture Advanced Technology)
PE 0603236N (Warfighter Sustainment Advanced Technology)
PE 0603612M (USMC Mine Countermeasures Systems - Adv Dev)
PE 0603635M (Marine Corps Ground Combat/Support Systems)
PE 0204163N (Fleet Telecommunications - (Tactical))
PE 0206313M (Marine Corps Communications Systems)
PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems)
PE 0305204N (Tactical Unmanned Air Vehicles (JMIP))

NON-NAVY RELATED RDT&E:
PE 0603004A (Weapons and Munitions Advanced Technology)
PE 0603005A (Combat Vehicle and Automotive Advanced Technology)
PE 0603606A (Landmine Warfare and Barrier Advanced Technology)
PE 0603607A (Joint Service Small Arms Program)
PE 0603619A (Landmine Warfare and Barrier - Adv Dev)
PE 0603772A (Advanced Tactical Computer Science and Sensor Technology)
PE 0604710A (Night Vision Systems - SSD)
PE 0604808A (Landmine Warfare/Barrier - SSD)
PE 0602301E (Computing Systems and Communications Technology)
PE 0602702E (Tactical Technology)

D. ACQUISITION STRATEGY:
Not Applicable.

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BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603640M PROGRAM ELEMENT TITLE: MARINE CORPS ADVANCED TECHNOLOGY DEMONSTRATIONS (ATD)
PROJECT NUMBER: 2297 PROJECT TITLE: CMC WARFIGHTING LAB CORE

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
2297 CMC WARFIGHTING LAB CORE	50,520	35,059	35,082	37,604	33,439	34,174	34,952

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Marine Corps Warfighting Laboratory (MCWL) collects lessons learned from current operations, explores emerging threats and opportunities, and explores Joint and emerging service concepts through concept-based experimentation in order to enhance current and future warfighting capabilities. The use of modeling and simulation (M&S), both conducted within Service wargaming and virtual experiment venues (conducted in partnership with the Navy and Joint Forces Command (JFCOM)), will provide both a necessary Joint context for the Marine Corps Expeditionary Force Development System process as well as the opportunity to explore the implications of proposed future programs on seabased power projection capabilities.

“Live experimentation” permits exploration of prototype and surrogate technologies, as well as tactics, techniques, and procedures (TTPs), in order to better refine equipment requirements and to identify Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF) initiatives needed to produce future capabilities. Experimentation encompasses inquiries into multiple warfighting areas, including: Command, Control, Communications, and Computers (C4); Intelligence, Surveillance, and Reconnaissance (ISR); Fires, Targeting, and Maneuver; Combat Service Support (CSS) and Force Protection; and Warfighting Excellence.

Using operational forces, MCWL conducts Advanced Warfighting Experiments (AWEs) supported by Limited Objective Experiments (LOEs), Limited Technical Assessments (LTAs), Wargames, and Studies. AWEs, LOEs, and LTAs examine discrete variables in as much isolation as can be achieved. Technologies assessed in LTAs are incorporated in LOEs while LOEs are building blocks from which resulting AWE-level campaigns are constructed. These campaigns (e.g., the Sea Viking experimentation series) are executed under the guidance of the Commandant of the Marine Corps (CMC) and in support of the Marine Corps Expeditionary Maneuver Warfare Enabling Capability List (ECL).

MCWL’s Sea Viking campaign is designed to transform the STOM concept into an operational reality coupled with implementing the emerging Distributed Operations (DO) concept. DO is a concept characterized as the physical

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dispersion of network-enabled units, from squad to battalion size, over an extended battlespace.

- Sea Viking 2004 (SV04): (FY 2002 through calendar year (CY) 2004) SV04 was a series of related events that constituted the overall Marine Corps Service Experimentation campaign through 2004. Its goals and objectives were based on guidance from the CMC focusing on the seabased Marine Expeditionary Brigade (MEB), emphasizing execution of the Operational Maneuver from the Sea (OMFTS) and STOM concepts, in a Joint context. SV04 was significantly redefined in order to accommodate force deployments in support of OIF with experimental objectives refocused on operational assessment by forward-deployed forces operating in highly dispersed units.

