

UNCLASSIFIED

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

DATE: February 2007

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603640M
PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

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	86,777	83,376	70,968	68,564	69,217	70,293	69,946	71,997
2223 MARINE CORPS ATD	21,187	23,997	36,610	36,243	37,175	37,605	36,541	37,619
2297 CMC WARFIGHTING LAB CORE	34,214	35,320*	34,358	32,321	32,042	32,688	33,405	34,378
9999 CONGRESSIONAL PLUS-UPS	31,376	24,059*	0	0	0	0	0	0

* Project 2297 includes 400K associated with Congressional Plus-Up for Joint Improvised Explosive Device Neutralizer III.

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: As a key component of naval expeditionary forces, the Marine Corps has unique and technologically stressing requirements because of its expeditionary mission and intensive operational tempo, Marine Air-Ground Task Force (MAGTF) structure, and conduct of maneuver warfare. Critical requirements in this program element (PE) are: Command, Control, Communications, Computers, Intelligence, and Reconnaissance (C4ISR); maneuver techniques and means; force protection; logistic sustainment; human performance, training and education; and firepower. There are ongoing actions to develop and demonstrate advanced technologies and concepts in operational environments. Joint service efforts are aligned with Defense Technology Objectives and Joint Warfighting Capability Objectives. In addition, there is funding for experimentation in warfighting concepts as well as operational assessment of emerging technologies, to include technical support of operating forces to assess military utility of selected technologies. This PE specifically supports: continued development of Distributed Operations (DO) through field experiments with Marine infantry battalions; rapid response to low-, mid-, and high-intensity conflicts in the Global War on Terrorism (GWOT); methods for countering irregular threats; and expansion of seabasing and naval force packaging capabilities. The investment directly assists in fulfilling the forward presence

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requirements of Sea Shield and the transformational capabilities prescribed by Sea Strike. The Future Naval Capability (FNC) process is supported and funds are programmed accordingly. This PE is largely focused on demonstration of products and capabilities from the knowledge base and Discovery and Invention (D&I) phases of Naval Science and Technology (S&T). As Naval partners, the Navy and Marine Corps S&T Team strive to transition technologies that will implement objectives outlined in the Naval Operations Concept. This PE also funds technical solutions designed to increase Naval force capability, such as the Naval Expeditionary Combat Command. Investments in S&T provide the opportunities for future capabilities and will prevent technological surprise. The PE as a whole will advance the amphibious and expeditionary capabilities for the Combatant Commanders helping to meet their emerging challenges by enhancing Naval S&T contributions to the long commitment to the GWOT.

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	88,108	59,170	62,853	59,205
Congressional Action	0	24,550	0	0
Congressional Undistributed Reductions/Rescissions	-423	-344	0	0
Execution Adjustments	994	0	0	0
Non-Pay Inflation Adjustments	0	0	-146	93
Program Adjustments	0	0	8,178	9,202
Rate Adjustments	0	0	83	64
SBIR Assessment	-1,902	0	0	0
FY 2008/FY 2009 President's Budget Submission	86,777	83,376	70,968	68,564

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Project 2297, 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 Marine Corps Warfighting Laboratory (MCWL) Advanced Warfighting Experiments (AWEs) Sea Viking (SV) 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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PROJECT NUMBER: 2223

PROJECT TITLE: MARINE CORPS ATD

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
2223 MARINE CORPS ATD	21,187	23,997	36,610	36,243	37,175	37,605	36,541	37,619

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Critical Marine Corps requirements/imperatives addressed in this Project are: Maneuver; Firepower; 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. 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 related Enabling Capability (EC). The focus of the EC 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 and is one of 25 prioritized Capability Gaps (prioritized by the Chief of Naval Operations and the Marine Corps Combat Development Command (MCCDC) that are made up of 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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B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2006	FY 2007	FY 2008	FY 2009
MANEUVER	7,060	6,916	6,812	6,609

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, 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 from the beach exit to inland objectives. MAGTF MCM is a functional component of Naval Expeditionary Maneuver Warfare and includes Ship to Objective Maneuver (STOM), Expeditionary Operations from a Sea Base, sustained Operations Ashore, Urban and Asymmetric Operations, and OOTW.

FY 2006 Accomplishments:

- Continued Advanced Electronically Controlled Active Suspension System (ECASS) development in support of High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), MAGTF Expeditionary Family of Fighting Vehicles and other Light Armored Vehicles.
- Continued Electromagnetic Non-Explosive Reactive Armor (E-NERA) and Advanced Electromagnetic Armor technology development efforts.
- Continued development of scalable explosive neutralization technologies for MCM.
- Continued development of technologies to defeat side/top attack and advanced fuse mines through signature reduction and advanced signature duplication.
- Continued the development of technologies to locate and defeat IEDs.
- Completed and demonstrated hand held Nuclear Quadrupole Resonance technology integration efforts with Ground Penetrating Radar and Electromagnetic Induction sensors.
- Initiated S&T programs to address MAGTF Land MCM Master Plan capability gaps.
- Initiated development of technologies to defeat advanced mine fuses (seismic, acoustic, and infrared).
- Initiated the formation of blast consortia to foster the increased understanding of blast and fragmentation interaction with vehicles and biological effects.
- Initiated a program to examine the feasibility of using lightweight mine clearance devices on USMC combat