- Sea Viking 2006 (SV06): (FY 2005 through FY 2006) SV06 builds on the results, findings, and events of SV04 in order to further develop a true seabased capability within the context of emerging Joint concepts. As with SV04 it uses an integrated “campaign” approach and is a key component of the Navy’s Sea Trial process. SV06 fully supports the Naval Transformation Roadmap. SV06 constitutes the principal exploratory effort into development of the future capabilities required for realization of the Naval Operational and Enhanced Network Seabasing concepts. In exploring the seabase, such issues as seabased fires are an integral part of Joint fires in support of the expeditionary force conducting operational maneuvers. Live experimentation, both in simulated war zone and actual theater (i.e., Iraq) environments, permits both explorations of prototype and surrogate technologies in order to better refine equipment requirements and to identify DOTMLPF initiatives needed to produce future capabilities. Live experimentation will provide a venue for practical development, testing, and refinement of alternative TTPs.

- Sea Viking 2008 (SV08): (FY 2007 through FY 2008) SV08 continues exploration of seabased forcible entry onto the irregular, nonlinear, battlespace emphasizing enhanced individual and small unit capabilities. While previous experiments in the Sea Viking series have focused on battalion-level “train, man, and equip” issues, SV08 strives to identify and assess technologies and procedures that will improve the individual Marine cognitively, physiologically, and through advanced simulation-based training. These could run the gamut from “simple” issues such as reducing the Marine’s combat load while increasing the level of force protection, to development of simulation systems that enable the Corps to produce the numbers of ground terminal air controllers MCWL’s SV06 DO experiments identified as an operational requirement. In keeping with the SV06 and DO objective of empowering small unit leaders, SV08 seeks to identify tools that will increase the individual Marine’s range of lethality (day and night), the situational awareness, and, ultimately, the ability to fight and win the Global War on Terrorism (GWOT).

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B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2005	FY 2006	FY 2007
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS (C4)	7,756	8,121	7,291

This activity encompasses all MCWL C4 related experimentation efforts. Please note, although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.

FY 2005 Accomplishments:

- Continued C4 support for the SV06 experimentation campaign.
- Continued OTH and OTM/COC dismounted communications investigations in support of I MEF and II MEF OIF deployments. These efforts centered on the overarching Expeditionary Tactical Communication System (ETCS) efforts coupled with OTM/COC investigations.
- Completed C4 support for the SV04 experimentation campaign.
- Initiated small unit DO efforts, as they relate to command and control (C2) functions.

FY 2006 Plans:

- Continue all efforts of FY 2005, less those noted as completed above.
- Complete C4 support for the SV06 experimentation campaign.
- Complete experimentation of initial SV06 OTH dismounted communications concept demonstrator.
- Complete experimentation of SV06 OTM/COC for vertical maneuver element (VME).
- Complete small unit enhancement efforts based on the results of initial DO C2 experimentation.
- Initiate C4 support for the SV08 experimentation campaign.
- Initiate experimentation of enhanced OTH dismounted communications concept demonstrator for SV08.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Initiate exploration of the battalion COC requirements for surface maneuver elements (e.g., for EFV and LAV platforms).
- Initiate experimentation of concept demonstrators to support company and below alternative C2 architectures.

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- Initiate C4 related small unit enhancements against irregular forces, including urban terrain.

	FY 2005	FY 2006	FY 2007
INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR)	18,609	7,215	6,598

This activity includes MCWL ISR related experimentation efforts involving enhanced reconnaissance; sensors (to include mine detection); and unmanned ground and aerial vehicles. Please note, although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.

The increase in FY 2005 was due to GWOT support for Counter IED efforts.