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vehicles.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Complete the program to examine the feasibility of using lightweight mine clearance devices on USMC combat vehicles. Effort transferred to MCWL.
- Initiate development of a Combat S&T vehicle prototype to enhance crew survivability and vehicle fuel efficiency.
- Initiate efforts to detect IEDs using radio frequency sources.
- Initiate studies to identify technology development plans to close identified force protection capability gaps.
- Initiate development of a test bed to demonstrate advanced survivability concepts.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete development of scalable explosive neutralization technologies for MCM.
- Complete Advanced ECASS development in support of HMMWV, MAGTF Expeditionary Family of Fighting Vehicles and other Light Armored Vehicles.
- Complete and transition continued development of technologies to locate and defeat IEDs into PEs associated with the FNC program.
- Complete E-NERA.
- Initiate technology development programs to address force protection capability gaps.
- Initiate development of fuel efficiency and battle field power systems for improved performance.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Initiate efforts in spectral signature classification for MCM applications.

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	FY 2006	FY 2007	FY 2008	FY 2009
LITTORAL COMBAT/POWER PROJECTION (LC/PP)	2,873	3,581	16,225	16,675

This activity is aligned with the Sea Strike, Sea Shield, Sea Basing and FORCENet pillars and provides the capability for the demonstration and transition of technologies developed through the related Marine Corps S&T programs directly to an acquisition program of record. Littoral Combat/Power Projection is the FNC.

The funding profile from FY 2006 to FY 2009 reflects the reorganization of the FNC program investments into ECs. As a result of this reorganization, the funding for each EC has been realigned to a Budget Activity as appropriate. The focus of the ECs within this PE will be on technology related to Urban, Asymmetric, Littoral and Expeditionary Operations. The related science and technology development is of the highest importance to Marine Corps operations in Iraq, Afghanistan and the GWOT. Understandably, these Warfighter Capability Gaps are among those highest rated of the 34 prioritized Capability Gaps (prioritized by the OPNAV N-6/7 and the MCCDC). The technologies associated with these gaps are being pursued as part of an overall effort that addresses Sea Strike, Sea Shield, Sea Basing and FORCENet Capability Gaps. Warfighter Capability Gaps are made up of ECs and supporting products. This activity includes support to the Urban, Asymmetric Operations-related to EC's for IED's, Modular Scalable Effects Weapons, Advanced Naval Fires Technology, Dynamic Target Engagement, Position Location Information, Transparent Urban Structures and Hostile Fire Detection and Response.

Increase from FY 2007 to FY 2008 and out reflects the transition of projects in Asymmetric Threat Weapon technologies, unambiguous warning devices, active RPG defense technologies, and Electro Optic/Infrared/Laser technologies.

FY 2006 Accomplishments:

- Continued efforts to provide urban direction finding of Radio Frequency (RF) emitters from moving platforms. (Concurrent funding from PE 0602131M and 0603782N.)
- Continued development of an obstacle detection system on the Expeditionary Fighting Vehicle (EFV). (Transitioned from 0602131M.)
- Continued development of tools and technologies to support Marine Corps Intelligence, Surveillance and Reconnaissance (ISR) efforts Measurement and Signature Intelligence Tactical Remote Sensor System (MASINT/TRSS) in remote sensor integration within the Distributed Common Ground/Surface System (DCGS). (Realigned to PE 0603114N in FY 2007.)

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- 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. (Concurrent funding in PE 0602131M and 0602236N; realigned to PE 0603114N in FY 2007.)
- Continued development of improved lightweight computational fire control interface technology. (Concurrent funding from PE 0602131M, 0602236N, 0603236N and 0603782N; realigned to PE 0603114N in FY 2007.)
- Continued development of improved fire control systems technologies to Expeditionary Fire Support System artillery and mortar systems. (Realigned to PE 0603114N in FY 2007.)
- Continued 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 in PE 0602131M). (Realigned to PE 0603114N in FY 2007.)
- Continued development 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). (Realigned to PE 0602114N and 0603114N in FY 2007.)
- Continued integration of hostile fire detection and counter-fire system (GUNSLINGER). (Concurrent funding in PE 0602131M and 0603782N; realigned to PEs 0602114N and 0603114N in FY 2007.)
- Continued development of innovative relay Beyond Line of Sight (BLOS) technology through integration and demonstration of secure wireless networks/secure wireless local area network (LAN) communication technologies. (Concurrent funding in PEs 0602131M, 0602236N, 0603236N and 0603782N; realigned to PE 0603235N in FY 2007.)

FY 2007 Plans:

- Continue all efforts of FY 2006.
- Complete efforts to provide urban direction finding of RF emitters from moving platforms; provide algorithms to MARCORSYSCOM Program Manager INTEL.
- Complete development and begin transition of an obstacle detection system on the EFV. (Transitioned from PE 0602131M.)

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete development and transition Asymmetric Threat Weapon technologies. (Transitioned from PE 0602131M and 0602123N)
- Complete development and transition unambiguous warning devices technologies. (Transitioned from PE 0602131M)

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- Complete development and transition active RPG defense technologies. (Transitioned from PE 0602131M)
- Complete development and transition improved imaging (Electro Optic/Infrared/Laser) technologies. (Transitioned from PE 0602131M)
- Complete development and transition reconfigurable surveillance Unmanned Aerial Vehicles (UAVs) for Warfighter protection technologies. (Transitioned from PE 0602131M)
- Initiate development of transparent urban structures technologies. (Previous and concurrent funding from PE 0602131M)
- Initiate development of modular scalable effects prototype weapon. (Concurrent funding from PE 0602131M.)
- Initiate development of counter improvised explosive devices technologies. (Concurrent funding from PE 0602131M)
- Initiate development of tactical urban breaching technologies. (Concurrent funding from PE 0602131M)

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Initiate development of decision aid software to assist warfighter with interpretation of sensor information and subsequent decisions based on that information. (Previous and concurrent funding from PE 0602131M.)

	FY 2006	FY 2007	FY 2008	FY 2009
HUMAN PERFORMANCE, TRAINING & EDUCATION	2,828	3,642	3,618	3,376

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 was changed from "Human Performance, Training and Education" to better describe its program/projects.

The funding profile from FY 2006 to FY 2007 reflects the shift of the Marine Advanced Combat Headborne System Initiative (MACHSI) effort from the Fires Targeting and Maneuver activity in FY 2007.

FY 2006 Accomplishments:

- Continued integrating cognitive performance improvement (augmented cognition) technology using operationally relevant systems and scenarios, and demonstrated improved human cognition via multiple sensory modalities.

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- Continued the integration and evaluation of cognitive state detection technologies with instructor-based training scenario applications and demonstrated improved individual task performance.
- Completed demonstration and evaluation of technologies available for prototype of a Rapid Portable Synthetic Environment Generation capability.
- Initiated the development of tools to capture metrics and lessons learned from a variety of simulation and training sources.
- Initiated research into augmented reality training systems to enhance warfighter performance in urban combat.
- Initiated development of immersive closed loop training system for MOUT.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Continue MACHSI: physical protection of the head, neck and face. (Transitioned from the Firepower activity.)
- Complete the integration and evaluation of cognitive state detection technologies with instructor-based training scenario applications and demonstrated improved individual task performance.
- Initiate development of the Distributed Operations Training/Virtual Test Bed.
- Initiate research into environmental effects on cognitive and team performance.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete research into augmented reality training systems to enhance warfighter performance in urban combat.
- Complete integrating cognitive performance improvement (augmented cognition) technology using operationally relevant systems and scenarios, and demonstrate improved human cognition via multiple sensory modalities.
- Complete development of immersive closed loop training system for MOUT.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Complete human performance physical protection of the head, neck and face efforts.
- Initiate development of Tools for Strategic Corporal Assessment/Training.

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	FY 2006	FY 2007	FY 2008	FY 2009
LOGISTICS	3,123	3,585	3,683	3,750

This activity supports Marine Corps Expeditionary Logistics which is the practical discipline and real world 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 2006 Accomplishments:

- Continued exploring the development of portable fuel cell technologies capable of providing power in the 100 Watt to 500 Watt power range.
- Continued 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.
- Continued development of lightweight high specific energy battery charger.
- Completed development of a computer simulation-based tool for evaluating power requirements and powering options for electronic equipment used by Marine Expeditionary Force.
- Initiated development of vehicle embarked & powered manipulator arm for next generation expeditionary vehicles.
- Initiated Marine Corps Seabasing Roadmap study.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Complete 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.
- Complete Marine Corps Seabasing Roadmap study.
- Complete development of lightweight high specific energy battery charger.
- Initiate efforts to develop a micro turbine generator capable of 100W average power.

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- 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.)

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete development of vehicle embarked & powered manipulator arm for next generation expeditionary vehicles.
- Initiate analysis of material alternatives for automated vehicle health monitoring and reporting.
- Initiate development of a tracking capability for major classes of supplies, forces & equipment.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Complete efforts to develop a micro turbine generator capable of 100W average power.
- Complete development of a portable fuel processor.

	FY 2006	FY 2007	FY 2008	FY 2009
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE (C4ISR)	2,772	3,079	3,017	2,854

This activity integrates and demonstrates enhanced communications and situational awareness in warfighting environments and communication and situational awareness technologies for near term USMC operations.

FY 2006 Accomplishments:

- Continued integration and demonstration of naval tactical warfighting applications and network connectivity.
- Continued development and demonstration of low-cost compact conformal antenna capability.
- Continued development and demonstration of urban communications capability.
- Initiated demonstration of advanced network mobility and network security capabilities.
- Initiated efforts to reduce the risk in investing in the ability to see through urban structures in an effort to identify enemy personnel or other assets.

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- Initiated designing tools for mission specific tactical sensor fields capable of fulfilling specific mission objectives.
- Initiated developing smart tactical sensors, platforms and algorithms capable of forwarding information/knowledge vice raw data.
- Initiated creating a service oriented sensor network for expeditionary forces' current and future tactical sensors.
- Initiated creating fusion tools capable of translating tactical sensor data into appropriate situational awareness for expeditionary forces in near real-time.
- Initiated designing autonomous platforms and automatic sensor planning and management tools to ensure that the right data is collected by the right sensor in support of intelligence requirements.
- Initiated developing tailored tactical Human to Machine Interfaces aligned to primary operational functions and non-intrusive within the battlespace.
- Initiated creating services for the tactical network that are fully operable with DCGS and the DCGS Integration Backbone.

FY 2007 Plans:

- Continue all efforts of FY 2006.
- Complete demonstration of advanced network mobility and network security capabilities.
- Initiate development and demonstration of measurement and signature intelligence data management and integration capability.
- Initiate demonstrations of tagging, tracking and locating various adversarial targets.
- Initiate development of adaptable enemy course of action engine (smart algorithms) development to interfere with or influence adversarial plans.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete efforts to reduce the risk in investing in the ability to see through urban structures in an effort to identify enemy personnel or other assets.
- Initiate demonstrations of improved urban communications capabilities.
- Initiate urban navigation with limited Global Positioning System availability demonstrations.
- Initiate development of advanced tactical sensor nets that will localize mobile detection of threats.