FY 2005 Accomplishments:

- Continued ISR support for the SV06 experimentation campaign.
- Continued Visual Intelligence, Surveillance, Tactical Alert System (VISTAS) (formerly known as Local Area Sensor System (LASS)) experimentation. VISTAS is an unattended ground sensor system.
- Continued efforts to support enhanced ISR capabilities to better enable Marine infantry units to locate enemy forces as part of DO experimentation.
- Completed ISR support for the SV04 experimentation campaign.
- Completed Dragon Eye Unmanned Aerial Vehicle (UAV) payload development, integration, experimentation, and refinement of Tactics, Techniques, and Procedures (TTPs). Dragon Eye is a back-packable system, with modular payloads, designed to provide the small unit leader with an "over-the-hill" reconnaissance and surveillance capability.
- Completed DR Mobile Ground Sensor (MGS) efforts and transition to Joint Program Office. DR is a ground mobile sensor (Unmanned Ground Vehicle (UGV)) that will be used by Marine infantry battalions.
- Completed development of the Ion Mobility Spectrometer Explosive Detection System (IMSEDS). IMSEDS has a limited range and has proved operationally unsuitable. Therefore, initiated and completed Venom prototype experimentation. Venom is a tube-launched system allowing convoy stand-off protection by engaging/detonating possible vehicle-borne IEDs. Efforts support OIF.
- Initiated and Completed the assessment of the Marine Corps Transparent Ballistic Gunners Shield (MCTAGS). MCTAGS will provide a reasonable level of 360 degree armor protection for combat wheeled vehicles. Efforts support OIF.
- Initiated and completed Beam Hit Digital Down Link (DDL) capability. The Beam Hit program (a collaborative

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effort) facilitates development of an IED change detection system. Efforts support OIF.
- Initiated assessment of alternative change detection concept demonstrators. Efforts support OIF.
- Initiated experimentation of Tier II UAV concept demonstrators to provide persistent ISR at the Regimental level.
- Initiated additional IED investigations into promising detect and neutralize technologies.
- Initiated and completed MCM analysis of alternatives.
- Initiated and complete experimentation with the Hyper Detection Locating System (HDILS). HDILS technology provides the capability to detect surface, and subsurface, IEDs and differentiate mass composition, e.g., amongst metal, wood and plastic. Effort focuses on detection at increased speed and at enhanced distances. Efforts support OIF.

FY 2006 Plans:

- Continue all efforts of FY 2005, less those noted as completed above.
- Complete ISR support for the SV06 experimentation campaign.
- Complete VISTAS experimentation and transition to Joint Program Office.
- Complete efforts to enhance the reconnaissance and surveillance capabilities to better enable Marine infantry units to locate enemy forces as part of DO experimentation.
- Initiate ISR support for the SV08 experimentation campaign.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Initiate efforts to develop the TTPs required for small infantry units to employ UGVs, UAVs, and unattended ground sensors.
- Initiate ISR related small unit enhancements against irregular forces, including urban terrain.
- Initiate participation in DARPA’s development and upgrade of the WASP micro UAV and conduct extended operational assessment of WASP Block I through Block III.
- Initiate investigations into Multi-Sensor Surveillance System (MSSS) efforts. MSSS calls for an advanced and robust surveillance system for wide area base perimeter surveillance.

	FY 2005	FY 2006	FY 2007
FIRES, TARGETING, AND MANEUVER	8,702	5,042	4,409

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This activity includes MCWL experimentation efforts in the areas of fires, targeting, and maneuverability. Please note, although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.