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FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Complete conformal antenna integration and demonstrations.

	FY 2006	FY 2007	FY 2008	FY 2009
FIREPOWER	2,531	3,194	3,255	2,979

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.

The funding profile from FY 2006 to FY 2007 reflects the initiation of enhanced lethality and extended range ammunition demonstrations in FY 2007. The changes are consistent with the Marine Corps plans.

FY 2006 Accomplishments:

- Continued scalable effects conventional warhead concept development.
- Initiated shipboard submunition Microelectromechanical System (MEMS) fuze safety and reliability enhancement effort from PE 0602131M.
- Initiated MACHSI advanced technology development. (Transitioned from FY 2005 PE 0602131M.)
- Initiated development of caseless small caliber ammunition.

FY 2007 Plans:

- Continue all efforts of FY 2006.
- Initiate enhanced lethality and extended range ammunition demonstrations.

FY 2008 Plans:

- Continue all efforts of FY 2007.
- Complete development of caseless small caliber ammunition.
- Initiate improved mortar munition integration and demonstrations.

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- Initiate development of targeting and engagement technologies for distributed operations collaborative fires integration and demonstrations.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Complete shipboard submunition MEMS fuze safety and reliability enhancement effort.
- Complete enhanced lethality and extended range ammunition demonstrations.

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 0602236N (Warfighter Sustainment Applied Research)
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 System)
PE 0204163N (Fleet Telecommunications (Tactical))
PE 0206313M (Marine Corps Communications Systems)
PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems)
PE 0305204N (Tactical Unmanned Aerial Vehicles)

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)

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PROGRAM ELEMENT: 0603640M

PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT NUMBER: 2223

PROJECT TITLE: MARINE CORPS ATD

PE 0604808A (Landmine Warfare/Barrier - SSD)

PE 0602702E (Tactical Technology)

D. ACQUISITION STRATEGY:

Not Applicable.

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PROGRAM ELEMENT: 0603640M

PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT NUMBER: 2297

PROJECT TITLE: CMC WARFIGHTING LAB CORE

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
2297 CMC WARFIGHTING LAB CORE	34,214	35,320*	34,358	32,321	32,042	32,688	33,405	34,378

* FY 2007 includes 400K associated with Congressional Plus-Up for Joint Improvised Explosive Device Neutralizer III.

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: MCWL examines 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: C4; ISR; Fires, Targeting, and Maneuver; Combat Service Support (CSS) and Force Protection; and Warfighting Excellence.

Using operational forces, MCWL conducts 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).

SV is a series of two-year campaigns that provide focus and synergy to MCWL concept-based experimentation. This approach allows integration of USMC service experiments with other services and with JFCOM experiments.

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PROJECT TITLE: CMC WARFIGHTING LAB CORE

SV experiments are currently focused on the implementation of the DO Concept as an extension of maneuver warfare down to the small unit tactical level. DO is a concept characterized as the physical dispersion of network-enabled units, from squad to battalion size, over an extended battlespace.

- Sea Viking 2006 (SV06): (FY 2005 through FY 2006) SV06 is a series of related events that examine enhanced infantry training and tactics through several LOEs that will culminate in the SV06 AWE. The SV06 AWE will be a live force experiment that examines the DO concept in the operational context provided by a deploying Marine Expeditionary Unit (MEU) in the GWOT. SV06 will permit development of prototype and surrogate technologies in order to better refine material and non-material capabilities needed by the Marine Corps to adapt to the shift toward irregular warfare.

- Sea Viking 2008 (SV08): (FY 2007 through FY 2008) SV08 continues exploration of DO in the irregular, nonlinear, battlespace emphasizing enhanced individual and small unit capabilities. SV08 expands the focus of DO beyond infantry training and tactics into logistics, command and control (C2), and ISR. In addition, SV08 will strive to identify and assess technologies and procedures that will improve the individual Marine cognitively and physiologically through advanced simulation-based training. In keeping with the SV06 DO objective of empowering small unit leaders, SV08 seeks to identify decision support tools that will increase the individual Marine's situational awareness through small unit access to tactical ISR assets and exploitation of actionable intelligence to better fight and win the GWOT.

- Sea Viking 2010 (SV10): (FY 2009 through FY 2010) SV10 shifts the focus of MCWL experimentation toward irregular warfare. SV10 will examine enhancement of MAGTF counterinsurgency operations across all warfighting areas. Additionally, the campaign will include experimentation with training and mission rehearsal simulators, next generation tactical vehicles, and Future Combat Systems (FCS) spinout technologies.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2006	FY 2007	FY 2008	FY 2009
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS (C4)	8,242	7,874	7,970	7,282

This activity encompasses all MCWL C4 related experimentation efforts. 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.