FY 2005 Accomplishments:

- Continued fires, targeting, and maneuver support for the SV06 experimentation campaign.
- Continued evaluation of vehicles as surrogates for Internal Transportable Vehicles (ITVs).
- Completed fires, targeting, and maneuver support for the SV04 experimentation campaign.
- Completed first Dragon Fire II concept demonstrator. This includes the gun assembly, safety release testing/documentation, ammunition purchase, and initial firing tests. This effort is an augmentation to the Mobile Fire Support System (MFSS) Congressional enhancement (Project C9154).
- Completed counter shooter efforts by testing alternative systems. Efforts supported OIF.
- Initiated Dragon Fire II next generation concept demonstrator using the Dragon Fire/LAV test-bed.
- Initiated and completed investigations into highly mobile, internally transportable counter-fire radar to support a VME.
- Initiated HMGI. HMGI is a collaborative effort, to include related design, fabrication, and testing of prototype advanced mounts.
- Initiated investigations into the ECASS which is a system that has the capability to adjust itself continuously to changing road conditions. This was a collaborative effort.
- Initiated and completed Coalition Combat Identification (CCID) efforts. This collaborative effort supported integration of Battlefield Target Identification Devices (equipment) on United States Marine Corps (USMC) M1A1 main battle tanks.

FY 2006 Plans:

- Continue all efforts of FY 2005, less those noted as completed above.
- Complete fires, targeting, and maneuver support for the SV06 experimentation campaign.
- Complete evaluation of vehicles as surrogates for ITVs.
- Complete first Dragon Fire II concept demonstrator firing tests.
- Initiate fires, targeting, and maneuver support for the SV08 experimentation campaign.
- Initiate and complete integration of Dragon Fire II with radar for a quick counter fire capability.

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- Initiate integration of Remote Operations Video Enhanced Receiver (ROVER) video imaging capability with Strike-Link FAC/FO digital CAS Suite.
- Initiate assessment of alternatives of man portable standoff breaching capabilities.
- Initiate and complete assessment of 120-millimeter (mm) mortar rounds with scalable effects.
- Initiate assessment of alternatives and experimentation of land mine breaching and neutralization technologies.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Complete development and assessment of advanced common mount for HMGI.
- Complete ECASS investigations/experimentation.
- Complete ROVER integration with Strike-Link FO/FAC digital CAS Suite.
- Complete analysis of alternative man portable standoff breaching capabilities.
- Initiate Fires, Targeting, and Maneuver related small unit enhancements against irregular forces, including urban terrain.

	FY 2005	FY 2006	FY 2007
COMBAT SERVICE SUPPORT (CSS) AND FORCE PROTECTION	5,085	3,788	3,747

This activity includes MCWL experimentation efforts involving seabasing, logistics, CSS, urban combat, medical, force protection, as well as training and education. Please note, although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.

FY 2005 Accomplishments:

- Continued CSS and force protection support for the SV06 experimentation campaign.
- Continued to investigate individual equipment to enhance Marines' survivability and combat effectiveness. This effort included protective face/neck masks/shields, lower torso gear, whole body covering blankets that not only supported MCWL experimentation, but OIF as well.
- Continued High Speed Connector (HSC). HSC is a commercially available advanced hull and propulsion technology. The HSC program develops, integrates, and experiments with Marine unique Tactics, Techniques, Technologies, and Procedures (TTTPs).

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- Continued bio-science (medical) initiatives, to include Tactical Medical Coordination System (TacMedCS), a prototype system to enhance Casualty Evacuation (CASEVAC) tracking; Combat Trauma Registry (CTR), the raw data collection, entering of pertinent data into the CTR, performing analysis, and reporting on casualties treated during OEF as well as OIF; evaluating Dragon Doc/Medical Assault Packs (MAP), upgraded Field Corpsman treatment items; and providing for Mini Forward Resuscitative Surgery System (FRSS) capability study using a proven method to provide medical support for STOM/DO.
- Completed Dust Palliative efforts by experimenting with a suitable low-maintenance, lightweight, replacement and/or augmentation to current AM-2 matting to facilitate the construction or enhancement of Forward Operating Bases (FOBs). This effort supported MCWL sponsored experimentation, as well as OIF.
- Completed CSS and force protection support for the SV04 experimentation campaign.
- Initiated and completed support for NIRF prototype. NIRF (a collaborative effort) is a Quick-Reaction Capability (QRC) intended to provide a countermeasure against IEDs. Program directly supports OIF.