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PROJECT NUMBER: 2297

PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

FY 2006 Accomplishments:

- Continued C4 extended user assessments of selected prototype technologies in support of forces engaged in Operation Enduring Freedom and OIF.
- Continued C4 support for the SV06 experimentation campaign.
- Completed experimentation of initial SV06 Over the Horizon (OTH) (previously known as Expeditionary Tactical Communication System) dismounted communication concept demonstrator.
- Completed experimentation of SV06 On The Move/Combat Operations Center (OTM/COC) for Vertical Maneuver Element (VME).
- Completed small unit enhancement efforts based on the results of initial D0 C2 experimentation.
- Initiated experimentation of enhanced OTH communications Low Earth Orbit Satellite (LEOSAT)/Line of Sight (LOS) hybrid in support of SV08.
- Initiated experimentation of coalition C4 interoperability concept demonstrator.
- Initiated experimentation of concept demonstrators to support company and below alternative C2 architectures.
- Initiated C4 related small unit enhancements against irregular forces, including urban terrain.

FY 2007 Plans:

- Complete all efforts of FY 2006, less those noted as completed above.
- Complete support for the SV06 experimentation campaign plan.
- Initiate C4 support for SV08 experiments.
- Initiate experimentation of enhanced communications concept demonstrators as part of SV08.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete support for SV08.
- Complete experimentation of enhanced communications concept demonstrator for SV08.
- Complete experimentation of coalition C4 interoperability concept demonstrator.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

- Complete experimentation of OTH LEOSAT/LOS hybrid in support of SV08 and emerging DO architecture.
- Complete experimentation with concept demonstrators to support company and below C2 architectures.
- Initiate experimentation with concept demonstrators to integrate legacy systems with emerging Battalion and higher level C2 systems.
- Initiate experimentation with Joint FCS spinouts to determine applicability to USMC Operating Forces.

	FY 2006	FY 2007	FY 2008	FY 2009
INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR)	3,946	4,653	4,532	4,630

This activity includes MCWL ISR related experimentation efforts involving enhanced reconnaissance; sensors (to include mine detection); and unmanned ground and aerial vehicles. 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 2006 Accomplishments:

- Continued ISR support for the SV06 experimentation campaign.
- Continued additional IED investigations into promising detect and neutralize technologies.
- Completed Visual Intelligence Surveillance Tactical Alert System (VISTAS) experimentation and transition to Joint Program Office.
- Completed efforts to enhance the reconnaissance and surveillance capabilities to better enable Marine infantry units to locate enemy forces as part of DO experimentation.
- Initiated experimentation of Tier II Unmanned Aerial System (UAS) concept demonstrator to provide persistent ISR at regimental and battalion level.
- Initiated development and experimentation of ISR technologies in preparation for SV08 planned experiments.
- Initiated development and experimentation of the Wasp micro UAS, with the Defense Advanced Research Projects Agency (DARPA), in support of DO experimentation and OIF.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Complete support for the SV06 experimentation campaign plan.
- Initiate efforts to develop the TTPs required for small infantry units to employ Unmanned Ground Vehicle (UGVs), Unmanned Aerial Vehicle (UAVs), and unattended ground sensors.

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

- Initiate ISR related small unit enhancements against irregular forces, including urban terrain.
- Initiate experimentation with the Small Unit Remote Scouting System (SURSS) as a possible component for inclusion into the Multi-Sensor Surveillance System (MSSS). MSSS is a future system intended to provide wide-area perimeter surveillance.
- Initiate experimentation of enhanced ISR concept demonstrators as part of SV08.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete development and experimentation of ISR technologies in preparation for SV08 planned experiments.
- Complete participation in DARPA's development and upgrade of the Wasp micro UAS and conduct extended operational assessment of Wasp Block II and Block III.
- Complete efforts to develop the TTPs required for small infantry units to employ UGVs, UASs and unattended ground sensors in support of SV08.
- Complete ISR related small unit enhancements against irregular forces, including urban terrain.
- Complete experimentation with the SURSS as a possible component of the MSSS effort.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Initiate development and experimentation with integrated, multi-sensor, air and ground-based ISR concept demonstration systems and employment TTPs at the battalion level in support of SV10.
- Initiate development of concept demonstrators and experimentation with emerging Tier I and Tier II UASs.
- Initiate experimentation with potential spinout technologies from Joint FCS.

	FY 2006	FY 2007	FY 2008	FY 2009
FIRES, TARGETING, AND MANEUVER	5,334	4,704	4,300	4,191

This activity includes MCWL experimentation efforts in the areas of fires, targeting, and maneuverability. 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.

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

FY 2006 Accomplishments:

- Continued Fires Targeting and Maneuver support for the SV06 experimentation campaign.
- Continued evaluation of alternative counter shooter technologies.
- Continued development and testing of Heavy Machine gun Initiative (HMGI), an effort to design advanced mounts for USMC crew served weapons.
- Continued investigations into, in coordination with the Office of Naval Research (ONR), ECASS technology to develop and test advanced tactical vehicle suspensions.
- Completed evaluation of vehicles as surrogates for Internally Transportable Vehicles (ITVs).
- Completed first Dragon Fire II (XM326) concept demonstrator firing tests.
- Completed Remote Operations Video Enhanced Receiver (ROVER) integration with Strike-Link Forward Observer/Forward Air Controller (FO/FAC) digital Close Air Support (CAS) suite.

FY 2007 Plans:

- Continue all efforts of FY 2006, less those noted as completed above.
- Complete ECASS investigations/experimentation.
- Complete development of second XM326 120mm mortar system.
- Complete support for the SV06 experimentation campaign plan.
- Initiate experimentation of enhanced Fires, Targeting and Maneuver concept demonstrators as part of SV08.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete development and assessment of advanced common mount for HMGI.
- Initiate experimentation with fires, targeting, and mobility spinouts from Joint FCS.

FY 2009 Plans:

- Continue all efforts in FY 2008, less those noted as completed above.
- Complete development and experimentation with enhanced infantry weapon munitions in support of OIF.
- Initiate experimentation in support of SV10 with next generation utility and combat vehicles and weapon systems.

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

	FY 2006	FY 2007	FY 2008	FY 2009
COMBAT SERVICE SUPPORT (CSS) AND FORCE PROTECTION	6,710	6,643	6,713	6,134

This activity includes MCWL experimentation efforts involving seabasing, logistics, CSS, urban combat, medical, force protection, as well as training and education. 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 2006 Accomplishments:

- Continued CSS and force protection planning support for the SV06 experimentation campaign.
- Continued to investigate individual equipment to enhance survivability and combat effectiveness.
- Continued to develop and experiment with High Speed Connector (HSC) technologies. HSC is a naval vessel intended to provide connectivity for the seabase and a multimission platform for the Joint littoral component commander.
- Continued to develop and experiment with bio-science (medical) technologies to include Tactical Medical Coordination System to track casualties.
- Completed a Forward Resuscitative Surgery System (FRSS) Study to assess the advantages of employment of the FRSS with a MEU, Combat Trauma Registry, a system that collects data and assesses combat injuries, and Dragon Doc, an advanced corpsman kit.
- Initiated and completed Vehicle Hardening assessments/experimentation efforts.
- Initiated and completed development and experimentation with IED Change Detection system.
- Initiated experimentation of simulation-based training technologies to enhance small unit leader decision-making ability.
- Initiated IED Detector Dog experiment that will merge specialized breeding, urban conditioning, and multi-disciplinary training techniques in support of small unit infantry operations. Effort supports OIF.
- Initiated MCM/Counter IED efforts for mine and IED clearance, detection and neutralization.
- Initiated robotic Road-Side (RS) IED/Vehicle-Borne (VB) IED vehicle capability effort.
- Initiated lightweight body armor materials investigation and human performance evaluation and modeling of extremity body armor systems.
- Initiated development and testing, with ONR of the Light Armored Vehicle (LAV) self-extractor, which extricates itself from minefields.

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

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.
- Complete support for the SV06 experimentation campaign plan.
- Complete development and testing of the LAV Self-extractor.
- Complete development and experimentation with Tactical Medical Coordination System.
- Complete lightweight body armor materials experimentation.
- Initiate experiment to develop training, organization and equipment allowance modifications for logistics units based on the requirement to support DO.
- Initiate development and experimentation with concept demonstrators that enable distribution of material from the seabase to small, widely dispersed, units ashore.
- Initiate development and experimentation of logistics related equipment and employment tactics tailored to the requirements of logistics units supporting DO.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete experimentation to develop equipment allowances, training, organization, and tactics for logistic units supporting DO.
- Complete experimentation with concept demonstrators that enable distribution of material to small, widely dispersed, units ashore.
- Complete development and experimentation with logistics-related equipment tailored to requirements of DO.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Complete RSIED/VBIED vehicle capability effort.
- Initiate development and testing of training simulation systems for MAGTF level logistics and ground combat element personnel and units in support of SV10 experimentation.
- Initiate development of logistics decision support systems in support of counter insurgency operations.
- Initiate development of prototype logistics equipment tailored for counter insurgency operations.

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

	FY 2006	FY 2007	FY 2008	FY 2009
MARINE CORPS WARFIGHTING LABORATORY (MCWL)OPERATIONS (SUPPORT)	5,063	6,125	6,148	5,794

MCWL Operations (Support) efforts include overall MCWL experimentation doctrine, planning, analysis, data collection, as well as technology transition tracking efforts. 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 2006 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.

FY 2007 Plans:

- Continue all efforts of FY 2006.
- Complete support for the SV06 experimentation campaign plan.
- Initiate engineering, technical and data collection support for SV08.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete support for SV 08.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Initiate support for SV10.

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: CMC WARFIGHTING LAB CORE

	FY 2006	FY 2007	FY 2008	FY 2009
WARFIGHTING EXCELLENCE	4,919	4,921	4,695	4,290

This activity includes MCWL experimentation efforts in the areas of wargaming, the Center for Emerging Threats and Opportunities (CETO), and Joint experimentation. 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 2006 Accomplishments:

- Continued support for the SV06 experimentation campaign.
- Continued executive agent responsibilities for Joint Title X programs, such as Unified Quest, Unified Course, and Unified Engagement. Title X war games generally address future capabilities in the context of Title X readiness responsibilities.
- Continued management and oversight of non-Title X Wargaming, including the highly visible Office of the Secretary of Defense Net Assessment Transformation War Game series and the Special Operations Command wargaming series.
- Continued to conduct quarterly Emerald Express seminars that resulted in collection and dissemination of insights and observations from the Operating Forces. Produced reports for the purpose of professional military education and advancing the lessons-learned process.
- Continued to support the CETO mission: 1) prevent operational and tactical surprises to senior Warfighting Commanders by assessing future security environments in light of emerging threats and potential conceptual and technological opportunities; 2) help focus science, technology, and experimental efforts by appraising promising concepts and technologies; 3) serve as a catalyst to stimulate thought and debate on issues of importance to the Marine Corps.
- Initiated Marine Corps funding contribution to the Joint Force Protection Advanced Concept Technology Demonstration (ACTD) to provide warfighters with a simple, timely, and comprehensive understanding of deployment and distribution of information. ACTDs are intended to rapidly field needed joint capabilities by using emergent mature technologies matched with innovative operational concepts.