FY 2006 Plans:

- Continue all efforts of FY 2005, less those noted as completed above.
- Complete CSS and force protection planning support for the SV06 experimentation campaign.
- Initiate CSS and force protection support for the SV08 experimentation campaign.
- Initiate experimentation of simulation-based training technologies to enhance small unit leader decision-making ability.
- Initiate Vehicle Hardening assessments/experimentation efforts.
- Initiate IED Detector Dog experiment that will merge specialized breeding, urban conditioning and multi-disciplinary training techniques in support of small unit infantry operations

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Complete and transition HSC experimentation efforts to Joint Program Office.
- Complete experimentation of simulation based training technologies to enhance small unit leader decision-making ability.
- Initiate Joint Aero-ballistic Non-lethal Incapacitation System (JANIS) investigations. JANIS encompasses the development of an untethered electro-muscular incapacitation system with a range of zero (0) to one hundred (100) meters.

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	FY 2005	FY 2006	FY 2007
MARINE CORPS WARFIGHTING LABORATORY (MCWL)OPERATIONS (SUPPORT)	5,254	6,864	8,229

MCWL Operations (Support) efforts include overall MCWL experimentation doctrine, planning, analysis, data collection, as well as technology transition tracking efforts. Please note, although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.

FY 2005 Accomplishments:

- Continued support for the SV06 experimentation campaign.
- Continued to synthesize results and lessons learned into proposed DOTMLPF recommendations for the Marine Corps.
- Continued to provide technical, strategic, and managerial support to Marine Corps experimentation.
- Continued to provide overall analysis and reporting of experimentation efforts, analytical assistance during experiment design, and maintenance of an ad-hoc analysis capability.
- Completed support for the SV04 experimentation campaign.

FY 2006 Plans:

- Continue all efforts of FY 2005, less those noted as completed above.
- Complete support for the SV06 experimentation campaign.
- Initiate support for the SV08 experimentation campaign.
- Initiate and complete Integrated Global Positioning System Radio System (IGRS) II data collection/reconstruction efforts.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.

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	FY 2005	FY 2006	FY 2007
WARFIGHTING EXCELLENCE	5,114	4,029	4,808

This activity includes MCWL experimentation efforts in the areas of wargaming, the Center for Emerging Threats and Opportunities (CETO), and Joint experimentation. Please note, although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.

FY 2005 Accomplishments:

- Continued support for the SV06 experimentation campaign.
- Continued Executive Agent (EA) responsibilities for Joint Title Ten (X) / Joint Concept Development and Experimentation (JCDE) programs such as Unified Quest, Unified Course, and Unified Engagement. Title X wargames generally address future capabilities in the context of core Title X readiness responsibilities. JCDE efforts include the co-sponsored Marine Corps/JFCOM Joint Urban Warrior (JUW) program designed to support JFCOM Joint Urban Operations (JUO) efforts. JUW is focused on the integration of the full spectrum of advanced operational concepts, organizational innovations, technologies, and other transformational opportunities in complex urban operations.
- Continued the management and oversight of non Title X Wargaming to include the highly visible Office of the Secretary of Defense’s (OSD’s) Net Assessment Transformation War Game series and the SOCOM wargaming series.
- Continued to conduct quarterly Emerald Express seminars, resulting in the collection and dissemination of insights and observations from Operating Forces. Produced reports for the purpose of Professional Military Education (PME) and to further advance the lessons learned process.
- Continued to provide CETO support. CETO’s mission is to: 1) prevent operational and tactical surprises to senior warfighting commanders by assessing the future security environment in light of emerging threats and potential conceptual and technological opportunities, 2) help focus science and technology and experimental efforts by appraising promising concepts and technologies; and 3) serve as a catalyst to stimulate thought and debate on issues of importance to the USMC.
- Completed support for the SV04 experimentation campaign.
- Completed Joint Experimentation Cell efforts by conducting Joint Warfighting Capability Assessments (JWCAs) and participating on Functional Capability Boards (FCB), as well as providing Joint Integration and Implementation Planner support to the Marine Corps.

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FY 2006 Plans:

- Continue all efforts of FY 2005, less those noted as completed above.
- Complete support for the SV06 experimentation campaign.
- Initiate support for the SV08 experimentation campaign.
- Initiate the Joint Force Protection (JFP) ACTD to provide warfighters with a simple, timely, comprehensive understanding of deployment and distribution information. ACTDs are intended to rapidly field needed Joint capabilities by employing emergent mature technologies matched with innovative operational concepts.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Initiate investigations/participation into promising ACTDs.

C. OTHER PROGRAM FUNDING SUMMARY:
NAVY RELATED RDT&E: The Navy’s 6.1 program contributes indirectly to this effort.
PE 0602131M (Marine Corps Landing Force Technology)

D. ACQUISITION STRATEGY:
Not Applicable.

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CONGRESSIONAL PLUS-UPS:

	FY 2005	FY 2006
ADVANCED DEPLOYABLE WATER PURIFICATION TECHNOLOGY	0	1,300

This effort supports advanced deployable water purification technology research.

	FY 2005	FY 2006
ADVANCED MINE DETECTION	2,507	0

Continued development of a hand-held, portable Advanced Mine Detector (AMD) system for the U.S. Marine Corps. Once developed, the detector will enable Marines to accurately detect buried metallic and non-metallic anti-tank and antipersonnel mines and unexploded ordnance with far fewer false alarms than is possible with current detection systems. Quadrupole Resonance (QR) technology is ideally suited for discriminating buried landmines from clutter (i.e., metal objects, rocks, etc.) because QR sensors measure explosives at the molecular level. The sensors emit low-frequency, specially tuned radio waves and then measure the unique responses from specific explosives.

	FY 2005	FY 2006
ARMORED PATROL VEHICLE	0	1,500

This effort supports armored patrol vehicle research.

	FY 2005	FY 2006
C3RP	4,533	3,400

FY 2005 - This effort established an Interdisciplinary Center of Excellence in research relevant to national security and the Marine Corps on the Central Coast of California by bringing together Universities, government agencies (both federal and state), and the private sector, which can evolve into a valuable national resource. Continued efforts to explore this potential and to identify and support relevant research and expertise.

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FY 2006 - This effort supports C3RP research.

	FY 2005	FY 2006
COMMON REMOTELY OPERATED WEAPON SYSTEM (CROWS)	0	1,000

This effort supports the Common Remotely Operated Weapon System(CROWS).

	FY 2005	FY 2006
CRAFT INTEGRATED ELECTRONIC SUITE (CIES)	964	1,000

FY 2005 - Integrated an electronic control system and added the sensors and C2 systems required to enhance the situational awareness of the crew of a small boat (Stilitto). The objective of the work is to ready the Stilitto for participation in experimentation that is aimed at understanding ad hoc survivable networks. The deliverable is a boat with upgraded electronic control and C4ISR. Technology transfer to the Sea Lion program of record is expected.

FY 2006 - This effort supports CIES research.

	FY 2005	FY 2006
EXCALIBUR UNMANNED COMBAT AERIAL VEHICLE	967	0

Developed a concept of operations for the Excalibur tactical unmanned combat air vehicle demonstrator. The Excalibur is anticipated to be a survivable, Vertical Takeoff and Landing (VTOL), tactical-class unmanned combat air vehicle that can reach conflict areas in a timely manner, engage and destroy targets of opportunity, provide overhead coverage at trouble spots, such as roadside ambushes, and operate without runways or launch mechanisms.