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PROJECT TITLE: CMC WARFIGHTING LAB CORE

FY 2007 Plans:

- Continue all efforts of FY 2006.
- Complete support for the SV06 experimentation campaign plan.
- Initiate concept development and Modeling and Simulation support for SV08.
- Initiate technology assessment and operational evaluation of DARPA-developed robotic prototypes in support of DO experimentation.
- Initiate investigations/participation into promising ACTDs.

FY 2008 Plans:

- Continue all efforts of FY 2007, less those noted as completed above.
- Complete collaborative advanced technology demonstration with DARPA-developed prototype systems in support of SV08 objectives.
- Complete concept development and M&S support for SV08.

FY 2009 Plans:

- Continue all efforts of FY 2008, less those noted as completed above.
- Initiate participation in approved ACTDs and related Joint programs supporting Marine Corps combat development objectives.
- Initiate collaborative advanced technology demonstration with DARPA-developed prototype systems in support of SV10 objectives.

CONGRESSIONAL PLUS-UP	FY 2006	FY 2007
JOINT IMPROVISED EXPLOSIVE DEVICE (IED) NEUTRALIZER III	0	400

This effort supports for an independent evaluation of the Joint IED Neutralizer (JIN) III system. JIN III is a remote controlled vehicle that's designed to neutralize IEDs. The method in which it does this is classified. There is an urgent need to protect Coalition Forces from harm inflicted by IEDs. Before the system can be used in theater it must be independently evaluated. Successful performance of the system may result in its use by the military which may save Coalition lives. Funds purchase test equipment, test personnel, test site preparation and travel expenses.

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PROJECT TITLE: CMC WARFIGHTING LAB CORE

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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PROGRAM ELEMENT: 0603640M

PROJECT NUMBER: 9999

PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

	FY 2006	FY 2007
ADVANCED DEPLOYABLE WATER PURIFICATION TECHNOLOGY	1,244	0

This effort supported research into a promising desalination technology to integrate into the advanced deployable water purification technology research effort.

	FY 2006	FY 2007
ARMORED PATROL VEHICLE	1,438	0

This effort supported development of new blast armor and vehicle solutions that will allow enhanced survivability without a severe weight penalty for the armored patrol vehicle. Lightweight armor recipes were developed and advanced hull shape concepts were tested.

	FY 2006	FY 2007
C3RP	3,256	3,188

FY 2006 - This effort identified and supported relevant research and expertise at the California Central Coast Research Partnership, 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 creating a valuable national resource.

FY 2007 - This effort supports C3RP research.

	FY 2006	FY 2007
COMMON REMOTELY OPERATED WEAPON SYSTEM (CROWS)	974	0

CROWS utilized a stabilized mount to employ a variety of weapon systems, such as medium or heavy machine guns, the M249 Squad Automatic Weapon or MK-19 automatic grenade launcher, remotely while the Marine remained under armor in a HMMWV rather than in the current turret position which exposed the Marine to IEDs and small arms

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PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: Congressional Plus-Ups

fire. It incorporated day and night vision optics, a laser range finder and automatic ballistic compensation to ensure accuracy. CROWS is capable of firing on the move.

FY 2006 Accomplishments:

- Initiated purchase of one CROWS system for a Limited Technical Assessment (LTA). Assessment investigated application of CROWS with acoustic and infrared gunfire detection and location systems for shoot back response.

	FY 2006	FY 2007
CRAFT INTEGRATED ELECTRONIC SUITE (CIES)	958	1,644

FY 2006 - This effort distributed the data received from the Gunslinger sensors into the Common Operational Picture (COP) surveillance tool as well as integrated the COP into the Gunslinger graphical user interface. Gunslinger is a hostile fire detection and counter fire system that automatically detects, locates, identifies and engages hostile fire sources in constrained, dispersed and urban environments, in near real-time, with high precision.

FY 2007 - This effort continues to support the integration of an electronic control system to enhance the situational awareness of the crew of a small boat (Stilitto) to improve the understanding of ad hoc survivable networks delivering a boat with upgraded electronic control and C4ISR. Technology will transfer to the Sea Lion program of record.

	FY 2006	FY 2007
DUAL STAGE ULTRA RELIABLE WATER FILTRATION TECHNOLOGY DEVELOPMENT	0	996

This effort supports dual stage water filtration technology. The funding will stimulate science to advance water purification technology and potentially reduce cost and energetics to desalinate or purify water.

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PROJECT NUMBER: 9999

PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: Congressional Plus-Ups

	FY 2006	FY 2007
EXPEDITIONARY UNIT WATER PURIFICATION	8,320	3,238

FY 2006 - This effort addressed the following areas: 1) Design specification/fabrication of an Engineering Prototype 300,000 Gallons Per Day (GPD) multi-pass high purity aircraft carrier reverse osmosis desalination plant demonstrator. 2) Design and fabrication of a ruggedized EUWP system that is capable of operation in the field. Advanced demonstrations of large capacity water systems, both ship board and land based, were conducted. These Expeditionary Water Purification Systems may lead to lower cost and more compact desalination systems that will allow Expeditionary Forces to desalinate seawater in high biofouling waters near the shore.

FY 2007 - This effort supports expeditionary unit water purification.