	FY 2005	FY 2006
EXPEDITIONARY UNIT WATER PURIFICATION II	11,089	8,700

FY 2005 - Conducted comprehensive search for robust, dynamic, other than classical S&T approaches to water desalination, reclamation, energetics, distribution, on the national and international scale. Funded select

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S&T efforts deemed to have higher than average expectation of reducing the cost of water purification in terms of power, footprint, and so on. Utilizing both the Generation I demonstrator, and the Generation II preliminary specification and engineering design, conducted studies and analysis of promising S&T derived from the Expeditionary Warfare Water Purification (EUWP) S&T program to date. Simultaneously, developed a Generation II, 300 – 500,000 gallon per day (GPD) engineering prototype which can be used to develop knowledge products for military, federal, and applicable commercial entities of successful S&T also emanating from the EUWP S&T investment program, as well as newly emerging technology from independent sources. Such studies and analysis process will be available for use to address such issues as scalability of select “technology insertion” candidates into large capacity water systems both ship board and land based.

FY 2006 - This effort supports expeditionary unit water purification II research.

	FY 2005	FY 2006
LASER INTEGRATED TARGET ENGAGEMENT SYSTEM	0	3,600

This effort supports laser integrated target engagement system research.

	FY 2005	FY 2006
MAN-PORTABLE QUADRUPOLE RESONANCE LANDMINE DETECTION	0	2,600

This effort focused on advanced development and demonstration of landmine countermeasures technologies; specifically, a landmine detection system on quadrupole resonance technology, engineered into a man-portable configuration.

	FY 2005	FY 2006
MARITIME AIR-GROUND TASK FORCE SITUATIONAL AWARENESS	0	1,000

This effort supports maritime air-ground task force situational awareness research.

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	FY 2005	FY 2006
MOBILE FIRE SUPPORT SYSTEM - DRAGON FIRE II	988	2,800

FY 2005 - Funding/efforts were augmented by Marine Corps Warfighting Laboratory (MCWL) core funding; discussed in Project C2297 under Fires, Targeting, and Maneuver subsection.

The Mobile Fire Support System (MFSS), now referred to as Dragon Fire II, is an automated and modular rifled 120-millimeter fire support system concept demonstrator that uses automation to improve precision, responsiveness, and digital connectivity to support units. It is capable of firing from its towed carriage and from its modified Light Armored Vehicle (LAV) interchangeably and in its towed configuration is transportable within the MV-22 Osprey aircraft.

FY 2005 Accomplishments: Completed software and engineering design. Fabricated the new concept demonstrator system and test firings were conducted to complete the system.

FY 2006 - This effort supports the Mobile Fire Support System-Dragon Fire II.

	FY 2005	FY 2006
PORTABLE METHANOL FUEL CELL	964	0

Effort was designed to develop direct methanol fuel cell electrochemistry by employing advanced micro-fuel cell technology in passive, ambient conditions (e.g. no balance of plant for humidity and no temperature controls). This no fault methanol fuel cell module (cells will be both in parallel and in series) will leverage industrial battery research efforts directed towards the consumer market. The ultimate research goal is to provide a lighter, longer lasting power supply thereby reducing the weight of batteries carried by individual Marines.

	FY 2005	FY 2006
PRECISION APPROACH AND LANDING SYSTEM (PALS)	0	2,700

This effort supports research of the Precision Approach and Landing System(PALS).

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	FY 2005	FY 2006
PROJECT ALBERT	3,292	0

Under the umbrella of MCWL experimentation efforts, Project Albert provides design and development of new tools to capture emergent behavior in synthetic environments that, over time, will lead to more effective warfighters. The project's vision includes strong interdisciplinary collaborative teams to address previously unanswered questions relevant to success in warfare. The goal of Project Albert is to investigate and apply promising technologies to support military decision-makers in meaningful ways through modeling, analysis, and new ways of combining them to include important phenomena inadequately represented by current techniques.