	FY 2006	FY 2007
INDIRECT FIRE MULTI-GRENADE LAUNCHER	0	996

This effort will investigate the feasibility and suitability of a different underbarrel grenade launcher for the M16-series service rifle. This effort will likely focus on technologies for a multi-shot capability and enhanced accuracy and lethality throughout the effective engagement range of the weapon.

	FY 2006	FY 2007
LASER INTEGRATED TARGET ENGAGEMENT SYSTEM (LITES)	3,456	4,832

FY 2006 - The Laser Integrated Target Engagement System (LITES) is a laser-based target location, tracking, identification and designation system with day and night capability that provides improved power efficiency and performance, consolidation of functions and remote operation to improve safety and accuracy, lighten workloads, and open new operational scenarios for forward units. This high power, fiber optic laser technology has greatly improved performance over the legacy technology, providing moving target tracking.

FY 2006 Accomplishments:

- Initiated development of fiber-optic laser-based one man portable system for forward operating units to be used for precision target location/tracking, target identification, and laser designation.

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Exhibit R-2a

DATE: February 2007

BUDGET ACTIVITY: 03

PROGRAM ELEMENT: 0603640M

PROJECT NUMBER: 9999

PROGRAM ELEMENT TITLE: USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)

PROJECT TITLE: Congressional Plus-Ups

- Initiated efforts to provide improved power efficiency and performance, consolidation of functions and remote operation to improve safety/accuracy, lighten workloads, and open new operational scenarios for forward units. Efforts support OIF.

FY 2007 - This effort supports LITES research.

	FY 2006	FY 2007
MAN-PORTABLE QUADRUPOLE RESONANCE LANDMINE DETECTION	2,502	0

This effort focused on advanced development and demonstration of landmine countermeasures technologies, specifically, a landmine detection system using quadrupole resonance technology engineered into a man-portable configuration. The S&T effort has completed and the technology has transitioned to engineering development.

	FY 2006	FY 2007
MARITIME AIR-GROUND TASK FORCE SITUATION AWARENESS	958	996

FY 2006 - This effort distributed the data received from the Gunslinger sensors into the Common Operational Picture (COP) surveillance tool as well as integrated the COP into the Gunslinger graphical user interface. Gunslinger is a hostile fire detection and counter fire system that automatically detects, locates, identifies and engages hostile fire sources in constrained, dispersed and urban environments, in near real-time, with high precision.

FY 2007 - This effort continues the plans to distribute the data received from the Gunslinger sensors into the COP surveillance tool as well as integrated the COP into the Gunslinger graphical user interface.

	FY 2006	FY 2007
MOBILE FIRE SUPPORT SYSTEM - DRAGONFIRE II	2,740	0

The MFSS, now referred to as the XM326, 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 LAV interchangeably, and, in its towed configuration is transportable within the MV-22 Osprey aircraft.

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FY 2006 Accomplishments:

- Initiated engineering testing and application of any required changes to the XM326 MFSS and built a second XM326. Efforts supported OIF.

FY 2006 - Funding/efforts were augmented by MCWL core funding; discussed in Project R2297 under Fires, Targeting, and Maneuver subsection.

	FY 2006	FY 2007
PRECISION APPROACH AND LANDING SYSTEM (PALS)	2,593	0

PALS provided instantaneous groundspeed, height above ground and geo-location information in low/zero visibility conditions to the pilot through an integrated cockpit hover display for safe hover and landing operations in vertical lift aircraft (to include helicopters, tilt-rotors, and UAVs). Current instruments do not provide accurate landing information and loss of visual reference has resulted in numerous accidents in low/zero visibility conditions in Iraq and Afghanistan.

FY 2006 Accomplishments:

- Initiated integration of advancements achieved with the low speed air speed system development. PALS development continued to enhance the altitude and airspeed accuracy, as well as provided weight reduction.
- Initiated testing in a dust chamber and in actual flight configurations at designated testing locations.
- Initiated engineering studies conducted to determine installation requirements on legacy aircraft. Efforts support OIF.

	FY 2006	FY 2007
TELEPRESENT RAPID AIMING PLATFORM (TRAP)	2,937	0

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

FY 2006 Accomplishments:

- Continued to upgrade and refurbish existing TRAP systems and purchased additional ones.
- Continued testing Sensor Laser Aiming Module-Remote (SLAM-R) systems for use with TRAP. SLAM-R is a variant

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of the STORM laser range finder prototype. Conducted a limited technical assessment of the TRAP network controller and SLAM-R.

- Continued to enhance remote weapon system tube launched prototype firing system for incorporation into TRAP. Efforts support OIF.

	FY 2006	FY 2007
ULTRA PROGRAM	0	2,989

The ULTRA Program develops and demonstrates advanced survivability, mobility, and power generation technologies for future recon/scout vehicles. The operational impacts are increased crew survivability, improved mobility & safety and potentially reduced vehicle costs.

	FY 2006	FY 2007
USMC ADVANCED TECH DEMO	0	5,180

This effort will be devoted, almost exclusively, toward IED mitigation and detection, force protection, and counter sniper technologies. Efforts include IED Detector Dogs (off-leash, small unit support), barrier protection (adhesives that minimize blast effects on existing barrier structures), and technologies to detect, protect, and or provide an offensive capability against enemy combatants.

In addition, it will address other critical enablers which include C4ISR capabilities that facilitate operations over widely dispersed areas, sustainment of the distributed force (to the tactical level), casualty treatment and evacuation on the distributed battlefield, and human performance (cognitive and physiological).