FY 2005 Accomplishments:
- Continued modeling and developing Data Farming techniques. Specific areas of application included Maneuver in Urban Operations and UAV for concurrent operations.
- Initiated Convoy Protection, Improvised Explosive Devices, Manpower versus Technical Tradeoff in Combat Support Operations, Search Pattern Effectiveness for UAVs in a Maritime Environment, and Modeling Aspects of Net Centric Operations.

	FY 2005	FY 2006
RAPID DEPLOYMENT FORTIFICATION WALL (RDFW)	967	0

RDFW prototyped development/experimentation effort being pursued by MCWL mainly via Congressional enhancements. The purpose of this Improved Expedient Fortification Construction program is to experiment with commercial-off-the-shelf expedient fortification construction systems. By leveraging modern materials and techniques, the Marine Corps can increase force protection while decreasing the manpower hours needed to construct expedient fortifications.

FY 2005 Accomplishments:
- Conducted extensive ballistic testing using the Air Force's Force Protection Battle Lab.
- Purchased additional grids, in support of the Second Marine Expeditionary Force (II MEF)/OIF deployments, for force protection and road stabilization in theater experimentation in Iraq.

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	FY 2005	FY 2006
STUDY TO IDENTIFY AND EVALUATE ALTERNATIVE FIXED-WING LIFT PLATFORMS	967	0

Identified and evaluated alternative vertical lift platforms in the event of Joint Strike Fighter (JSF) Short Takeoff Vertical Landing (STOVL) cancellation. Recent design reviews of the STOVL variant of JSF project it to be overweight for the System Design & Development (SDD) Phase, which could cause it to fall short of several key performance parameters. This study performed an Analysis of Alternatives (AOA) in the event of cancellation of the current design effort.

	FY 2005	FY 2006
TELEPRESENT RAPID AIMING PLATFORM (TRAP)	977	3,000

FY 2005 - The Remote Precision Gun (also known as TRAP) is a remotely operated weapon system which integrates 5.56 to .50 caliber systems with man-in-the-loop remotely controlled robotic firing and observation systems.

FY 2005 Accomplishments:
- Continued the design overhaul and upgrades initiated in FY 2004.
- Integrated laser range finding module and improved optics with digitally generated aiming crosshair into the system.
- Conducted operational assessment of the upgraded system with II MEF in theater. Efforts support OIF.
- Published report to MCCDC for potential transition to acquisition program of record.

FY 2006 - This effort supports TRAP research.

	FY 2005	FY 2006
TRANSPORTABLE TRANSPONDER LANDING SYSTEM	1,943	0

TTLS was originally developed under a DARPA effort through Naval Air Systems Command (NAVAIR) and Advanced Navigation and Positioning Corporation (ANPC). The system was designed to provide a precision approach capability by using inexpensive ground systems to provide position information for aircraft equipped with a transponder and standard Federal Aviation Administration (FAA) Category I Instrument Landing System (ILS) equipment. In order for TTLS to suit the USMC tactical mission requirements, several technologies must be

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603640M PROGRAM ELEMENT TITLE: MARINE CORPS ADVANCED TECHNOLOGY DEMONSTRATIONS (ATD)
PROJECT NUMBER: 9999 PROJECT TITLE: Congressional Plus-Ups

developed. These include: Link 4A data-link guidance output to support USMC aircraft; multiple aircraft tracking and guidance; miniaturization of the system for mounting on a supporting ground vehicle; reciprocal approaches/runway support; Local Sector Surveillance and Control; and reduced TTLS susceptibility to jamming.

FY 2005 Accomplishments:
- Continued development efforts in support of the TTLS concept demonstration.
- Tested a new interrogation method that doubles the current surveillance range while minimizing aircraft transponder occupancy to address the FAA’s concerns.